Climatological Summary for the Hanford Area

**W. A. Stone
J. M. Thorp
O. P. Gifford
D. J. Hoitink**

June 1983

**Prepared for the U.S. Department of Energy
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**Pacific Northwest Laboratory
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Richland, Washington 99352

SUMMARY

NARRATIVE CLIMATOLOGICAL SUMMARY OF THE HANFORD AREA*

The Hanford Meteorology Station is situated on a plateau in south-central Washington. The plateau slopes downward toward the Columbia River about 10 miles north of the station and upward to the foothills of the Rattlesnake Mountains about 10 miles south. Elevation of the station is 733 feet, which is roughly 300 feet above the Columbia River to the north. Both the Rattlesnake Mountains south and southwest of the station and the Yakima Ridge to the west rise to more than 3500 feet, while the Saddle Mountains beyond the Columbia River to the north rise to more than 2500 feet.

Greatly affecting the climate of the Hanford Area, although not visible from the meteorology station, are the Cascade Mountains beyond Yakima to the west. Since Hanford is in the rain shadow of these mountains, precipitation averages only 6.25 inches annually. The 3 months November through January contribute 44 percent of this total, while the 3 months July through September contribute only 12 percent. On the average there are only 2 occurrences per year of 24-hour amounts of precipitation of 0.50 inch or more, while occurrences of 24-hour amounts of 1.00 inch or more number only 2 in the entire 35 years of record (1946-1980). One of these was the record storm of October 1-2, 1957, in which rainfall totalled 1.08 inches in 3 hours, 1.68 inches in 6 hours, and 1.88 inches in 12 hours. At the other extreme, there have been 81 consecutive days without measurable rain (June 22-September 10, 1967), 139 days with only 0.18 inch (June 22-November 7, 1967), and 172 days with only 0.32 inch (February 24-August 13, 1968). Only 0.15 inch of precipitation was recorded during the months of September through December 1976. Normal for that period of time is 2.50 inches and is 40 percent of the total annual precipitation.

About 38 percent of all precipitation during the months of December through February is in the form of snow. However, in only 1 winter in 4 is an accumulation of as much as 6 inches on the ground expected. The average seasonal number of days with 6 inches or more of snow on the ground is 4, although the 1964-65 winter had 35, 32 of which were consecutive. The record greatest depth of snow on the ground is 24.5 inches, which occurred in February 1916. However, since that date, the greatest depth has been 12.1 inches, occurring in December 1964.

By serving as a source of cold air drainage, the Cascade Mountains also have considerable effect on the wind regime at Hanford. This drainage (gravity) wind, plus topographic channeling, causes a considerable diurnal range of speed during summer. In July, hourly average 50-foot speeds range from a low of 5.2 mph from 9 to 10 a.m. to a high of 13.0 mph from 9 to 10 p.m. In contrast, the corresponding speeds for January are 5.5 and 6.3 mph.

Although the gravity wind occurs with regularity in summer, it is seldom strong unless reinforced by frontal activity. In June, the month of highest average speed, there are fewer instances of hourly averages exceeding 31 mph than in December, the month of lowest average speed. It is also notable that, although channeling results in a prevailing WNW or NW wind the year around, the strongest speeds are from the SSW, SW and WSW.

Atmospheric stagnation is an important factor in Hanford's wind regime. Decembers, for example, have an average of 10 days with peak gusts under 13 mph. By contrast, only once in 5 years does June have even one such day.

Temperatures at Hanford are colder in winter and warmer in summer than would be the case without the Cascades. However, other mountain ranges to the north and east shield the area from many of the arctic surges and half of all winters are free of temperatures as low as 0°F. However, 6 winters in 63 of record have contributed a total of 16 days with temperatures -20° or below and in January-February, 1950, there were 4 consecutive such days. There are 10 days of record when even the maximum temperature failed to get above zero. At the other extreme, in the winter of 1925-1926, the lowest temperature all season was +22°.

Although winter minima have varied from -27° to +22°, summer maxima have varied only from 100° to 115°. However, there is considerable variation in the frequency of such maxima. In 1954, for example, there was only 1 day with a maximum as high as 100°. On the other hand, there have been 3 summers (1938, 1962 and 1967) when the temperature went to 100° or above for 11 consecutive days.

Although temperatures reach 90° or above an average of 55 days a year, minimum temperatures 70° or above occur only an average of 8 days a year. The usual cool nights are a result of the gravity wind mentioned earlier.

Thunderstorms have been observed at the station in every month except November and January and one occurred at Richland (about 25 miles SE) on January 18, 1953. Although severe ones are rare, lightning strikes have occasionally ignited grass fires which burned thousands of acres of the Hanford project land and resulted subsequently in considerable wind erosion. The most notable of these occurrences were in August 1961, July 1963, and July 1970.

On June 16, 1948, a tornado was observed near the east end of Rattlesnake Mountain about 10 miles south of the Hanford Meteorology Station. It was over barren country and no damage resulted. There have been two funnel clouds observed in 36 years (1945-80) of observations. However, the nearest reported tornado damage has been at Yakima, about 45 miles west (April 30, 1957), and at Wallula Junction, about 50 miles southeast (June 26, 1958). Damage from these included moving a double garage off its foundation into a field 20 feet away, and lifting an 800-pound boat across a road.

*Based on records kept at the Hanford Meteorology Station from 1945-1980 and supplemented with precipitation and temperature data taken by U.S. Weather Bureau cooperative observers at a site about 10 miles ENE of the present station location during the period 1912-1944.

AVERAGES AND EXTREMES OF CLIMATIC ELEMENTS AT HANFORD

(BASED ON ALL AVAILABLE RECORDS TO AND INCLUDING THE YEAR 1980)

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	TEMPERATURE (°F)										PRECIPITATION (INCHES)									
	1912-1980 AVERAGES					1912-1980 EXTREMES					1912-1980 TOTALS					1912-1980 AVERAGES				
	DAILY MAXIMUM	DAILY MINIMUM	MONTHLY	HIGHEST MONTHLY	LOWEST MONTHLY	DAILY MAXIMUM	DAILY MINIMUM	RECORD HIGHEST	RECORD LOWEST	RECORD HIGHEST	RECORD LOWEST	RECORD HIGHEST	RECORD LOWEST	RECORD HIGHEST	RECORD LOWEST	MEAN MONTHLY	MEAN ANNUAL	MEAN MONTHLY	MEAN ANNUAL	MEAN MONTHLY
Jan	36.6	21.9	29.3	42.5	19.3	12.1	19.0	72	1971	2	19.0	71	1971	2	19.0	11.0	19.0	11.0	19.0	11.0
Feb	45.4	27.3	36.3	44.5	19.8	21.4	19.2	71	1971	3	19.0	71	1971	3	19.0	11.0	19.0	11.0	19.0	11.0
Mar	56.5	33.7	45.1	49.8	19.8	24.4	19.2	71	1971	4	19.0	71	1971	4	19.0	11.0	19.0	11.0	19.0	11.0
Apr	66.2	40.0	53.1	59.6	19.8	24.4	19.2	71	1971	5	19.0	71	1971	5	19.0	11.0	19.0	11.0	19.0	11.0
May	75.5	47.8	61.7	68.8	19.8	24.4	19.2	71	1971	6	19.0	71	1971	6	19.0	11.0	19.0	11.0	19.0	11.0
June	83.2	55.1	69.3	75.4	19.8	24.4	19.2	71	1971	7	19.0	71	1971	7	19.0	11.0	19.0	11.0	19.0	11.0
July	91.8	61.0	76.4	81.5	19.8	24.4	19.2	71	1971	8	19.0	71	1971	8	19.0	11.0	19.0	11.0	19.0	11.0
Aug	80.3	59.2	74.3	81.5	19.8	24.4	19.2	71	1971	9	19.0	71	1971	9	19.0	11.0	19.0	11.0	19.0	11.0
Sept	79.6	50.8	65.2	71.7	19.8	24.4	19.2	71	1971	10	19.0	71	1971	10	19.0	11.0	19.0	11.0	19.0	11.0
Oct	65.4	40.6	53.0	59.0	19.8	24.4	19.2	71	1971	11	19.0	71	1971	11	19.0	11.0	19.0	11.0	19.0	11.0
Nov	48.4	31.3	39.8	46.0	19.8	24.4	19.2	71	1971	12	19.0	71	1971	12	19.0	11.0	19.0	11.0	19.0	11.0
Dec	39.4	26.0	32.7	38.5	19.8	24.4	19.2	71	1971	1	19.0	71	1971	1	19.0	11.0	19.0	11.0	19.0	11.0
Year	64.8	41.2	51.0	58.1	19.8	24.4	19.2	71	1971	11.5	19.0	71	1971	11.5	19.0	11.0	19.0	11.0	19.0	11.0

EXTREME AVERAGES OR TOTALS
AND YEAR OR SEASON OF OCCURRENCE

1912-1980 TEMPERATURE AVERAGES (°F)

HIGHEST ANNUAL	96.2	(1954)
LOWEST ANNUAL	50.2	(1929)
HIGHEST WINTER (12-1-15)	41.1	(1913-14)
LOWEST WINTER	24.2	(1948-49)
HIGHEST SPRING (16-30)	58.2	(1947)
LOWEST SPRING	38.0	(1951)
HIGHEST SUMMER (1-15)	78.2	(1958)
LOWEST SUMMER	70.2	(1960)
HIGHEST FALL (16-31)	56.6	(1963)
LOWEST FALL	39.9	(1974)

1912-1980 PRECIPITATION TOTALS (IN)

GREATEST ANNUAL	11.35	(1950)
LEAST ANNUAL	2.99	(1976)
GREATEST MONTHLY	4.32	(1915-16)
LEAST MONTHLY	0.3	(1974-75)

1912-1980 WIND SPEED AVERAGE (MPH)

HIGHEST ANNUAL	5.3	(1965-66)
LOWEST ANNUAL	0.3	(1974-75)

1912-1980 RELATIVE HUMIDITY AVERAGE (%)

HIGHEST ANNUAL	55.9	(1974-75)
LOWEST ANNUAL	49.4	(1967)

1912-1980 SKY COVER AVERAGES

(SUNRISE TO SUNSET, SCALE 0-10)		
HIGHEST ANNUAL	8.0	(1974-75)
LEAST ANNUAL	5.1	(1969)

1912-1980 SOLAR RADIATION

AVERAGE DAILY TOTAL (KCAL/CM ²)		
HIGHEST ANNUAL	190	(1973)
LOWEST ANNUAL	125	(1969)

* CALORIES/CM²
† ALSO ON EARLIER YEARS

	WIND (MPH)										RELATIVE HUMIDITY (%)									
	1912-1980 AVERAGES					1912-1980 EXTREMES					1912-1980 AVERAGES					1912-1980 EXTREMES				
	PREVAILING DIRECTION	MEAN MONTHLY	HIGHEST MONTHLY	LOWEST MONTHLY	YEAR	PREVAILING DIRECTION	MEAN MONTHLY	HIGHEST MONTHLY	LOWEST MONTHLY	YEAR	MEAN MONTHLY	HIGHEST MONTHLY	LOWEST MONTHLY	YEAR	MEAN MONTHLY	HIGHEST MONTHLY	LOWEST MONTHLY	YEAR	MEAN MONTHLY	LOWEST MONTHLY
Jan	NW	6.4	10.3	1972	3.1	1955	40	SW	1972	70.4	88.8	1960	60.0	1963	100	1980	11	1963	7.9	9.2
Feb	NW	7.1	10.8	1976	4.6	1963	70	SW	1971	70.7	86.9	1963	54.0	1967	100	1980	14	1962	7.6	9.3
Mar	NW	8.5	10.7	1977	5.9	1955	70	SW	1966	55.9	75.9	1960	46.0	1965	100	1979	12	1965	8.5	9.5
Apr	NW	9.0	11.1	1972	7.4	1954	71	SW	1972	46.9	64.5	1963	36.9	1966	100	1978	9	1964	8.4	9.3
May	NW	8.9	10.5	1965	5.8	1957	71	SW	1948	43.0	61.9	1948	31.2	1966	100	1978	7	1953	5.9	7.7
June	NW	9.2	10.7	1949	7.7	1950	72	SW	1957	19.7	53.5	1950	30.0	1949	100	1977	10	1964	5.3	7.0
July	NW	8.7	9.6	1963	6.8	1955	69	SW	1979	32.2	40.5	1955	21.9	1959	99	1972	6	1951	2.9	4.7
Aug	NW	8.0	9.1	1966	6.0	1956	66	SW	1961	35.6	47.8	1976	24.5	1967	100	1972	7	1951	3.4	5.4
Sept	NW	7.5	9.2	1961	5.4	1957	63	SW	1953	41.6	55.5	1977	33.2	1974	100	1978	10	1962	4.1	6.7
Oct	NW	6.6	9.1	1966	4.4	1952	63	SW	1950	36.8	74.2	1962	42.5	1962	100	1980	10	1952	5.8	8.0
Nov	NW	6.1	8.2	1977	2.9	1964	64	SW	1949	73.6	88.7	1979	62.8	1976	100	1980	10	1976	7.7	9.1
Dec	NW	6.1	8.3	1968	2.9	1963	71	SW	1955	80.0	90.5	1950	69.0	1968	100	1980	26	1972	8.1	9.2
Year	NW	7.7	11.1	1972	2.9	1956	80	SW	1972	54.3	90.5	1950	21.9	1959	100	1980	6	1951	6.0	9.3

AVERAGES AND EXTREMES OF CLIMATIC ELEMENTS AT HANFORD (cont'd)

(BASED ON ALL AVAILABLE RECORDS TO AND INCLUDING THE YEAR 1980)

PAGE 2 OF 2

	NUMBER OF DAYS (1954-1980)										NUMBER OF DAYS (1945-1980) *																				
	CLEAR					PTLY CLDY	CLOUDY					THUNDERSTORMS					HEAVY FOG (V/S. 1/4 MI. OR LESS)					PRECIPITATION 0.10 INCH OR MORE					SNOW 1.0 INCH OR MORE				
	MEAN MONTHLY	GREATEST MONTHLY	YEAR	LEAST MONTHLY	YEAR		MEAN MONTHLY	GREATEST MONTHLY	YEAR	LEAST MONTHLY	YEAR	MEAN MONTHLY	GREATEST MONTHLY	YEAR	LEAST MONTHLY	YEAR	M ONTHLY MEAN	GREATEST MONTHLY	YEAR	LEAST MONTHLY	YEAR	MEAN MONTHLY	GREATEST MONTHLY	YEAR	LEAST MONTHLY	YEAR	MEAN MONTHLY	GREATEST MONTHLY	YEAR	LEAST MONTHLY	YEAR
Jan	3	7	1963	0	1955+	5	22	28	1978	17	1963	0	0	-----	0	-----	6	15	1976	0	1949	3	8	1970	0	1977+	2	10	1950	0	1977+
Feb	4	9	1968+	0	1980+	5	19	26	1980	12	1964	0	1	1972+	0	1980+	3	11	1963	0	1977	2	5	1980+	0	1979+	1	4	1975+	0	1979+
Mar	6	12	1979+	1	1978+	8	17	23	1977	9	1979+	0	1	1969+	0	1980+	1	5	1951	0	1990+	2	8	1987	0	1980+	0	2	1957+	0	1980+
Apr	6	12	1962	1	1963	9	15	21	1979+	6	1956	1	3	1979+	0	1977+	0	1	1975+	0	1980+	1	5	1948	0	1977+	0	0	-----	0	-----
May	8	14	1973	1	1977	11	12	19	1977+	6	1958	2	7	1956	0	1977+	0	1	1958	0	1980+	2	4	1980+	0	1979+	0	0	-----	0	-----
June	10	21	1961	5	1972+	10	10	15	1980+	5	1979+	2	8	1972+	0	1963+	0	1	1971	0	1980+	2	8	1950	0	1979+	0	0	-----	0	-----
July	19	26	1960	13	1976+	7	5	12	1976	0	1967	2	7	1975	0	1973+	0	0	-----	0	1980+	1	3	1974+	0	1980+	0	0	-----	0	-----
Aug	18	30	1955	9	1978	7	6	13	1968	0	1969+	2	8	1953	0	1974+	0	1	1959	0	1980+	1	5	1978	0	1980+	0	0	-----	0	-----
Sept	15	27	1975	6	1978	7	8	16	1977	1	1975	1	4	1959	0	1976+	0	1	1977	0	1980+	1	5	1977+	0	1978+	0	0	-----	0	-----
Oct	10	14	1980+	1	1975	7	14	22	1973	9	1970	0	2	1976	0	1980+	1	7	1980	0	1978+	2	8	1950	0	1978+	0	1	1973	0	1980+
Nov	4	10	1957	1	1973+	5	21	25	1973+	15	1961	0	0	-----	0	-----	6	13	1965	0	1960	3	10	1973	0	1976+	1	6	1955	0	1980+
Dec	3	9	1978	1	1980+	5	23	28	1967	17	1978	0	1	1971	0	1980+	8	17	1950	2	1968	3	9	1964	0	1976+	2	6	1964	0	1976+
Year	106	30	Aug 1955	0	Feb 1980+	86	172	28	Jan 1978+	0	1969+	10	8	1972+	0	-----	25	17	Dec 1950	0	-----	23	10	Nov 1973	0	Aug 1980+	6	10	Jan 1950	0	-----

NUMBER OF DAYS			
CLEAR (0-3 TENTHS SKY COVER, SR TO SS)			
GREATEST ANNUAL (1954-80)	121	1960	
LEAST ANNUAL (1954-80)	80	1977	
CLOUDY (9-10 TENTHS SKY COVER, SR TO SS)			
GREATEST ANNUAL (1954-80)	193	1978	
LEAST ANNUAL (1954-80)	85	1966	
THUNDERSTORMS			
GREATEST ANNUAL (1945-80)	23	1948	
LEAST ANNUAL (1945-80)	3	1949	
HEAVY FOG (V/S. 1/4 MILE OR LESS)			
GREATEST SEASONAL (1945-80)	42	1950-51	
LEAST SEASONAL (1945-80)	9	1948-49	
PRECIPITATION 0.10 INCH OR MORE			
GREATEST ANNUAL (1946-80)	39	1950	
LEAST ANNUAL (1946-80)	10	1965	
SNOW 1.0 INCH OR MORE			
GREATEST SEASONAL (1946-80)	15	1955-56	
LEAST SEASONAL (1946-80)	0	1976-77	
3 IN. OR MORE SNOW ON GROUND			
GREATEST SEASONAL (1946-80)	40	1978-79+	
LEAST SEASONAL (1946-80)	0	1976-77	
PEAK GUST 40 MPH OR GREATER			
GREATEST ANNUAL (1945-80)	41	1961	
LEAST ANNUAL (1945-80)	10	1978	
MAX. TEMPERATURE 90 OR ABOVE			
GREATEST ANNUAL (1912-80)	85	1940+	
LEAST ANNUAL (1912-80)	29	1980	
MAX. TEMPERATURE 100 OR ABOVE			
GREATEST ANNUAL (1912-80)	32	1942	
LEAST ANNUAL (1912-80)	1	1954	
MAX. TEMPERATURE 32 OR BELOW			
GREATEST SEASONAL (1912-80)	53	1955-56	
LEAST SEASONAL (1912-80)	1	1937-38	
MIN. TEMPERATURE 32 OR BELOW			
GREATEST SEASONAL (1912-80)	141	1916-17	
LEAST SEASONAL (1912-80)	75	1957-58	
MIN. TEMPERATURE 0 OR BELOW			
GREATEST SEASONAL (1912-80)	18	1949-50	
LEAST SEASONAL (1912-80)	0	1976-77	

REFERENCE NOTES

* PRECIPITATION OBSERVATIONS NOT
BEGUN UNTIL 1946

LESS THAN 1/2

+ ALSO ON EARLIER YEARS

LOCATION AND HISTORY

PRESENT LOCATION 25 MILES NW OF RICHLAND, WASHINGTON

LATITUDE 46°34'N; LONGITUDE 119°36'W; ELEVATION 733 FEET

OBSERVATIONS FROM 1912 TO 1944 WERE BY UNITED STATES WEATHER
BUREAU COOPERATIVE OBSERVERS AT A SITE ABOUT 10 MILES ENE OF
PRESENT LOCATION. SINCE 1944, OBSERVATIONS HAVE BEEN
MAINTAINED ON A 24 HOUR-A DAY BASIS BY THREE DIFFERENT
DOE CONTRACTORS.

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I. INTRODUCTION

CLIMATOLOGICAL SUMMARY FOR THE HANFORD AREA

I. INTRODUCTION

This document is a summarization of meteorological observations from the Hanford Meteorology Station (HMS),^(a) located near Richland, Washington. The information in this document is based on records kept at the HMS from 1946 to 1980, supplemented with precipitation and temperature data taken by U.S. Weather Bureau cooperative observers at a site about 10 miles east-northeast of HMS during the period 1912 to 1943.

Hanford climatological data are applied in solutions of a wide variety of problems. Frequently, these applications include the following:

1. Safety analysis appraisals for planned operational facilities.
2. Design and construction of new or alteration of existing facilities.
3. Assessment of the diffusion climatology of an arid region.

One purpose of this document is to present climatological information applicable to each of the above. Another purpose is to update the information published in two earlier summary documents: A Climatological Study of the Hanford Area (Jenne and Kerns 1959) and Climatology of the Hanford Area (Stone, Jenne and Thorp 1972).

LOCATION AND DESCRIPTION OF THE HMS

The HMS is on a plateau in south-central Washington (Figures 1a and 1b). The plateau slopes downward toward the Columbia River, which is about 10 miles north of the station and about 300 feet lower in elevation. Elevation of the station is 733 feet MSL at latitude 46°34' N, longitude 119°36' W. The nearest city is Richland, about 25 miles southeast.

(a) The HMS is operated for the U.S. Department of Energy by Battelle Memorial Institute.

FIGURE 1a. The Hanford Reservation in Relation to Surrounding Terrain

In the immediate vicinity of the meteorology station are the Rattlesnake Mountains south and southwest, the Yakima Ridge to the west, and the Saddle Mountains northwest and north. The latter are within 20 miles of the station and rise to more than 2500 feet MSL, while the Yakima Ridge and Rattlesnake Mountains are within 10 miles of the station and rise to more than 3500 feet MSL. The Cascade Mountains beyond Yakima to the west greatly affect the climate of the Hanford Area, but are not visible from the meteorology station.

Vegetation in the Hanford environs, including the mountainous areas, consists mainly of sagebrush, rabbitbrush, bunchgrass, cheat grass, and other semi-arid plants. There are few trees except in isolated cultivated locations.

The HMS consists of a 410-foot steel tower (Figure 2a) with booms spaced at 50-foot intervals and instrumented as shown below.

Instrument	Tower Levels (ft)								
	20	50	100	150	200	250	300	350	400
Temperature Sensor	X	X	X		X	X	X		X
Wind Sensor		X	X		X		X		X

About 75 feet northwest of the tower is a surface installation consisting of temperature, wind and relative humidity sensors (Figure 2b). Near the meteorology building, about 1500 feet west of the tower, are a pyranometer, an acoustic sounder, precipitation gages, and an instrument shelter which houses the maximum and minimum thermometers. These facilities, plus the recorders and other installations inside the meteorology building, are described in detail by Stone (1964).

HISTORY OF THE HMS

The first official climatological observations in the Hanford Area were made by U.S. Weather Bureau^(a) cooperative observers. These

(a) Now the National Weather Service

(a)

(b)

FIGURE 2. (a) The 410-Foot Meteorology Tower (Showing Instrument Booms);
(b) Surface Installation 75 Feet Northwest of the Tower

observations began April 15, 1912, and continued almost without interruption until March 31, 1943. They consisted of daily maximum and minimum temperatures and total precipitation, including measurements of unmelted snow. Although there were minor changes in observer location, all were along the Columbia River about 10 miles east-northeast of the present HMS.

After March 1943, and until December 1944, the only official weather observations in the Hanford area were made by a U.S. Weather Bureau unit near Richland. These observations covered the period from December 1, 1943, to May 18, 1944.

The HMS was constructed as part of the Manhattan Project in 1944. Hourly observations on a continuous basis began on December 7, 1944, and continued through June 1971. From July 1971 through June 1974, the station was not manned for the hours from 1600 through 2300; however, most hourly data for that period of the day were recovered from recorder strip charts. These data include: ambient air temperature, temperature of the dew point, relative humidity, solar radiation, atmospheric pressure, precipitation and wind speed and direction. The HMS resumed 24-hour operation starting July 1974 and continues to operate on that basis.

Original meteorological measurements at HMS were mainly wind and temperature observations from the surface to the top of the 410-foot tower. Before the end of 1946, however, the measurement program was expanded to include all of the standard "surface observations" specified by the Weather Bureau (Circular N). Since 1965, four of these hourly observations per day (0400, 1000, 1600 and 2200 PST) have been phoned to Seattle for national transmission over Teletype Service C.

REPORT CONTENT

This document presents summaries of HMS data in the following categories:

- surface temperatures, degrees Fahrenheit
- subsoil temperatures, degrees Fahrenheit
- precipitation, inches
- tower wind speeds and directions, miles per hour
- tower temperatures, degrees Fahrenheit
- sky cover, visibility and solar radiation
- psychrometric data, degrees Fahrenheit
- atmospheric pressure
- miscellaneous meteorological phenomena (thunderstorm frequency, for example)
- diffusion climatology
- persistence and extreme values of temperatures, winds and precipitation
- meteorological instrumentation.

The data are summarized in graphic and tabular form. The narrative highlights significant features of the climatological information.

The HMS data are reported here in English units. For those interested in SI equivalents, a list of conversions is provided below:

1 centimeter = 0.393701 inch

1 foot = 0.3048 meter

1 inch = 2.54 centimeters

1 kilometer = 0.621371 statute mile

1 meter = 3.28084 feet; 39.37 inches

1 mile (statute) = 1.609344 kilometers

1 millibar = 10^3 dynes cm^{-2} ; 0.0295 inch Hg

1 langley = 1 gram calorie cm^{-2}

Fahrenheit degrees = 1.8 (Celsius degrees) + 32°

Celsius degrees = (Fahrenheit degrees - 32°)/1.8

1 mile per hour = 0.44704 meters s^{-1} ; 0.868391 knot

1 meter per second = 2.23694 miles hr^{-1} ; 1.94254 knots

II. SURFACE TEMPERATURES (°F)

II. SURFACE TEMPERATURES (°F)^(a)

MONTHLY AND ANNUAL MEANS

Mean temperatures, computed from observed daily maximum and minimum 3-foot temperatures for the period 1912 through 1980, are presented in Table 1. The right side of the table shows annual averages and at the bottom of each column, both monthly averages and monthly normals are shown. The monthly averages are for the entire period of record while the normals are based on the 1951 through 1980 record (30 years).

As indicated in Table 1, there is a much greater range and variability in winter temperatures than in summer temperatures. Examples are shown below and in Figure 3.

	<u>Monthly Means During Winter</u>		
	<u>Dec</u>	<u>Jan</u>	<u>Feb</u>
Highest of Record (M_1)	42.0	42.5	44.5
Lowest of Record (M_2)	<u>18.5</u>	<u>12.1</u>	<u>21.4</u>
Range (M_1-M_2)	23.5	30.4	23.1

	<u>Monthly Means During Summer</u>		
	<u>June</u>	<u>July</u>	<u>Aug</u>
Highest of Record (M_3)	75.4	81.8	81.5
Lowest of Record (M_4)	<u>63.0</u>	<u>72.4</u>	<u>69.8</u>
Range (M_3-M_4)	12.4	9.4	11.7

(a) In addition to material presented in the numbered tables in this section, miscellaneous surface temperature statistics listed include:

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TABLE 1. Composite Record of Monthly and Annual Mean Temperatures (°F)
for Hanford Townsite (Near) and HMS: 1912 Through 1980

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	ANNUAL
1912	---	---	---	---	62.6	71.1	74.8	70.5	62.3	49.1	42.6	35.2	---
1913	25.8	28.2	43.2	54.1	61.4	70.6	76.0	73.7	62.2	49.5	43.0	31.2	51.6
1914	37.4	35.5	46.8	53.7	62.9	65.7	75.2	73.8	60.2	53.4	41.0	22.6	52.4
1915	25.2	38.2	48.2	55.4	60.2	67.2	72.8	77.5	62.4	54.0	37.8	32.4	52.6
1916	16.4 ^(a)	32.4 ^(a)	46.9	53.0	56.8	---	---	73.6	63.8	50.8	35.5	25.4	---
1917	28.4	34.6	43.2	50.5	60.0	66.0	77.4	75.7	66.2	54.3	42.9	41.0	53.4
1918	34.8	36.0	45.3	53.8	58.8	73.4	76.9	72.1	68.5	56.2	40.6	35.6	54.3
1919	31.1	37.1	45.5	54.5	60.8	66.9	76.6	74.4	64.0	49.4	38.8	18.5	51.5
1920	26.8 ^(a)	35.2	46.4	51.5	58.9	67.6	78.6	74.0	63.2	51.8	40.6	37.2	52.6
1921	35.3	38.1	47.6	51.5	63.6	72.5	75.3	75.4	59.8	54.8	40.4	31.4	53.8
1922	19.1	30.7	44.4	52.2	61.3	75.4	78.5	75.3	66.4	54.7	38.4	23.0	51.6
1923	37.0	28.8	46.0	54.8	62.2	67.8	76.6	77.5	68.4	53.7	42.8	33.2	54.1
1924	25.0	43.7	46.9	54.3	68.3	71.2	75.2	73.5	65.5	54.6	39.4	23.8	53.4
1925	34.8	44.4	47.3	56.4	63.8	71.0	79.2	72.8	63.4	50.6	37.6	38.0	54.9
1926	33.9	43.7	49.8	58.9	61.8	72.6	78.7	72.6	58.8	53.6	42.8	27.8	54.6
1927	28.3	40.8	44.6	52.4	58.6	70.0	75.6	72.9	61.5	52.3	44.0	26.2	52.3
1928	28.4	36.2	47.8	51.4	65.6	68.9	77.6	72.0	63.9	52.5	40.8	32.2	53.1
1929	20.0	21.4	46.8	51.8	61.8	67.4	74.6 ^(a)	74.4	62.2	54.2	32.9	34.6	50.2
1930	12.2	39.7	48.6	57.8	61.5	67.8	77.6	75.6	65.2	48.8	38.6	31.3	52.1
1931	35.3	38.2	46.2	54.4	67.0	69.0	78.4	75.4	65.1	52.1	37.4	27.8	53.9
1932	26.4	34.0	46.4	56.0	61.2	72.3	73.0	74.0	65.3	53.4	43.8	30.4	53.0
1933	35.8	26.6 ^(a)	42.6 ^(a)	51.6	56.6	68.4	74.4	73.2	60.4	54.1 ^(a)	41.6	42.0	52.3
1934	39.6	41.8	49.6	59.6	64.4	70.7	74.2	73.6	62.0	55.6	46.0	37.5	56.2
1935	33.1	37.0	43.0	49.5	60.5	67.2	73.4	70.7	66.9	50.7 ^(a)	35.3	32.4	51.6
1936	35.4 ^(a)	21.5	43.8	57.3	66.2	70.3	75.2	73.8	63.0	54.2	31.8	35.6	52.4
1937	13.0	30.5	46.7	51.4	61.5	68.4	77.3	70.7	65.4	56.2	44.9	37.8	52.0
1938	36.7	34.0	45.0	53.0	61.1	71.2	79.0	72.0	70.0	54.0	37.4	33.8	53.9
1939	36.6	34.4	45.9	54.6	63.4	67.2	77.3	75.5	66.7	53.4	39.9	39.0	54.5
1940	32.0	39.6	49.0	54.4	64.6	72.8	76.6	74.0	69.5	57.3	35.6	33.8	54.9
1941	33.4	38.1	47.6	55.4	60.8 ^(a)	68.5 ^(a)	80.0	73.4	61.0	52.2	43.8	36.7	54.2
1942	25.4	37.8	43.2	54.5	60.2	66.8	76.0	76.8	66.8	54.4	38.2	32.0	52.7
1943	22.7	36.2	42.9	---	---	---	---	---	---	---	---	32.8	---
1944	29.4	36.2	41.5	52.9	61.8 ^(a)	---	---	---	---	---	---	---	---
1945	33.9	38.6	42.1	50.3	61.7	67.5	78.0	77.5	64.6	56.4	40.6	32.7	53.6
1946	34.4	39.6	45.5	53.7	64.2	66.9	76.1	76.6	63.5	49.5	35.8	34.8	53.4
1947	27.3	39.9	49.6	56.2	68.8	67.8	75.4	71.8	65.5	53.3	41.2	33.1	54.2
1948	32.0	31.8	42.1	49.3	58.4	72.5	72.8	71.9	64.4	50.9	40.8	26.8	51.1
1949	14.0	31.9	45.1	55.5	67.0	69.4	75.0	74.9	68.1	50.3	45.3	35.1	52.6
1950	12.1	30.7	42.3	49.9	59.0	66.5	75.4	76.4	67.5	51.1	40.7	36.2	50.6
1951	33.0	36.9	40.1	54.1	61.1	69.4	76.7	74.2	66.8	51.5	39.5	27.4	52.6
1952	25.2	36.7	44.1	55.2	62.7	67.1	77.0	74.0	69.0	59.0	34.0	34.8	53.2
1953	42.5	41.2	46.2	51.0	58.0	63.0	75.8	74.0	67.8	55.4	43.4	37.6	54.7
1954	28.9	39.3	41.5	51.4	62.9	65.5	73.9	71.4	65.1	51.4	46.0	34.0	52.6
1955	30.0	35.3	39.4	47.5	57.0	70.2	73.0	75.5	66.4	53.3	31.3	29.4	50.7
1956	31.8	25.6	43.8	56.2	65.3	65.7	78.9	75.3	67.3	52.1	36.6	34.6	52.8
1957	16.5	34.1	44.0	55.2	65.9	70.8	74.3	72.9	69.0	50.7	40.4	38.5	52.7
1958	37.1	44.5	43.5	51.3	68.1	73.9	81.2	79.4	65.6	54.4	40.6	35.2	56.2
1959	32.0	35.5	45.1	54.2	57.5	68.6	77.7	71.8	62.6	53.4	36.4	33.1	52.3
1960	23.3	37.4	45.1	52.6	58.5	70.1	81.8	71.4	67.7	54.5	41.2	29.0	52.7
1961	35.0	43.7	46.1	52.3	60.0	74.0	79.4	80.2	63.8	51.6	35.3	33.7	54.6
1962	29.8	36.6	42.6	55.6	56.9	68.3	76.0	71.9	67.1	52.6	43.2	36.8	53.1
1963	25.4	38.3	46.4	49.8	61.7	69.4	72.4	75.7	71.1	56.0	42.8	30.2	53.3
1964	35.6	38.1	43.8	50.2	59.7	67.7	74.5	69.8	63.0	53.3	38.2	25.4	51.6
1965	32.3	40.5	42.9	54.8	60.5	69.3	76.5	74.7	62.4	57.1	43.1	33.0	53.9
1966	34.0	39.9	45.4	54.6	63.2	66.9	73.3	75.6	68.8	53.4	43.7	38.2	54.8
1967	39.8	43.7	44.3	47.6	60.5	72.5	78.6	81.5	71.7	55.1	41.5	33.1	55.8
1968	35.7	41.8	49.0	51.3	62.4	69.8	79.7	71.5	66.8	50.3	41.7	30.6	54.2
1969	19.8	31.7	45.8	52.2	64.6	75.1	76.0	72.8	67.4	51.0	40.2	34.6	52.6
1970	30.7	40.6	45.0	49.0	61.5	73.6	78.6	76.3	61.8	50.9	39.7	30.8	53.2
1971	35.8	39.1	40.7	52.0	64.0	65.3	78.7	80.5	61.5	51.7	40.4	30.6	53.4
1972	30.5	34.8	47.0	49.6	64.3	69.7	76.2	77.6	61.4	52.3	39.9	27.3	52.6
1973	29.1	38.5	47.4	53.6	63.1	68.7	78.2	73.9	65.7	52.4	38.4	38.1	53.9
1974	29.4	40.9	45.2	52.9	57.9	72.6	74.5	75.5	68.0	52.5	41.6	36.2	53.9
1975	32.5	33.7	42.5	48.2	60.2	67.2	79.5	71.0	68.0	52.5	39.5	34.5	52.4
1976	32.0	37.6	41.4	50.8	60.5	65.6	75.1	70.8	69.0	52.4	40.6	30.7	52.2
1977	25.2	40.5	45.4	57.3	56.9	72.6	73.7	79.2	61.5	51.9	38.9	33.8	53.1
1978	32.5	37.9	47.4	51.9	58.6	70.3	75.7	72.7	63.8	52.4	32.3	27.5	51.9
1979	14.0	34.2	46.5	52.8	64.1	70.8	77.2	74.6	69.2	56.5	34.2	36.4	52.5
1980	23.7	34.6	44.4	55.2	61.4	64.7	74.7	71.2	66.0	52.6	41.0	36.6	52.2
AVG	29.3	36.3	45.1	53.1	61.5	69.3	76.4	74.3	65.2	53.0	39.8	32.7	53.0
*NORMAL	30.1	37.8	44.4	52.3	61.3	69.3	76.6	74.6	66.2	53.1	39.5	33.1	53.2

(a)

AVERAGE ADJUSTED FOR ONE OR MORE DAYS OF MISSING DATA

* NORMALS ARE AVERAGES FOR THE PERIOD 1951-1980

--- THE HIGHEST AND LOWEST AVERAGES IN EACH COLUMN ARE UNDERScoreD

(σ = STANDARD DEVIATION)

FIGURE 3. Frequency Distribution of Monthly Mean Temperatures January and July, 1912 Through 1980

Table 1 also shows that negative departures from the average are greater than positive departures during winter months, but in the summer months the departures are more nearly equal. During July and August positive departures are higher than the negative departures as indicated below and in Figure 3.

<u>Winter Months</u>	<u>Average (Table 1)</u>	<u>Greatest Departure From Average</u>	
		<u>Negative</u>	<u>Positive</u>
Dec	32.7	14.2 (1919)	9.3 (1933)
Jan	29.3	17.2 (1950)	13.2 (1953)
Feb	36.3	14.9 (1929)	8.2 (1958)

<u>Summer Months</u>	<u>Average (Table 1)</u>	<u>Greatest Departure From Average</u>	
		<u>Negative</u>	<u>Positive</u>
June	69.3	6.3 (1953)	6.1 (1922)
July	76.4	4.0 (1963)	5.4 (1960)
Aug	74.3	4.5 (1964)	7.2 (1967)

FREQUENCY DISTRIBUTION OF DAILY MAXIMUM AND MINIMUM TEMPERATURES: JANUARY AND JULY

The frequency distributions of daily maximum and minimum temperatures for the coldest and warmest months are shown in Figure 4, for the period 1951 through 1980 (30 years).

DAYS WITH MAXIMUM TEMPERATURES 100°F OR ABOVE, 90°F OR ABOVE, AND 32°F OR BELOW

The number of days with maximum temperatures in the above categories for the period 1912 through 1980 are summarized by month in Table 2.

Maximum temperatures $\geq 100^{\circ}\text{F}$ have occurred as early as May 5 (1966) and as late as September 9 (1940). The annual number of days with maximum temperatures $\geq 100^{\circ}\text{F}$ has varied from 1 (1954) to 32 (1942). The greatest number of consecutive days with maximum temperatures $\geq 100^{\circ}\text{F}$ is 11 and has occurred three times (July 13-23, 1938; July 22-August 1, 1962; and August 10-20, 1967).

FIGURE 4. Frequency Distribution of Daily Maximum and Minimum Temperatures January and July, 1951 Through 1980

TABLE 2. Composite Record of Monthly and Seasonal Number of Days With Maximum Temperature (°F) in Relation to Certain Thresholds for Hanford Townsite (Near) and HMS: 1912 Through 1980

100 OR ABOVE							90 OR ABOVE							32 OR BELOW								
SEASON	MAY	JUNE	JULY	AUG	SEPT	TOTAL	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	TOTAL	SEASON	OCT	NOV	DEC	JAN	FEB	MAR	TOTAL
1912	0	6	8	4	0	18	0	4	14	20	14	2	0	54	1912-13	0	0	1	16	13	0	30
1913	0	3	13	7	0	23	0	0	14	22	20	3	0	65	1913-14	0	0	10	0	3	0	13
1914	0	1	10	7	0	18	0	4	9	25	23	2	0	64	1914-15	0	0	19	15	0	0	34
1915	0	0	6	9	0	15	0	1	3	15	29	4	0	57								
1916	0	--	--	7	0	(7)	0	0	--	--	17	1	0	(18)	1915-16	0	0	5	22	6	0	33
1917	0	1	3	2	0	11	0	0	6	24	26	5	0	61	1916-17	0	5	14	10	1	0	30
1918	0	2	6	0	0	8	0	2	19	18	13	7	0	59	1917-18	0	0	1	3	2	0	6
1919	0	0	6	1	0	7	0	1	0	23	20	3	0	53	1918-19	0	0	7	11	0	0	18
1920	0	1	11	5	0	17	0	0	5	26	20	1	0	52	1919-20	0	2	18	17	0	0	37
1921	0	1	7	5	0	13	0	3	13	21	13	0	0	55	1920-21	0	0	1	2	0	0	3
1922	0	4	8	3	0	15	0	3	20	23	18	3	0	67	1921-22	0	3	11	22	5	0	41
1923	0	3	8	6	0	17	0	1	6	23	22	12	0	64	1922-23	0	1	17	2	8	0	28
1924	0	1	8	2	0	11	0	11	7	20	13	11	0	62	1923-24	0	0	4	12	0	0	16
1925	0	5	8	1	0	14	0	0	13	27	9	1	0	60	1924-25	0	2	17	2	0	0	21
1926	0	3	6	0	0	9	4	1	13	26	1	0	0	55	1925-26	0	3	0	3	0	0	6
1927	0	0	4	0	0	4	0	0	4	19	18	0	0	41	1926-27	0	0	14	12	0	0	26
1928	1	1	9	0	0	11	0	6	4	21	14	5	0	50	1927-28	0	0	14	12	0	0	26
1929	0	0	2	3	0	5	0	5	3	17	20	5	0	50	1928-29	0	0	9	26	16	0	51
1930	0	0	9	7	0	16	0	1	5	22	20	3	0	51	1929-30	0	0	5	26	0	0	31
1931	1	3	10	6	0	20	0	9	5	22	22	4	0	52	1930-31	0	0	9	0	0	0	9
1932	0	5	3	7	0	15	0	1	16	16	17	5	0	55	1931-32	0	5	12	16	5	0	38
1933	0	2	6	9	0	17	0	1	8	21	18	1	1	50	1932-33	0	0	12	4	12	0	28
1934	1	1	6	4	0	12	4	8	9	18	23	4	0	66	1933-34	0	0	3	0	0	0	3
1935	0	0	5	0	1	6	0	1	4	17	15	9	0	46	1934-35	0	0	0	6	0	0	6
1936	1	1	7	3	0	12	1	8	12	19	20	5	0	65	1935-36	2	0	11	4	19	0	36
1937	0	2	8	3	0	13	0	2	8	25	15	10	0	60	1936-37	0	4	5	29	7	0	45
1938	0	1	16	3	2	22	0	6	16	26	21	16	0	85	1937-38	0	0	1	0	0	0	1
1939	0	2	14	9	0	25	1	3	6	21	25	9	0	65	1938-39	0	0	3	0	3	0	6
1940	0	6	9	7	1	23	0	9	20	25	24	7	0	85	1939-40	0	0	0	4	1	0	5
1941	0	1	12	6	0	19	0	--	8	29	18	0	0	(55)	1940-41	0	0	3	3	0	0	6
1942	0	2	13	16	1	32	0	1	3	26	23	10	0	63	1941-42	0	0	1	16	0	0	17
1943	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1942-43	0	0	5	20	1	0	26
1944	0	--	--	--	--	--	0	--	--	--	--	--	--	--	1943-44	0	--	10	7	0	0	(17)
1945	0	0	8	4	0	12	0	1	7	22	21	5	0	56	1944-45	--	--	--	12	1	1	(14)
1946	0	0	7	6	0	13	1	0	4	15	13	0	0	38	1945-46	0	2	9	0	0	0	11
1947	1	0	2	0	0	3	0	8	4	17	11	2	0	42	1946-47	0	4	4	14	0	0	22
1948	0	2	0	0	0	2	0	1	9	14	7	7	0	38	1947-48	0	0	6	8	9	0	23
1949	0	1	6	2	1	10	0	8	8	15	13	8	0	57	1948-49	0	0	13	28	8	0	49
1950	0	0	2	3	2	7	0	1	5	20	22	8	0	56	1949-50	0	0	5	24	5	1	35
1951	0	0	8	3	0	11	0	1	8	23	19	5	0	56	1950-51	0	0	2	8	2	0	12
1952	0	0	9	3	0	12	0	2	5	21	17	12	0	57	1951-52	0	0	16	19	0	0	35
1953	0	0	4	4	0	8	0	0	0	21	13	11	0	45	1952-53	0	9	6	1	0	0	16
1954	0	0	1	0	0	1	0	2	3	20	9	3	0	37	1953-54	0	0	2	12	4	0	18
1955	0	2	5	2	2	11	0	0	9	12	19	8	0	48	1954-55	0	0	5	13	2	1	21
1956	0	0	10	5	0	15	0	7	2	22	16	7	0	54	1955-56	0	15	16	7	15	0	53
1957	0	1	1	0	0	2	0	3	8	14	8	6	0	39	1956-57	0	7	10	22	7	0	46
1958	0	6	10	11	0	28	0	8	11	28	25	5	0	77	1957-58	0	0	2	2	0	0	4
1959	0	0	8	1	0	9	0	1	7	21	12	3	0	44	1958-59	0	3	4	8	2	0	18
1960	0	0	16	5	0	21	0	1	12	28	12	5	0	58	1959-60	0	5	7	23	1	2	38
1961	0	7	8	10	0	25	0	1	15	26	24	1	0	67	1960-61	0	0	14	10	0	0	24
1962	0	10	1	0	0	11	0	0	11	17	10	8	0	46	1961-62	0	0	7	12	2	0	21
1963	0	3	0	2	0	5	0	4	7	8	18	11	0	48	1962-63	0	0	3	14	3	0	20
1964	0	0	6	0	0	6	0	0	5	14	10	2	0	41	1963-64	0	1	11	3	0	0	15
1965	0	0	6	5	0	11	0	0	7	20	12	1	0	40	1964-65	0	0	14	5	0	0	19
1966	1	0	2	3	0	6	0	5	2	15	21	7	0	50	1965-66	0	1	8	3	0	0	12
1967	0	2	6	15	0	23	0	2	13	25	27	12	0	79	1966-67	0	0	2	0	0	0	2
1968	0	0	10	3	0	13	1	1	5	22	12	4	0	45	1967-68	0	0	10	4	0	0	14
1969	0	3	3	2	0	8	0	6	17	20	15	7	0	65	1968-69	0	0	7	20	4	0	31
1970	0	9	11	5	0	25	0	2	15	22	19	0	0	58	1969-70	0	3	9	15	0	0	27
1971	0	0	16	11	0	27	0	2	2	20	26	2	0	52	1970-71	0	2	11	9	1	0	23
1972	0	0	5	10	0	15	0	5	8	21	19	5	0	58	1971-72	1	0	10	9	7	0	27
1973	0	2	10	5	0	17	0	6	7	21	18	4	0	56	1972-73	0	0	14	10	0	0	24
1974	0	5	5	3	0	14	0	0	18	15	18	6	0	58	1973-74	0	4	1	12	0	0	17
1975	0	0	9	0	0	9	0	2	4	22	12	8	0	48	1974-75	0	0	0	6	6	0	12
1976	0	1	2	0	0	3	0	1	4	17	9	4	0	35	1975-76	0	3	5	7	0	0	15
1977	0	1	2	13	0	16	1	0	13	16	22	6	0	52	1976-77	0	0	12	26	3	0	35
1978	0	1	6	7	0	13	0	0	12	17	11	2	0	42	1977-78	0	5	9	6	2	0	22
1979	0	2	7	1	0	10	0	1	13	23	20	7	0	64	1978-79	0	7	11	30	4	0	52
1980	0	0	2	0	0	3	0	0	0	18	9	2	0	29	1979-80	0	7	3	16	6	0	32
AVG	*	2	7	4	*	13	*	3	9	20	18	5	*	55	AVG	*	2	8	11	3	*	24

GREATEST AND LEAST SEASONAL TOTALS ARE UNDERScoreD
 () INDICATES AN INCOMPLETE SEASONAL TOTAL
 * DENOTES AN AVERAGE OF LESS THAN ONE HALF DAY

One notable period of above-normal temperatures occurred July 15-August 13, 1971. During this 30-day period there were 27 days with maximum temperatures $\geq 100^{\circ}\text{F}$ in three separate periods with 9 consecutive days $\geq 100^{\circ}\text{F}$. The lowest maximum temperature for the 30 day period was 98°F and the highest was 112°F . The average maximum temperature was 104.7°F .

Maximum temperatures $\geq 90^{\circ}\text{F}$ occur an average of 55 times a year but vary from a low of 29 (1980) to a high of 85 (1938 and 1940). The earliest occurrences have varied from April 17 (1936) to July 2 (1953), with an average annual date of May 23 (see Table 3). The latest annual occurrence of maximum temperatures $\geq 90^{\circ}\text{F}$ has varied from August 22 (1977) to October 6 (1933). The median date for the period 1912 through 1980 is September 13. The greatest number of consecutive days with maximum temperatures $\geq 90^{\circ}\text{F}$ is 37 (July 19 through August 24, 1942).

The average seasonal number of days with maximum temperature of $\leq 32^{\circ}\text{F}$ is 24, with 2 occurring in November and the other 22 during the months of December through February. The earliest seasonal occurrence of a day with a maximum temperature $\leq 32^{\circ}\text{F}$ has been October 30 (1935) and the latest March 11 (1950). The number of winter days with maximum temperatures $\leq 32^{\circ}\text{F}$ has ranged from 1 (winter of 1937-1938) to 53 (winter of 1955-1956). The greatest number of consecutive days with maximum temperatures $\leq 32^{\circ}\text{F}$ is 29 (January 5 through February 2, 1937). During the period December 27, 1978, through February 4, 1979 (40 days), there was only 1 maximum temperature $\geq 32^{\circ}\text{F}$. The average maximum temperature for that period was 21°F .

There have been 10 days of record when the daily maximum temperature was $\leq 0^{\circ}\text{F}$. These days are tabulated below.

<u>Date</u>	<u>Max Temp</u>	<u>Date</u>	<u>Max Temp</u>
1. Dec 12, 1919	0	6. Feb 1, 1950	-3
2. Dec 13, 1919	-3	7. Feb 2, 1950	0
3. Dec 14, 1919	-3	8. Jan 27, 1957	0
4. Feb 9, 1929	-1	9. Dec 29, 1968	-2
5. Jan 31, 1950	-2	10. Dec 30, 1968	-2

TABLE 3. Composite Record of Annual First and Last Dates With Extreme Temperature (°F) in Relation to Certain Thresholds for Hanford Townsite (Near) and HMS 1912 Through 1980

YEAR	MAXIMUM 90 OR ABOVE		MINIMUM 32 OR BELOW		NO. DAYS FREE OF FREEZING
	FIRST IN SPRING	LAST IN SUMMER	LAST IN SPRING	FIRST IN FALL	
1912	MAY 8	SEPT 13	APRIL 26	OCT 7	163
1913	MAY 7	SEPT 17	MAY 2	OCT 5	155
1914	MAY 13	SEPT 2	MAY 5	OCT 22	169
1915	MAY 7	SEPT 18	APRIL 24	OCT 6	164
1916	-----	SEPT 1	MAY 14	OCT 1	139
1917	JUNE 8	SEPT 20	APRIL 22	OCT 17	177
1918	MAY 3	SEPT 18	APRIL 17	OCT 24	189
1919	MAY 21	SEPT 16	APRIL 20	OCT 8	170
1920	JUNE 3	SEPT 3	APRIL 30	OCT 19	171
1921	MAY 24	AUG 30	APRIL 29	<u>SEPT 11</u>	134
1922	MAY 13	SEPT 12	MAY 8	OCT 27	171
1923	MAY 8	SEPT 14	APRIL 7	OCT 24	199
1924	MAY 9	SEPT 14	APRIL 25	NOV 5	193
1925	JUNE 17	SEPT 3	MARCH 28	OCT 13	198
1926	APRIL 26	AUG 25	APRIL 3	SEPT 23	173
1927	JUNE 5	AUG 23	APRIL 20	OCT 29	191
1928	MAY 19	SEPT 5	MAY 2	OCT 12	162
1929	MAY 19	SEPT 16	APRIL 24	OCT 23	181
1930	MAY 27	SEPT 17	MAY 6	OCT 10	156
1931	MAY 11	SEPT 4	APRIL 27	OCT 7	162
1932	MAY 17	SEPT 14	APRIL 19	OCT 23	186
1933	MAY 29	OCT 6	MAY 5	SEPT 23	140
1934	APRIL 19	SEPT 6	APRIL 3	OCT 15	194
1935	MAY 21	SEPT 10	APRIL 30	OCT 9	161
1936	<u>APRIL 17</u>	SEPT 24	APRIL 4	SEPT 14	162
1937	MAY 2	SEPT 18	APRIL 28	NOV 3	188
1938	MAY 23	SEPT 23	MAY 7	OCT 17	162
1939	APRIL 28	SEPT 22	APRIL 20	OCT 6	168
1940	MAY 9	SEPT 11	APRIL 23	OCT 27	186
1941	MAY 23	AUG 23	APRIL 20	SEPT 20	152
1942	MAY 21	SEPT 27	MAY 2	OCT 12	162
1943	-----	-----	-----	-----	---
1944	MAY 5	-----	MAY 3	-----	---
1945	MAY 30	SEPT 14	APRIL 10	OCT 18	190
1946	APRIL 25	AUG 24	APRIL 7	OCT 11	186
1947	MAY 6	SEPT 12	APRIL 7	NOV 4	208
1948	MAY 26	SEPT 13	MAY 2	OCT 17	167
1949	MAY 8	SEPT 27	MAY 3	OCT 8	157
1950	MAY 26	SEPT 23	APRIL 27	NOV 8	194
1951	MAY 22	SEPT 19	APRIL 21	OCT 15	176
1952	MAY 24	SEPT 26	APRIL 29	NOV 1	185
1953	<u>JULY 2</u>	SEPT 15	APRIL 15	OCT 24	191
1954	MAY 17	SEPT 10	MAY 1	OCT 1	152
1955	JUNE 6	SEPT 10	MAY 14	OCT 31	169
1956	MAY 16	SEPT 19	APRIL 6	OCT 22	198
1957	MAY 29	SEPT 15	MARCH 26	OCT 22	210
1958	MAY 18	SEPT 10	<u>MARCH 19</u>	OCT 21	215
1959	MAY 13	SEPT 13	MAY 5	OCT 30	177
1960	MAY 10	SEPT 18	APRIL 21	OCT 11	172
1961	MAY 25	SEPT 4	APRIL 19	OCT 20	183
1962	JUNE 8	SEPT 26	MAY 4	NOV 12	191
1963	MAY 20	SEPT 29	APRIL 16	OCT 25	191
1964	JUNE 23	SEPT 24	APRIL 19	OCT 16	179
1965	MAY 28	SEPT 1	MAY 5	OCT 16	163
1966	MAY 3	SEPT 22	APRIL 19	OCT 14	177
1967	MAY 20	SEPT 28	APRIL 27	OCT 26	181
1968	APRIL 29	SEPT 9	APRIL 22	OCT 21	181
1969	MAY 9	SEPT 12	APRIL 26	OCT 13	169
1970	MAY 16	AUG 31	MAY 11	OCT 7	148
1971	MAY 11	SEPT 10	APRIL 22	OCT 16	176
1972	MAY 13	SEPT 16	APRIL 30	SEPT 25	147
1973	MAY 13	SEPT 11	APRIL 8	OCT 4	178
1974	JUNE 10	SEPT 25	MAY 16	OCT 6	<u>142</u>
1975	MAY 30	SEPT 15	APRIL 29	OCT 23	176
1976	MAY 16	SEPT 29	APRIL 23	OCT 19	178
1977	APRIL 24	AUG 22	APRIL 14	OCT 27	195
1978	JUNE 2	SEPT 3	APRIL 23	OCT 7	166
1979	MAY 22	SEPT 20	APRIL 19	OCT 31	194
1980	JULY 1	SEPT 6	APRIL 11	OCT 22	193
AVG	MAY 23	SEPT 13	APRIL 23	OCT 15	174

THE EXTREMES IN EACH COLUMN ARE UNDERSCORED

DAYS WITH MINIMUM TEMPERATURES 32°F OR BELOW AND 0°F OR BELOW

The number of days on which the minimum temperature was $\leq 32^{\circ}\text{F}$ or was $\leq 0^{\circ}\text{F}$ is tabulated by months for the entire period of record in Table 4.

The seasonal average number of days with minimum temperatures $\leq 32^{\circ}\text{F}$ is 115. It has varied from 75 (winter of 1957-1958) to 141 (winter of 1916-1917).

The first autumn freezing temperature ($\leq 32^{\circ}\text{F}$) has occurred as early as September 11 (1921) and as late as November 12 (1962). The median date is October 15 (Table 3). The last date in spring for minimum temperatures $\leq 32^{\circ}\text{F}$ has varied from March 19 (1958) to May 16 (1974), with an average date of April 23. The probability (p), based on Table 3, of one or more days with minimum temperatures $\leq 32^{\circ}\text{F}$ after the specified spring dates, or before the specified fall dates, is shown in Table 4a.

TABLE 4a. Percent Probability of Minimum Temperature of $\leq 32^{\circ}\text{F}$

<u>p (%)</u>	<u>After</u>	<u>p (%)</u>	<u>Before</u>
95	March 30	5	Sept 24
90	April 6	10	Oct 2
75	April 17	25	Oct 7
50	April 23	50	Oct 17
25	May 1	75	Oct 23
10	May 5	90	Oct 30
5	May 12	95	Nov 4

There is an average of 4 days per winter season when the daily minimum temperature is $\leq 0^{\circ}\text{F}$ (Table 4). However, nearly half of all winters are free of such days. There were 18 days in January-February 1950, and 13 days for the same months in 1957, with daily minimum temperatures $\leq 0^{\circ}\text{F}$. During these periods there were 4 (1950) and 2 (1957) consecutive days with minimum temperatures $\leq -20^{\circ}\text{F}$.

TABLE 4. Composite Record of Monthly and Seasonal Number of Days With Minimum Temperature (°F) in Relation to Certain Thresholds for Hanford Townsite (Near) and HMS: 1912 Through 1980

SEASON	32 OR BELOW										0 OR BELOW				
	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTAL	NOV	DEC	JAN	FEB	TOTAL
1912-13	0	9	15	27	30	26	21	8	2	138	0	0	2	4	6
1913-14	0	10	12	31	23	22	19	9	1	127	0	0	0	0	0
1914-15	0	3	19	30	31	22	17	6	0	128	0	2	2	0	4
1915-16	0	7	24	26	28	22	11	6	3	127	0	0	11	0	11
1916-17	0	12	21	30	29	24	22	3	0	141	0	1	0	0	1
1917-18	0	9	14	19	27	22	15	4	0	110	0	0	0	0	0
1918-19	0	3	19	23	25	22	11	7	0	110	0	0	0	0	0
1919-20	0	9	22	29	28	26	13	4	0	131	0	14	0	0	14
1920-21	0	2	18	23	28	15	13	6	0	105	0	0	0	0	0
1921-22	3	4	20	23	31	26	17	3	1	128	0	0	6	0	6
1922-23	0	4	13	26	23	25	16	1	0	108	0	7	0	0	7
1923-24	0	6	19	28	29	15	16	6	0	119	0	1	3	0	4
1924-25	0	0	17	26	29	9	9	0	0	90	0	8	0	0	8
1925-26	0	5	23	18	27	16	12	1	0	102	0	0	0	0	0
1926-27	4	4	12	28	27	17	17	8	0	117	0	0	3	0	3
1927-28	0	1	11	29	29	28	9	6	2	115	0	0	0	0	0
1928-29	0	3	17	29	31	26	19	8	0	133	0	0	5	9	14
1929-30	0	7	27	21	31	18	10	1	1	116	0	0	13	0	13
1930-31	0	11	22	27	23	21	12	4	0	120	0	0	0	0	0
1931-32	0	3	17	30	31	20	9	2	0	112	0	0	0	4	4
1932-33	0	3	8	24	24	24	22	8	1	114	0	5	0	4	9
1933-34	4	5	16	14	25	21	17	2	0	104	0	0	0	0	0
1934-35	0	2	8	19	23	22	21	15	0	110	0	0	1	0	1
1935-36	0	10	20	27	22	27	19	4	0	129	1	0	0	7	8
1936-37	2	9	30	26	31	22	13	5	0	138	0	0	10	3	13
1937-38	0	0	7	18	25	27	15	12	3	107	0	0	0	0	0
1938-39	0	9	26	27	26	26	17	8	0	139	0	0	0	0	0
1939-40	0	8	28	25	27	17	15	2	0	122	0	0	0	0	0
1940-41	0	2	25	23	28	25	23	5	0	131	0	0	0	0	0
1941-42	1	1	18	23	27	19	25	8	2	124	0	0	4	0	4
1942-43	0	8	19	28	31	19	18	--	--	(123)	0	0	4	0	4
1943-44	0	--	--	26	31	28	25	7	1	(118)	0	0	0	0	0
1944-45	0	--	--	--	27	18	12	6	0	(63)	0	0	0	0	0
1945-46	0	5	14	25	27	20	10	2	0	103	0	0	0	0	0
1946-47	0	8	23	24	27	19	6	1	0	108	0	0	1	0	1
1947-48	0	0	11	26	25	24	21	7	1	115	0	0	0	0	0
1948-49	0	8	15	30	31	25	11	4	1	125	0	2	9	0	11
1949-50	0	10	4	25	30	22	18	4	0	113	0	0	14	4	18
1950-51	0	0	13	19	26	25	21	2	0	106	0	0	0	0	0
1951-52	0	6	19	26	31	24	20	6	0	132	0	0	0	0	0
1952-53	0	0	25	19	9	15	12	4	0	84	0	0	0	0	0
1953-54	0	1	14	22	23	16	19	4	1	100	0	0	2	0	2
1954-55	0	6	6	26	30	25	22	10	1	126	0	0	0	0	0
1955-56	0	1	22	28	25	26	14	2	0	118	1	0	2	3	6
1956-57	0	3	18	21	31	23	11	0	0	107	0	0	12	1	13
1957-58	0	2	17	16	19	5	16	0	0	75	0	0	0	0	0
1958-59	0	4	14	24	25	24	14	2	1	108	0	0	2	0	2
1959-60	0	2	24	26	31	21	10	4	0	118	0	0	1	0	1
1960-61	0	4	15	29	23	10	7	5	0	93	0	0	0	0	0
1961-62	0	7	28	26	27	17	19	0	1	125	0	0	1	0	1
1962-63	0	0	13	17	27	17	11	2	0	87	0	0	2	0	2
1963-64	0	5	8	31	26	26	16	4	0	116	0	0	0	0	0
1964-65	0	5	13	29	25	18	19	1	1	111	0	2	0	0	2
1965-66	0	1	8	25	26	22	13	3	0	98	0	0	0	0	0
1966-67	0	3	11	18	20	17	18	9	0	96	0	0	0	0	0
1967-68	0	1	17	25	23	13	6	5	0	90	0	0	0	0	0
1968-69	0	3	8	24	30	25	15	1	0	106	0	4	5	1	10
1969-70	0	5	19	21	28	13	16	7	1	110	0	0	0	0	0
1970-71	0	8	14	28	24	19	20	7	0	120	0	0	0	0	0
1971-72	0	9	18	27	25	23	13	6	0	121	0	0	3	1	4
1972-73	3	6	13	23	30	23	10	4	0	112	0	7	1	0	8
1973-74	0	4	14	16	19	15	12	1	0	81	0	0	8	0	8
1974-75	0	4	12	26	29	24	17	7	0	119	0	0	0	0	0
1975-76	0	2	23	28	30	22	19	6	0	130	0	0	0	0	0
1976-77	0	8	17	30	30	19	14	1	0	119	0	0	0	0	0
1977-78	0	3	18	25	22	17	11	4	0	100	0	1	2	0	3
1978-79	0	7	26	31	31	21	13	2	0	131	0	3	8	2	13
1979-80	0	1	23	22	31	22	13	3	0	115	0	0	1	0	1
AVG	#	5	17	25	27	21	15	5	#	115	#	1	2	1	4

AN UNDERScoreD FIGURE DENOTE EITHER A RECCRD HIGH OR LOW FOR THAT MONTH OR SEASON

() INDICATES AN INCOMPLETE SEASONAL TOTAL

DENOTES AN AVERAGE OF LESS THAN ONE-HALF DAY

MONTHLY EXTREMES OF DAILY MAXIMUM AND MINIMUM TEMPERATURES

These data are presented in Table 5 and Figure 5. Note that there is a greater temperature range during the winter months than in summer. December temperatures have ranged from 69°F to -27°F, a range of 96°, while July temperatures have ranged from 115°F to 39°F, a range of 76°. The December minimum temperature has ranged from 56°F to -27°F, an 83° range, while July minimum temperatures have varied only from 82°F to 39°F, a 43° range.

It is possible for high winter maxima to exceed low summer maxima. For example, on January 31, 1972, the maximum temperature reached 72°F while the high temperature for July 2, 1966, was 59°F.

High winter minimum temperatures may also exceed low summer minima. The minimum temperature on December 2, 1975, was 56°F compared to July 2, 1979, which was 39°F.

NORMALS AND EXTREMES OF DAILY TEMPERATURES

Figure 5 is a graph of daily extremes of maximum and minimum temperatures and the daily normals. Note that the large ranges between the extremes of maxima and minima temperatures occurred during the winter months. During winter also the minimum extremes depart more from normal than do the maximum extremes.

RECORD COLD TEMPERATURES

The periods of December 1 through 17, 1919 (17 days duration), January 24 through February 5, 1950 (13 days duration), and January 12 through February 3, 1957 (23 days duration) were record-breaking cold periods. These three periods accounted for 7 of 10 days of record with a daily maximum temperature of $\leq 0^{\circ}\text{F}$ and for 9 of 16 days of record with a minimum temperature of $\leq -20^{\circ}\text{F}$. Some comparative statistics follow:

TABLE 5. Monthly Extremes of Daily Maximum and Minimum Temperatures and Daily Temperature Ranges for Hanford Townsite (Near) and HMS Based on Period of Record 1912 Through 1980

MONTH	DAILY MAXIMUM TEMPERATURE				DAILY MINIMUM TEMPERATURE				DAILY TEMPERATURE RANGE*			
	RECORD HIGHEST		RECORD LOWEST		RECORD HIGHEST		RECORD LOWEST		GREATEST		LEAST	
	°F	DATE	°F	DATE	°F	DATE	°F	DATE	°F	DATE	°F	DATE
JAN	72	31, 1971	-2	31, 1950	53	30, 1971	-23	17, 1916#	43	13, 1974	1	22, 1956#
FEB	71	12, 1924	-3	1, 1950	55	26, 1932	-23	3, 1950#	42	-1, 1947	2	16, 1959#
MAR	83	25, 1960	24	3, 1960	54	9, 1942	6	5, 1955	45	24, 1979	2	6, 1957
APR	95	22, 1934#	41	7, 1945	60	21, 1956	12	1, 1935	47	28, 1968#	7	20, 1980
MAY	103	26, 1936#	49	8, 1918	70	19, 1956	28	1, 1954	48	11, 1946	6	26, 1980#
JUNE	110	25, 1912	55	3, 1966	81	30, 1924	33	9, 1933	46	28, 1979	8	28, 1946#
JULY	115	27, 1939	59	2, 1966	82	30, 1925	39	2, 1979	44	16, 1976#	7	2, 1966
AUG	113	4, 1961	63	25, 1920	81	4, 1961	40	18, 1918	45	10, 1979	10	7, 1962#
SEPT	102	1, 1976#	52	23, 1934#	72	7, 1955	25	23, 1926	45	25, 1974#	5	13, 1980
OCT	90	6, 1933	31	30, 1935	60	26, 1945	6	31, 1935	45	4, 1980	2	30, 1971
NOV	75	3, 1975	14	13, 1955#	52	23, 1959#	-1	14, 1955	36	24, 1970	1	26, 1952
DEC	69	26, 1980	-3	13, 1919#	56	2, 1975	-27	12, 1919	46	1, 1975	1	24, 1975#
ANN	115	JULY 27, 1939	-3	FEB. 1, 1950#	82	JULY 30, 1925	-27	DEC. 12, 1919	48	MAY 11, 1946	1	NUMEROUS DATES

* STATISTICS TABULATED FOR THE DAILY TEMPERATURE RANGE ARE BASED ONLY ON THE PERIOD OF RECORD 1945-1980

DENOTES ALSO ON EARLIER DATES

FIGURE 5. Normal⁽¹⁾ and Extreme⁽²⁾ Daily Temperatures at Hanford⁽³⁾

Number of Days With Maximum Temperatures

	<u>Dec</u> <u>1919</u>	<u>Jan-Feb</u> <u>1950</u>	<u>Jan-Feb</u> <u>1957</u>
32°F or below (consecutive in each case)	17	13	23
15°F or below	7	10	7
0°F or below	3	3	1

Number of Days With Minimum Temperatures

0°F or below (consecutive in each case)	14	11	7
-10°F or below	6	6	5
-20°F or below	3	4	2
<u>Extreme Lows</u>	-27°F	-23°F	-22°F

Statistics tabulated below are for the January-February, 1950 and 1957 periods of cold temperatures. Comparative statistics are not available for December 1919.

Number of Hourly Observations With Temperatures Equal
to or Less Than Values Indicated (°F)

<u>Dates</u>	<u>Temperature Classification</u>			
	<u>< +10</u>	<u>< 0</u>	<u>< -10</u>	<u>< -20</u>
Jan 28- Feb 4, 1950	163 (117)	135 (93)	55 (16)	6 (3)
Jan 15- Feb 3, 1957	272 (136)	120 (44)	40 (16)	7 (2)

() Indicates greatest number of consecutive hours

Other periods of cold temperatures are tabulated below. These periods together with those of 1919, 1950 and 1957 account for all 16 days of record with a minimum temperature of $\leq -20^{\circ}\text{F}$.

From	To	Total	Number of Days			
			Maximum 32°F or Below	Minimum 0°F or Below	Minimum -20°F or Below	Extreme Low (°F)
Dec 30, 1915	Jan 20, 1916	22	20	11	2	-23
Jan 6, 1930	Jan 31, 1930	26	25	13	3	-22
Jan 5, 1937	Feb 2, 1937	29	29	12	2	-23

For additional information on extended periods of below normal temperatures see Appendix I, pages A.I-1 to A.I-4.

UNSEASONABLE COLD PERIODS

Two of the most unseasonably cold periods occurred during the year 1935. Lows of 12°F and 14°F were recorded, respectively, on April 1 and 2 of that year. A low of 10°F was recorded on October 29, followed by a low of 0°F on November 2.

The period of November 11 through 23, 1955, was the most prolonged period of cold temperatures for that month. During this period of time there were:

1. 12 consecutive days with maxima of 32°F or below
2. 5 consecutive days with maxima 20°F or below
3. 12 consecutive days with minima 20°F or below
4. 5 consecutive days with minima 10°F or below.

The extreme low during the period was -1°F and occurred on November 14.

PROLONGED PERIODS WITH ABOVE NORMAL SUMMER TEMPERATURES

There have been three summers (1958, 1971 and 1977) when high temperatures have been most prolonged. Data for these periods follow:

	<u>July 5 to Aug 26, 1958</u>	<u>July 13 to Aug 21, 1971</u>	<u>July 20 to Aug 22, 1977</u>
Total days duration	53	40	34
Number of days with max $\geq 90^{\circ}\text{F}$	50	39	32
Number of days with max $\geq 100^{\circ}\text{F}$	21	27	15
Number of nights with min $\geq 70^{\circ}\text{F}$	13	16	9
Number of nights with min $\leq 60^{\circ}\text{F}$	7	5	5
Average daily maximum	97.9	103.2	98.4
Average daily minimum	65.8	63.9	66.7
Mean temperature	81.8	86.2	82.7
Extreme high	107(7-28)	112(8-9)	107(8-18)
Lowest minimum	55(8-5)	56(7-13,8-15)	53(7-29)

MEAN TEMPERATURE WITH 10 AND 15-YEAR MOVING AVERAGES

Depicted in Figures 6 through 10 are annual mean temperatures and mean temperatures for selected months and seasons for the period of record 1912 through 1980. Some data for the years 1912, 1916 and 1944 are missing. The record from 1912 through 1943 was kept by cooperative observers. Starting December 1944 the observations were recorded at the HMS.

The 10 and 15-year moving averages of mean annual temperatures started a rising trend in 1957, peaked in 1967 and began falling in 1974.

Winter and summer 15-year moving averages began to rise in 1957, peaked in 1972 and then began slowly falling. The 1980 values remained well above the 1957 level.

The 15-year moving averages for March show a falling trend from 1934 through 1956, then a rising trend through 1972. The 1980 15-year moving average remained below that of 1934.

September's 15-year moving average rose steadily from 1934 to a high in 1963 then fell slightly through 1980. However, the 1980 15-year moving average remained well above that of 1934.

FIGURE 6. Annual Mean Temperatures (1913 Through 1980) and 10 and 15-Year Moving Averages

FIGURE 7. Summer Mean Temperatures and 15-Year Moving Averages for Period 1912 Through 1980

FIGURE 8. Winter Mean Temperatures and 15-Year Moving Averages for Period 1912 Through 1981

FIGURE 9. March Mean Temperatures and 15-Year Moving Averages for Period 1912 Through 1980

FIGURE 10. September Mean Temperatures and 15-Year Moving Averages for Period 1912 Through 1980

FREEZE-THAW CYCLES

A freeze-thaw cycle occurs when the day's minimum temperature is below freezing and the maximum temperature is above the freezing level. A summary of freeze-thaw cycles for the period of record (1912 through 1980) is shown in Table 6.

HEATING AND COOLING DEGREE DAYS

The base for both heating and cooling degree days is 65°F. If the daily mean temperature is less than 65°F, the difference is heating degree days and if greater than 65°F, the difference is cooling degree days. The degree day concept assumes that, if the mean daily outdoor temperature is 65°F, no heating or cooling inside a building will be necessary, and that both the heating and cooling degree days will be zero. If the daily mean temperature is below or above 65°F, the amount of energy required to maintain a comfortable temperature inside a building varies with the number of degree days.

Table 7 presents the heating degree data for the period 1945 through 1980 and Table 8 shows the cooling degree data for the period 1960 through 1980. The heating season is assumed to run from July 1 through June 30. The cooling season runs from January 1 through December 31.

EXTREME TEMPERATURE PROBABILITY

Refer to Section XI, pages 2 and 3.

VERTICAL TEMPERATURE PROFILES

Refer to Section X, pages 2-4 and 6.

TABLE 6. Freeze-Thaw Cycles: Days on Which Maximum was Above 32°F and Minimum 32°F or Below (1912 Through 1980)

	AVERAGE NUMBER OF CYCLES	MAXIMUM NUMBER OF CYCLES	MINIMUM NUMBER OF CYCLES
JANUARY	16	27 1946+	1 1979
FEBRUARY	18	28 1944+	5 1924
MARCH	16	25 1944+	6 1968+
APRIL	5	15 1935	0 1974+
MAY	#	3 1938+	0 1980+
JUNE	0	0 ----	0 ----
JULY	0	0 ----	0 ----
AUGUST	0	0 ----	0 ----
SEPTEMBER	#	4 1933	0 1980+
OCTOBER	5	12 1916	0 1962+
NOVEMBER	16	28 1961+	4 1949
DECEMBER	17	26 1974+	9 1972+
ANNUAL	93	168	25

DENOTES AN AVERAGE OF LESS THAN ONE-HALF DAY

+ ALSO IN EARLIER YEARS

TABLE 7. Heating Degree Day Data for the Period 1945 Through 1980 (Base 65°F)

MONTH	MEAN MONTHLY	HIGHEST MONTHLY	YEAR	LOWEST MONTHLY	YEAR	HIGHEST DAILY	DATE	LOWEST DAILY	DATE
JAN	1104	1640	1950	694	1953	77	31, 1950	9	20, 1968
FEB	781	1147	1956	576	1958	78	1, 1950	7	20, 1961
MAR	638	794	1955	476	1947	49	4, 1955	3	25, 1960+
APR	381	522	1955	253	1977	29	1, 1976	0	-----
MAY	156	258	1977	36	1947	22	1, 1954	0	-----
JUNE	35	90	1953	3	1958	15	3, 1966+	0	-----
JULY	4	22	1955	0	1975+	9	2, 1966+	0	-----
AUG	6	32	1960	0	1979+	8	30, 1964	0	-----
SEPT	70	179	1972	10	1979	19	27, 1972+	0	-----
OCT	376	479	1946	200	1952	36	29, 1971	0	-----
NOV	758	1008	1955	567	1954	56	14, 1955	3	3, 1975
DEC	990	1224	1964	822	1957	73	30, 1968	4	26, 1980
		(HS)	(S)	(LS)	(S)		FEB. 1		
SEASON	5299	6118	1978-79	4599	1966-67	78	1950	0	-----

+ ALSO ON EARLIER DATES
 HS HIGHEST SEASONAL TOTAL
 LS LOWEST SEASONAL TOTAL
 S SEASON OF OCCURRENCE

TABLE 8. Cooling Degree Day Data for Period 1960 Through 1980 (Base 65°F)

MONTH	MEAN MONTHLY	HIGHEST MONTHLY	YEAR	LOWEST MONTHLY	YEAR	HIGHEST DAILY	DATE	LOWEST DAILY	DATE
JAN	0	0	-----	0	-----	0	-----	0	-----
FEB	0	0	-----	0	-----	0	-----	0	-----
MAR	0	0	-----	0	-----	0	-----	0	-----
APR	2	24	1977	0	1978+	9	24, 1977	0	30, 1980+
MAY	43	94	1971	3	1962	17	5, 1966	0	30, 1980+
JUNE	183	310	1969	57	1980	27	17, 1961	0	28, 1980+
JULY	384	518	1960	232	1963	29	9, 1975+	0	11, 1980+
AUG	323	508	1967	171	1964	32	4, 1961	0	30, 1980+
SEPT	102	216	1967	27	1970	17	1, 1976+	0	27, 1980+
OCT	2	10	1971	0	1977+	4	7, 1979	0	31, 1980+
NOV	0	0	----	0	----	0	-----	0	-----
DEC	0	0	----	0	----	0	-----	0	-----
		(HA)		(LA)			AUG 4		
ANNUAL	1039	1414	1967	691	1980	32	1961	0	-----

+ ALSO ON EARLIER YEARS

HA HIGHEST ANNUAL

LA LOWEST ANNUAL

III. SUBSOIL TEMPERATURES (°F)

III. SUBSOIL TEMPERATURES (°F)

Hourly subsoil temperatures have been recorded at a depth of approximately 1/2-inch since 1944, and at the 15-inch and 36-inch depths since 1952. From 1944 to 1952 the 1/2-inch sensor was a nickel thermohm. This was replaced with a copper thermohm in 1952. At the time that the 1/2-inch sensor was changed, copper thermohms were also installed at the 15- and 36-inch depths.

The subsoil sensors are installed in the natural soil of the area with the vegetation cover removed. The soil is sandy and is mixed with some large gravel.

Monthly averages and extremes of monthly averages are presented in Table 9. The absolute extremes are also shown in that table. Monthly and hourly subsoil temperatures are depicted in Figure 11. The crossover months for the 15- and 36-inch subsoil temperatures are March and September. Figure 12 shows monthly averages compared with the 3-foot ambient air temperatures.

Even a slight snow cover has a noticeable effect on soil temperatures. Figure 13 shows the insulating effect on the 1/2- and 15-inch subsoil temperatures. On January 27 and 28, 1957 the ambient air temperature was cold but the soil temperature remained quite steady under a 4-inch snow cover. On January 8 and 9, 1979, the ambient air temperature was warmer, but the absolute 15-inch record low subsoil temperature occurred.

EXTREME SUBSOIL TEMPERATURE PROBABILITY

Refer to Section XI, pages 4 and 5.

TABLE 9. Subsoil Temperature Data (High and Low Extremes of Average Monthly Subsoil*)

	AVERAGE MONTHLY SUBSOIL TEMPERATURES*			-0.5 INCH				-15 INCHES				-36 INCHES			
	-0.5"	-15"	-36"	HIGHEST MONTHLY AVG	YEAR	LOWEST MONTHLY AVG	YEAR	HIGHEST MONTHLY AVG	YEAR	LOWEST MONTHLY AVG	YEAR	HIGHEST MONTHLY AVG	YEAR	LOWEST MONTHLY AVG	YEAR
JAN	31.1	36.0	42.4	39.4	1967	16.3	1949	41.3	1967	25.5	1979	48.7	1975	36.3	1979
FEB	38.5	39.0	42.1	44.7	1967	30.6	1950	44.9	1967	29.6	1957	46.9	1967	33.5	1957
MAR	48.0	46.4	46.1	54.0	1968	42.4	1955	52.6	1968	40.3	1955	51.7	1968	41.8	1955
APR	60.1	55.2	52.9	69.4	1977	53.2	1970+	62.1	1977	48.7	1955	57.4	1966	47.3	1955
MAY	72.8	65.4	60.7	83.6	1947	65.2	1959	70.4	1966	58.5	1955	64.3	1968	54.8	1955
JUNE	82.0	74.9	68.8	88.1	1974	74.2	1953	84.5	1966	67.2	1953	73.4	1969	64.0	1953
JULY	91.2	81.7	75.5	96.2	1968	84.0	1955	88.1	1967	75.4	1955	81.2	1967	70.9	1955
AUG	87.5	82.3	78.7	94.8	1971	81.6	1960	89.2	1967	77.3	1954	83.9	1967	74.6	1954
SEPT	74.3	74.5	74.8	81.0	1967	67.0	1959	82.2	1967	68.8	1955	81.4	1967	70.1	1978
OCT	56.7	62.6	67.1	62.3	1965	51.7	1946	66.6	1967	57.9	1957	72.3	1967	62.9	1959
NOV	41.4	49.0	56.7	46.2	1949	34.5	1952	54.0	1974	44.6	1978	62.7	1974	52.6	1959+
DEC	33.8	39.7	47.7	39.4	1969	27.1	1978	45.0	1974	34.4	1978	54.6	1974	44.9	1978+
ANNUAL	59.8	58.9	59.5	62.8	1967	57.3	1959	63.0	1967	56.1	1957	63.2	1967	57.6	1957
ABSOLUTE HIGH AND LOW SUBSOIL TEMPERATURES															
				150.0	1971	-3.0	1949	93.0	1967	16.1	1979	85.3	1967	32.0	1957

* -0.5 INCH PERIOD OF RECORD 1945-1980
 -15 INCH AND -36 INCH PERIOD OF RECORD 1952-1980

+ DENOTES ALSO IN EARLIER YEARS

FIGURE 11. Monthly and Diurnal Variation of Subsoil Temperature: 1955 Through 1980

FIGURE 11. Continued

FIGURE 11. Continued

FIGURE 12. Average Monthly Subsoil and Air Temperatures

FIGURE 13. Snow Cover Effect on Subsoil Temperatures

IV. PRECIPITATION

IV. PRECIPITATION^(a)

MONTHLY AND ANNUAL TOTALS

Table 10 shows monthly and annual totals for the period of record 1912 through 1980. The average monthly values are presented in Figure 14. The months of November, December and January provide 42% of the total annual precipitation. July is the driest month and is followed by continual monthly increases through January. In Figure 14 it is interesting to note the steady increase from March through June and then the significant drop in July.

AVERAGE NUMBER OF DAYS WITH SPECIFIED AMOUNTS

These data are tabulated in Table 11 for the years 1946 through 1980. There are an average of 130 days per year when precipitation occurs; however, only 23 days per year have totals of 0.10 inch or more. During this 35-year record only twice has daily precipitation equalled or exceeded 1.00 inch.

TOTAL TIME WITH PRECIPITATION OBSERVED

The total time during which precipitation was observed at the HMS includes all types of precipitation. These data are presented in Table 12. No record was kept for the hours 1600 through 2400 from July 1971 through June 1974, so there is a 3-year gap in the record for those hours.

November's total monthly precipitation is close to that of December and January, but the percent of time that precipitation was observed is significantly less. There is a continual rise in the monthly average precipitation from March through June (see Figure 14) but no significant increase in the percent of time.

(a) In addition to material presented in the numbered tables in this section, miscellaneous precipitation statistics listed include:

								Page
Notable Wet Periods	.	.	.	.	.	.	.	IV-6
Notable Dry Periods	.	.	.	.	.	.	.	IV-10

TABLE 10. Composite Record of Monthly and Annual Precipitation (Inches)
for Hanford Townsite (Near) and HMS: 1912 Through 1980

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
1912	---	---	---	---	0.93	0.22	0.09	0.93	0.04	0.55	1.19	0.46	(4.41)
1913	1.39	0.16	0.05	0.16	0.61	1.11	0	T	0.03	1.42	0.75	0.76	6.44
1914	1.12	1.15	T	0.54	0.60	0.29	0.73	0	0.32	1.75	0.58	0.74	7.82
1915	0.65	0.61	0.58	0.39	0.90	0.76	0.21	T	T	0.20	1.56	1.10	6.96
1916	0.69	1.54	0.55	0.77	0.01	---	---	0	0.02	0	1.20	0.87	(5.65)
1917	1.00	0.28	0.31	0.72	0.57	0.09	T	0	0.07	0	0.81	0.50	4.35
1918	0.63	0.50	0.22	0	0.34	0.68	0.28	0.38	0.15	0.54	0.69	0.49	4.90
1919	1.04	1.09	0.38	0.32	0.64	0	T	T	0.74	0.21	0.88	1.00	6.30
1920	1.46	T	T	0.78	0.05	0.69	T	1.18	0.75	0.51	0.99	1.22	7.63
1921	0.36	1.25	T	0.60	0.33	0.12	T	0.14	0.06	0.29	1.61	0.69	5.45
1922	0.37	0.45	0.26	0.14	T	0.65	0	0.26	0.26	0.72	0.28	1.03	4.42
1923	0.37	0.40	0.05	0.85	0.27	1.11	0.33	T	0.43	1.03	0.06	0.56	5.46
1924	1.02	0.78	0.10	0.01	T	0.14	0.37	0.17	0.83	0.77	1.36	1.16	6.71
1925	0.66	0.70	0.06	0.80	0.87	0.34	0	T	0.49	0.07	0.96	0.66	5.61
1926	0.93	0.57	0.08	0.04	0.26	0.80	0	0.10	0.30	0.40	3.05	0.78	7.31
1927	1.29	0.77	0.45	0.03	0.09	T	T	0.29	1.14	0.62	1.26	0.40	6.34
1928	1.34	0.09	0.63	0.71	0.12	0.08	0.15	0.05	0.01	0.58	0.49	1.33	5.58
1929	1.37	0.07	0.02	0.05	0.25	0.89	T	0.07	0.15	0.07	T	0.84	3.78
1930	0.58	0.78	0.14	0.24	0.43	0.09	T	0.06	0.40	0.04	0.32	0.30	3.38
1931	1.35	0.17	0.99	0.11	0	0.51	0.19	0	0.16	0.47	1.15	2.53	7.63
1932	1.52	0.15	0.63	0.96	0.29	0.06	0.03	0.10	T	0.77	0.65	0.24	5.40
1933	0.86	0.50	0.43	0	1.06	0.17	0.10	0.13	0.44	0.59	0.48	1.20	5.96
1934	0.41	0.10	0.57	0.29	1.56	0.12	0	0.45	0.71	0.74	1.05	0.50	6.50
1935	0.41	0.31	0.05	0.08	0.13	0.37	0.46	0	0.05	0.39	0.30	0.87	3.42
1936	1.54	0.65	0	0.35	0.33	0.50	0.04	0.01	0.28	0.06	T	0.98	4.74
1937	0.80	0.63	0.76	0.73	0.01	1.09	0.24	0.06	0.16	0.39	1.84	1.08	7.79
1938	0.35	0.77	1.15	0.18	0.11	1.78	0.06	0.14	0.02	0.79	0.67	0.71	6.73
1939	0.59	0.80	0.52	T	0.07	0.07	0	0.28	0.11	0.25	T	1.69	4.38
1940	0.84	<u>3.08</u>	0.47	0.26	0.28	0.11	0.34	0	0.88	2.03	1.45	1.52	11.26
1941	1.82	0.65	0.16	0.31	0.83	1.16	0.08	0.59	0.57	0.41	0.46	0.40	7.44
1942	0.46	0.47	0	0.20	1.02	1.28	0.02	0	T	0.54	1.34	1.19	6.52
1943	0.40	0.37	0.33	---	---	---	---	---	---	---	---	0.23	(1.33)
1944	0.39	0.56	0.03	0.77	---	---	---	---	---	---	---	---	(1.75)
1945	---	---	---	---	---	---	---	---	---	---	---	---	---
1946	---	---	---	---	---	---	0.15	0.35	0.52	0.65	0.66	0.11	(2.44)
1947	0.32	0.27	0.42	0.70	0.02	1.07	0.71	0.68	<u>1.34</u>	2.20	0.81	0.75	9.29
1948	1.36	0.69	0.07	0.95	1.71	1.47	0.40	0.39	0.16	0.45	0.95	1.11	9.71
1949	<u>0.13</u>	0.68	1.12	0.02	0.16	0.01	0.01	0.03	0.23	0.10	1.47	0.16	4.12
1950	1.80	1.06	0.87	0.47	0.27	<u>2.92</u>	0.07	T	0.01	2.46	0.55	0.97	<u>11.45</u>
1951	0.84	0.51	0.46	0.53	0.43	1.38	0.37	0.15	0.10	0.71	0.82	0.70	7.00
1952	0.65	0.50	0.06	0.13	0.58	1.07	T	0.08	0.08	0.04	0.20	0.77	4.16
1953	2.16	0.25	0.17	0.77	0.28	0.55	T	0.96	0.13	0.20	0.96	0.49	6.92
1954	1.48	0.28	0.59	0.07	0.41	0.10	0.22	0.42	0.51	0.42	0.86	0.35	5.71
1955	0.56	0.22	0.17	0.40	0.59	0.28	0.57	0	0.77	0.40	1.54	2.03	7.53
1956	1.71	0.56	0.10	T	0.22	0.86	T	0.38	0.01	1.03	0.15	0.58	5.60
1957	0.48	0.23	<u>1.86</u>	0.38	0.82	0.47	0.05	0.02	<u>0.34</u>	<u>2.72</u>	0.39	0.53	8.29
1958	1.74	1.48	0.46	0.64	0.74	0.81	0.02	T	0.05	0.19	0.77	1.84	8.74
1959	2.05	1.17	0.40	0.20	0.50	0.23	T	0.03	1.26	0.56	0.41	0.26	7.07
1960	0.51	0.58	0.67	0.53	0.71	0.14	T	0.26	0.23	0.23	0.92	0.64	5.42
1961	0.33	2.10	1.02	0.48	0.80	0.42	0.15	0.09	T	0.07	0.49	0.88	6.83
1962	<u>0.13</u>	0.90	0.14	0.34	1.35	0.12	T	0.50	0.38	0.95	0.62	0.60	6.03
1963	0.95	0.69	0.53	1.17	0.43	0.28	0.31	0.01	0.02	0.04	0.74	1.14	6.31
1964	0.37	0.01	0.03	0.11	0.04	0.90	0.04	0.24	0.09	0.28	0.94	2.34	5.39
1965	0.93	0.14	0.03	0.09	0.15	0.49	0.11	0.03	0.11	0.01	1.17	0.39	3.65
1966	0.68	0.03	0.39	0.03	0.05	0.43	<u>0.81</u>	T	0.27	0.39	2.25	0.60	5.93
1967	0.32	T	0.14	0.90	0.56	0.57	T	T	0.05	0.13	0.16	0.43	3.26
1968	0.88	0.58	0.02	0.01	0.06	0.19	0.04	0.51	0.25	0.93	1.23	1.25	5.95
1969	1.24	0.54	0.10	<u>1.22</u>	0.51	0.75	T	T	0.48	0.10	0.13	1.29	6.36
1970	<u>2.47</u>	0.75	0.27	0.45	0.54	0.25	0.01	T	0.03	0.24	0.71	0.61	6.33
1971	0.78	0.10	1.02	0.07	0.56	0.71	0.13	0.09	1.13	0.18	0.46	1.07	6.30
1972	0.19	0.27	0.58	0.10	<u>2.03</u>	0.66	0.16	0.56	0.03	T	0.55	1.27	6.39
1973	0.90	0.21	0.08	T	0.24	0.01	T	0.02	0.43	1.72	2.64	2.02	8.27
1974	0.90	0.41	0.52	0.46	0.28	0.12	0.71	T	0.01	0.21	0.71	0.97	5.30
1975	1.43	0.98	0.33	0.42	0.38	0.24	0.32	1.16	0.02	0.87	0.60	0.70	7.46
1976	0.56	0.36	0.23	0.41	0.08	0.11	0.13	0.96	T	0.04	T	<u>0.11</u>	<u>2.99</u>
1977	0.08	0.57	0.41	T	0.65	0.37	0.06	<u>1.36</u>	0.66	0.15	0.63	1.47	6.41
1978	1.72	0.92	0.30	0.46	0.41	0.09	0.52	<u>0.57</u>	0.11	T	1.21	0.26	6.57
1979	0.54	0.17	0.54	0.52	0.10	T	0.09	0.38	0.20	0.67	1.36	0.99	5.56
1980	1.32	1.30	0.30	0.86	1.41	0.96	T	0.02	0.85	0.33	0.44	1.89	9.68
AVG	0.92	0.60	0.37	0.39	0.48	0.54	0.15	0.24	0.31	0.56	0.85	0.89	6.30
*NORMAL	0.97	0.56	0.40	0.39	0.53	0.45	0.16	0.29	0.29	0.46	0.80	0.95	6.25

THE HIGHEST, AND IF MEASURABLE, THE LOWEST TOTALS IN EACH COLUMN
ARE UNDERScoreD

T DENOTES A TRACE (<0.005 INCH)

() DENOTES AN INCOMPLETE ANNUAL TOTAL

* NORMALS ARE AVERAGES FOR THE PERIOD 1951-1980

--- DENOTES MISSING DATA

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1945	----	----	----	----	----	----	----	----	----	----	----	----	----
1946	----	----	----	----	----	----	0.15	0.35	0.52	0.65	0.66	0.11	----
1947	0.32	0.27	0.42	0.70	0.02	1.07	0.71	0.68	1.34	2.20	0.81	0.75	9.29
1948	1.36	0.69	0.07	0.95	1.71	1.47	0.40	0.39	0.16	0.45	0.95	1.11	9.71
1949	0.13	0.68	1.12	0.02	0.16	0.01	0.01	0.03	0.23	0.10	1.47	0.16	4.12
1950	1.80	1.06	0.87	0.47	0.27	2.92	0.07	T	0.01	2.46	0.55	0.97	11.45
1951	0.84	0.51	0.46	0.53	0.43	1.38	0.37	0.15	0.10	0.71	0.82	0.70	7.00
1952	0.65	0.50	0.06	0.13	0.58	1.07	T	0.08	0.08	0.04	0.20	0.77	4.16
1953	2.16	0.25	0.17	0.77	0.28	0.55	T	0.96	0.13	0.20	0.96	0.49	6.92
1954	1.48	0.28	0.59	0.07	0.41	0.10	0.22	0.42	0.51	0.42	0.86	0.35	5.71
1955	0.56	0.22	0.17	0.40	0.59	0.28	0.57	0	0.77	0.40	1.54	2.03	7.53
1956	1.71	0.56	0.10	T	0.22	0.86	T	0.38	0.01	1.03	0.15	0.58	5.60
1957	0.48	0.23	1.86	0.38	0.82	0.47	0.05	0.02	0.34	2.72	0.39	0.53	8.29
1958	1.74	1.48	0.46	0.64	0.74	0.81	0.02	T	0.05	0.19	0.77	1.84	8.74
1959	2.05	1.17	0.40	0.20	0.50	0.23	T	0.03	1.26	0.56	0.41	0.26	7.07
1960	0.51	0.58	0.67	0.53	0.71	0.14	T	0.26	0.23	0.23	0.92	0.64	5.42
1961	0.33	2.10	1.02	0.48	0.80	0.42	0.15	0.09	T	0.07	0.49	0.89	6.84
1962	0.13	0.90	0.14	0.34	1.35	0.12	T	0.50	0.38	0.95	0.65	0.60	6.06
1963	0.95	0.69	0.53	1.17	0.43	0.28	0.31	0.01	0.02	0.04	0.74	1.14	6.31
1964	0.37	0.01	0.03	0.11	0.04	0.90	0.04	0.24	0.09	0.28	0.94	2.34	5.39
1965	0.93	0.14	0.03	0.09	0.15	0.49	0.11	0.03	0.11	0.01	1.17	0.39	3.65
1966	0.68	0.03	0.39	0.03	0.05	0.43	0.81	T	0.27	0.39	2.25	0.60	5.93
1967	0.32	T	0.14	0.90	0.56	0.57	T	T	0.05	0.13	0.16	0.43	3.26
1968	0.88	0.58	0.02	0.01	0.06	0.19	0.04	0.51	0.25	0.93	1.23	1.25	5.95
1969	1.24	0.54	0.10	1.22	0.51	0.75	T	T	0.48	0.10	0.13	1.29	6.36
1970	2.47	0.75	0.27	0.45	0.54	0.25	0.01	T	0.03	0.24	0.71	0.61	6.33
1971	0.78	0.10	1.02	0.07	0.56	0.71	0.13	0.09	1.13	0.18	0.46	1.07	6.30
1972	0.19	0.27	0.58	0.10	2.03	0.66	0.16	0.56	0.02	T	0.55	1.27	6.39
1973	0.90	0.21	0.08	T	0.24	0.01	T	0.02	0.43	1.72	2.64	2.02	8.27
1974	0.90	0.41	0.52	0.46	0.28	0.12	0.71	T	0.01	0.21	0.71	0.97	5.30
1975	1.70	0.98	0.33	0.42	0.38	0.24	0.32	1.16	0.03	0.87	0.60	0.70	7.73
1976	0.56	0.36	0.23	0.41	0.08	0.11	0.13	0.96	T	0.04	T	0.11	2.99
1977	0.08	0.57	0.41	T	0.65	0.37	0.06	1.36	0.66	0.15	0.63	1.47	6.41
1978	1.52	0.92	0.30	0.46	0.41	0.09	0.52	0.57	0.11	T	1.21	0.26	6.37
1979	0.54	0.17	0.54	0.52	0.10	T	0.09	0.38	0.20	0.67	1.36	0.99	5.56
1980	1.32	1.30	0.30	0.86	1.41	0.96	T	0.02	0.85	0.33	0.44	1.89	9.68
1981	0.56	0.60	0.70	0.02	0.99	0.43	0.19	0.03	0.60	0.39	1.08	1.45	7.04
1982	0.33	0.57	0.30	0.75	0.28	0.75	0.22	0.20	0.55	1.33	0.91	1.79	7.98
1983	1.44	1.36	1.00	0.42	0.52	0.68	0.31	0.12	0.46	0.52	2.12	2.12	11.07
1984	0.23	0.94	1.01	0.60	0.55	0.99	0.06	T	0.42	0.07	1.83	0.57	7.27
1985	0.34	0.82	0.36	0.01	0.12	0.15	0.12	0.01	0.63	0.46	1.24	0.84	5.10
1986	1.76	1.37	0.76	T	0.30	T	0.21	0.02	0.96	0.29	0.65	0.77	7.09
1987	0.80	0.19	1.05	0.14	0.17	0.11	0.50	0.07	0.01	T	0.40	1.63	5.07
1988	0.48	T	0.39	1.12	0.33	0.11	0.13	0	0.39	0.01	0.82	0.40	4.18
1989	0.21	1.67	1.56	0.84	0.59	0.01	0.01	0.26	0.02	0.42	1.04	0.29	6.92
1990	0.77	0.09	0.10	0.40	0.86	0.36	0.14	0.83	T	0.78	0.02	0.72	5.07
1991	0.33	0.19	1.12	0.45	0.49	1.44	0.29	0.07	0	0.53	1.44	0.40	6.75
1992	0.44	0.94	0.09	0.94	T	1.14	0.38	0.20	0.27	0.61	1.07	1.82	7.90
1993	1.30	1.17	0.67	0.71	0.60	0.12	1.76	0.24	0.04	0.09	0.19	0.94	7.83
AVG	0.87	0.61	0.49	0.42	0.50	0.53	0.21	0.25	0.31	0.51	0.84	0.92	6.49
NORMAL	0.79	0.62	0.47	0.41	0.51	0.38	0.18	0.27	0.31	0.39	0.91	1.03	6.26

FIGURE 14. Monthly Average Precipitation Amounts: 1912 Through 1980

TABLE 11. Average Number of Days With Precipitation of Specified Amount, 1946 Through 1980

MONTH	TRACE OR MORE	0.01 INCH OR MORE	0.10 INCH OR MORE	0.25 INCH OR MORE	0.50 INCH OR MORE	1.00 INCH OR MORE
JAN	17	9	3	1	#	0
FEB	12	7	2	1	#	0
MAR	11	6	2	#	#	0
APR	11	5	1	#	#	0
MAY	10	5	2	1	#	0
JUNE	9	5	2	1	#	#
JULY	5	2	1	#	0	0
AUG	6	3	1	#	#	0
SEPT	7	3	1	#	#	0
OCT	10	5	2	1	#	#
NOV	15	8	3	1	#	0
DEC	17	10	3	1	#	0
ANNUAL	130	68	23	7	1*	#

* ALTHOUGH THE NUMBER OF DAYS WITH 0.50 INCH OR MORE AVERAGES LESS THAN 0.5 DAYS FOR ANY ONE MONTH, 44 SUCH DAYS HAVE BEEN RECORDED DURING 35 YEARS OF RECORD FOR AN AVERAGE ANNUAL NUMBER OF 1.

USED TO DENOTE AN AVERAGE OF LESS THAN 1/2 DAY

TABLE 12. Monthly and Annual Averages and Extremes in Total Time With Precipitation
Observed: July 1946 Through June 1971, July 1974 Through December 1980

MONTH	AVERAGES		GREATEST			LEAST		
	NO. OF HOURS	% OF TIME	NO. OF HOURS	% OF TIME	YEAR	NO. OF HOURS	% OF TIME	YEAR
JAN	98.8	13.3	212.0	28.5	1969	29.2	3.9	1949
FEB	60.3	9.0	106.8	15.9	1958	4.7	0.7	1967
MAR	38.7	5.2	135.2	18.2	1957	7.3	1.0	1968
APR	31.3	4.3	69.2	9.6	1953	1.8	0.2	1956
MAY	35.2	4.7	89.9	12.1	1948	4.8	0.6	1947
JUNE	31.2	4.3	80.8	11.2	1950	3.2	0.4	1949
JULY	10.7	1.4	38.2	5.1	1966	1.2	0.2	1958
AUG	15.8	2.1	61.7	8.3	1968	0.0	0.0	1955
SEPT	17.4	2.4	52.2	7.2	1959	1.0	0.1	1975
OCT	36.2	4.9	119.9	16.1	1947	0.4	0.1	1978
NOV	65.7	9.1	132.2	18.4	1955	21.4	3.0	1957
DEC	89.7	12.1	179.6	24.1	1963	25.8	2.1	1976
AVG. ANNUAL	531.0	6.1						
AVG. ANNUAL EXTREMES			738.0	8.4	1950	294.6	3.4	1976

PERCENT OF DAYS AND MONTHLY PRECIPITATION INTENSITY FACTORS

Figures 15a,b and 16 graphically depict the percent of days with precipitation within specified parameters and intensity factors. It is interesting to note that while November, December and January are the leading months for total precipitation, the months with the highest intensity factors are June, July, August and September. There is a steady increase in the intensity factor from March through June.

NOTABLE WET PERIODS

There are five periods listed below when precipitation was abnormally high. Four of the five occurred during the "wet" cycle shown by the moving averages in Figure 17.

<u>Period</u>	<u>Number of Days Precip. T^(a) or More</u>			<u>Total Amount (Inches)</u>	
	<u>Altogether</u>	<u>Greatest Consec</u>	<u>With Measurable Precip</u>	<u>Water Equiv</u>	<u>Snow-fall</u>
Oct 7-Nov 4, 1947	23 out of 29	10	17	2.21	0
Jan 3-28, 1950	21 out of 26	10	15	1.80	23.4
Nov 11-Dec 19, 1950	33 out of 39	12	20	1.37	3.7
Nov 16-Dec 22, 1955	31 out of 37	15	24	3.19	22.7
Oct 31-Dec 7, 1973	32 out of 38	14	20	3.45	8.1

(a) Trace (<0.005 inch)

An unusual year from a precipitation standpoint was 1973. Total precipitation for the year was 8.27 inches, which was 132% of normal (6.25 inches). The period March 30 through September 18, 1973 was dry (see table on page IV-10), while the period October 31 through December 7, 1973, was a notable wet period (see table above). During the months of October, November and December 1973, 6.38 inches were recorded, which was 289% of normal (2.21 inches) for those months.

FIGURE 15. (a) Precipitation - Percent of Days Statistics Based on the Period 1946 Through 1980; (b) Percent of Days in a Year With Precipitation as Indicated

FIGURE 16. Monthly Average Precipitation Intensity Factors Based on the Periods July 1946 Through June 1971 and July 1974 Through 1980

FIGURE 17. Total Annual Precipitation (1913 Through 1980) and 10- and 15-Year Moving Averages

NOTABLE DRY PERIODS

The HMS is in a semi-arid region; therefore, there have been many dry periods. January and December are the only months that have always received measurable precipitation (1912 through 1980). There have been a total of 75 months in the period of record (1912 through 1980) without measurable precipitation. The months of July and August account for 43 of the 75 total (Table 10). The record number of consecutive days without measurable precipitation occurred in 1919. The period started May 23 and ran through September 1 (102 days). Listed below are some long periods with small amounts of precipitation.

<u>Year</u>	<u>From</u>	<u>To</u>	<u>Number Of Days</u>	<u>Total Precip (Inches)</u>
1917	May 29	Nov 1	157	0.16
1927	April 1	Aug 26	148	0.14
1968	Feb 24	Aug 13	172	0.32
1973	Mar 30	Sept 18	173	0.29
1976	Aug 26	Dec 31	128	0.15

The driest year of record (from 1912 through 1980) was 1976. Total precipitation for that year was 2.99 inches, which was only 48% of normal (6.25 inches). During the period September through December 1976 the total precipitation was 0.15 inch, which is 6% of normal (2.52 inches) for those months.

SNOWFALL

Snowfall, which includes all frozen precipitation, has varied from a seasonal total of 0.3 inch in 1957-1958 to 43.6 inches in 1915-1916 (Table 13). Snowfall accounts for 38% of all precipitation during the months December through February (Table 14). November and March snowfall accounts for about 16% of the total precipitation for those months. October and April both get a little snow but until April 6, 1982, there had never been a measurable amount in April. On that date 1 inch was recorded (not included in any table in this document).

TABLE 13. Composite Record of Monthly and Seasonal Snowfall for Hanford Townsite (Near) and HMS: 1912 Through 1980

SEASON	OCT	NOV	DEC	JAN	FEB	MAR	APR	TOTAL	FIRST SEASONAL (1)		LAST SEASONAL (1)	
									DATE	AMOUNT	DATE	AMOUNT
1912-13	0	0	0	12.0	2.5	0.4	0	14.9				
1913-14	0	0	7.6	T	T	0	0	7.6				
1914-15	0	T	1.5	4.0	0	0	0	5.5				
1915-16	0	0	7.0	9.6	<u>26.0</u>	1.0	0	43.6				
1916-17	0	T	8.5	2.2	<u>2.8</u>	0	0	13.5				
1917-18	0	0	1.0	2.2	0	0	0	3.2				
1918-19	0	T	1.2	5.0	3.0	0	0	9.2				
1919-20	0	2.0	7.0	14.0	T	0	T	23.0				
1920-21	0	0	4.0	2.0	4.0	0	0	10.0				
1921-22	0	12.2	4.5	4.1	3.0	0	0	23.8				
1922-23	0	0	8.5	0	4.0	0	0	12.5				
1923-24	0	0	2.0	4.0	0	0	0	6.0				
1924-25	0	3.0	7.0	6.0	0	0	0	16.0				
1925-26	0	3.0	0.5	2.0	0	0	0	5.5				
1926-27	0	5.5	6.0	9.8	0	0	T	21.3				
1927-28	0	0	7.0	2.9	0.2	0	0	10.1				
1928-29	0	0	2.5	11.5	0.8	0	0	14.8				
1929-30	0	2.3	3.5	6.6	3.0	0	0	15.4				
1930-31	0	3.2	0.5	T	0	T	0	3.7				
1931-32	0	0	7.7	13.9	1.5	0.2	0	23.3				
1932-33	0	0	2.5	6.9	<u>8.3</u>	0	0	17.7				
1933-34	0	0	6.2	T	0	0	0	6.2				
1934-35	0	0	T	2.8	0.8	0	0	3.6				
1935-36	T	0.2	T	3.2	5.4	0	0	8.8				
1936-37	0	0	0.3	12.5	4.2	T	0	17.0				
1937-38	0	T	0.2	T	6.2	0	0	6.4				
1938-39	0	0	0.2	0.5	1.8	0	0	2.5				
1939-40	0	0	0	7.1	2.0	0	0	9.1				
1940-41	0	8.2	0	1.5	T	0	0	9.7				
1941-42	0	1.0	0	3.0	1.0	0	0	5.0				
1942-43	0	4.0	8.5	6.0	0.5	0	0	19.0				
1943-44	0	0	0.7	3.3	0.4	0	0	4.4				
1944-45	-	---	---	---	---	-	---	---	NOV 29		FEB 18	
1945-46	-	---	---	---	---	-	---	---	NOV 6		FEB 5	
1946-47	T	7.2	0.5	3.3	T	T	0	11.0	NOV 17	0.2	JAN 31	2.2
1947-48	0	T	3.0	2.6	5.5	0.1	T	11.2	DEC 3	0.1	MAR 9	0.1
1948-49	0	1.7	8.1	1.8	6.9	T	0	18.5	NOV 18	1.7	MAR 15	T(2)
1949-50	T	0	0.7	<u>23.4</u>	3.1	1.5	T	28.7	DEC 16	0.2	MAR 13	0.3
1950-51	0	0.8	2.9	5.3	5.3	<u>4.2</u>	0	18.5	NOV 30	0.8	MAR 12	1.7
1951-52	0	0.5	4.4	7.5	3.1	T	0	15.5	NOV 25	0.5	FEB 19	3.0
1952-53	0	T	3.1	2.7	0	T	0	5.8	DEC 1	0.2	JAN 2	2.7
1953-54	0	0	1.0	14.3	1.6	T	0	16.9	DEC 8	1.0	FEB 11	1.6
1954-55	0	0	1.8	6.0	2.4	0.7	T	10.9	DEC 4	1.8	MAR 25	0.7
1955-56	0	<u>12.7</u>	13.4	10.2	2.2	T	0	38.5	NOV 2	0.2	FEB 23	0.1
1956-57	T	<u>0.1</u>	2.5	7.9	1.4	4.0	T	15.9	NOV 18	T	MAR 6	1.7
1957-58	0.3	0	T	T	0	T	0	<u>0.3</u>	OCT 22	0.3	#	
1958-59	0	T	0.9	4.5	12.7	0	0	<u>18.1</u>	NOV 14	T(2)	FEB 19	1.2
1959-60	0	0.3	1.0	5.9	T	1.5	0	8.7	NOV 14	0.1	MAR 5	1.5
1960-61	0	0	3.3	1.9	0	1.6	0	6.8	DEC 10	0.1	MAR 5	1.6
1961-62	0	0.5	6.1	0.4	2.4	0.9	0	10.3	NOV 23	0.1	MAR 9	0.1
1962-63	0	T	T	7.1	0.6	0	0	7.7	JAN 30	0.1	FEB 1	6.1
1963-64	0	T	6.4	2.9	T	T	T	9.3	DEC 8	4.3	JAN 24	1.5
1964-65	0	0.1	<u>19.1</u>	6.6	T	T	0	25.8	NOV 22	T(2)	MAR 26	T(2)
1965-66	0	T	6.9	2.6	T	T	0	9.5	DEC 23	0.6	MAR 21	T(2)
1966-67	0	0.4	2.8	0.1	0	0	0	3.3	NOV 11	0.4	JAN 26	0.1
1967-68	0	0	5.7	4.5	0.3	0	T	10.5	DEC 6	T(2)	FEB 17	0.3
1968-69	0	T	9.7	15.9	2.1	0	0	27.7	DEC 19	0.1	FEB 25	T(2)
1969-70	0	T	2.7	6.6	T	0.2	0	9.5	DEC 6	T(2)	MAR 1	0.2
1970-71	0	0.5	4.4	2.0	T	0.6	0	7.5	NOV 30	0.5	MAR 22	T
1971-72	0.6	T	8.1	4.9	1.4	0.1	T	15.1	OCT 29	0.1	MAR 1	T
1972-73	0	T	7.2	4.3	1.7	0	0	13.2	DEC 3	1.7	FEB 10	1.7
1973-74	<u>1.5</u>	6.6	7.5	3.9	0	T	0	19.5	OCT 31	1.5	JAN 12	2.3
1974-75	0	0	0.7	2.5	12.1	T	T	15.3	DEC 12	0.3	FEB 9	1.7
1975-76	0	1.7	3.8	6.0	0.2	T	T	11.7	NOV 10	0.6	FEB 3	0.2
1976-77	0	0	0.2	2.9	T	T	0	3.1	DEC 23	0.2	JAN 31	0.2
1977-78	0	2.1	3.4	2.9	0.9	T	0	9.3	NOV 18	0.1	FEB 26	0.1
1978-79	0	10.1	1.4	10.3	0.5	0.1	0	22.6	NOV 18	9.1	MAR 3	0.1
1979-80	0	5.6	7.3	8.7	4.5	0.3	0	26.2	NOV 22	1.4	MAR 4	0.3
AVG.	T	1.4	3.9	5.3	2.3	0.3	T	13.2	NOV 27		FEB 21	
NORMALS	T	1.4	4.6	5.4	1.8	0.5	T	13.7				

THE HIGHEST MONTHLY AND THE HIGHEST AND LOWEST SEASONAL TOTALS ARE UNDERSCORED

(1) AMOUNTING TO 0.01 INCH OR MORE (MELTED) OR 0.1 INCH (UNMELTED)

(2) MELTED AS IT FELL

(T) DENOTES A TRACE (<0.05 INCH)

(#) THE FIRST SNOWFALL WAS THE ONLY SNOWFALL

TABLE 14. Miscellaneous Snowfall Statistics, 1946 Through 1980

	OCT	NOV	DEC	JAN	FEB	MAR	SEASON
AVERAGE NUMBER OF DAYS WITH DEPTH AT 0400 PST							
1" OR MORE	0	1	5	9	4	#	19
3" OR MORE	0	1	2	5	3	0	11
6" OR MORE	0	#	#	2	1	0	3
12" OR MORE	0	0	#	#	0	0	#
RECORD GREATEST NUMBER OF DAYS WITH DEPTH AT 0400 PST							
1" OR MORE	0	(1978) 12	(1972) 18	(1969) 31	(1950) 17	(1950) 3	(1955-56) 54
3" OR MORE	0	(1978) 12	(1955) 14	(1969) 23	(1950) 16	0	(1978-79+) 40
6" OR MORE	0	(1978) 6	(1964) 12	(1965) 23	(1969+) 8	0	(1964-65) 35
12" OR MORE	0	0	(1964) 4	(1969) 1	0	0	(1964-65) 4
RECORD GREATEST DEPTH	(1973) 1.5	(1978) 9.1	(1964) 12.1	(1969) 12.0	(1969) 10.0	(1957) 2.3	(DEC 1964) 12.1
GREATEST IN 24 HOURS	(1973) 1.5	(1978) 8.3	(1965) 5.4	(1954) 7.1	(1975) 5.6	(1957+) 2.2	(NOV 1978) 8.3
AVERAGE PERCENT OF WATER EQUIVALENT OF ALL PRECIPITATION							
	4	19	41	45	28	14	25

() DENOTES YEAR OF OCCURRENCE
 + DENOTES ALSO IN EARLIER YEARS
 # DENOTES LESS THAN 1/2 DAY

A record snow depth of 24.5 inches occurred in February 1916. Since that date, the greatest depth has been 12.1 inches, recorded in December 1964. Figure 18 shows that in 10 of 35 winters, the maximum snow depth on the ground has exceeded 6 inches. The number of days with 6 inches or more of snow on the ground has varied from 35 in the 1964-1965 season to none as recently as the 1977-1978 winter.

MOVING AVERAGES

Figure 17 shows the 10- and 15-year moving averages of total annual precipitation. There was an upward trend in the 10-year moving average from 1936 to 1951, then a slow fall through 1970. The last 10 years show a slow rise. However, the 15-year moving average continued a very slow fall through 1976.

The 15-year moving average of seasonal snowfall (Figure 19) fell steadily from the 1927-1928 season through 1947-1948, then rose to a new high in 1956-1957. From the 1956-1957 high there was a slow fall to a secondary low in 1971-1972 followed by a slow rising trend.

HMS VERSUS RICHLAND

Table 15 compares the precipitation records of Richland and the HMS. Richland is on the Columbia River about 25 miles southeast of the HMS and is about 375 feet lower than the HMS. During the period 1946 through 1980 the average annual precipitation was higher in Richland than at the HMS with December and February being significantly higher. Because of the elevation difference, the HMS received a higher annual snowfall (13.7 inches seasonal average compared to 11.2 inches for Richland); however, the snowfall extremes are greater in Richland. During the 1955-1956 season Richland received a seasonal record of 41.6 inches compared to 38.5 inches for the HMS. Also, the maximum depth of snow of the ground in Richland was 14.0 inches (January 10, 1980) compared to 12.1 inches (December 27, 1964) at the HMS. Richland's record 24-hour snowfall of 12.5 inches on January 8-9, 1980, exceeds the HMS record of 8.3 inches on November 18-19, 1978. During the 35 years of record, less than half of the extremes at the HMS and Richland have occurred in the same years.

FIGURE 18. Greatest Depth of Snow on Ground During Winters of Record at Hanford 1946-47 Through 1980-81*

IV-15

FIGURE 19. Total Seasonal Snowfall and 15-Year Moving Averages for Period 1913 Through 1981

TABLE 15. Monthly and Annual Averages and Extremes of Precipitation for
HMS Versus Richland, July 1946 Through December 1980

	AVERAGES		EXTREMES							
			HMS				RICHLAND			
	HMS	RICHLAND	GREATEST	YEAR	LEAST	YEAR	GREATEST	YEAR	LEAST	YEAR
JAN	0.96	1.00	2.47	1970	0.08	1977	3.02	1970	0.10	1947
FEB	0.57	0.70	2.10	1961	T	1967	1.58	1980	T	1967
MAR	0.42	0.51	1.86	1957	0.02	1968	1.98	1957	0.04	1964
APR	0.41	0.42	1.22	1969	T	1977+	1.16	1969	T	1977+
MAY	0.53	0.57	2.03	1972	0.02	1947	2.07	1945	0.01	1966
JUNE	0.56	0.53	2.92	1950	T	1979	2.64	1948	T	1949
JULY	0.18	0.17	0.81	1966	T	1980+	0.93	1948	0	1967+
AUG	0.29	0.30	1.36	1977	0	1955	1.82	1977	0	1974+
SEPT	0.31	0.29	1.34	1947	T	1976+	1.12	1959	0	1975+
OCT	0.56	0.55	2.72	1957	T	1978+	2.41	1947	T	1978
NOV	0.81	0.88	2.64	1973	T	1976	2.78	1973	0.07	1976
DEC	0.90	1.04	2.34	1964	0.11	1976+	2.83	1973	0.13	1946
ANN	6.50	6.96	11.45	1950	2.99	1976	11.35	1948	3.12	1967

+ ALSO ON EARLIER YEARS

T DENOTES TRACE (<0.005 INCH)

EXTREME ANNUAL PRECIPITATION PROBABILITY

Refer to Section XI, page 10.

V. 50-FOOT WIND

V. 50-FOOT WIND

Wind speeds and directions are determined and recorded at the end of each hour. The speed is a visual average of speeds recorded on a strip chart for 1 hour. The direction is that which the observer considers to be the most persistent for the same time interval. When there is little or no movement of the direction pen for 1 hour and the speed is zero, the direction will be CM (calm) and the speed 0. If the wind direction varies so that no direction can be considered to be representative, V (variable) is recorded. In some of the wind tables, the wind directions, rounded to whole degrees, will be number-coded in direction classes as follows:

1. NNE (12°-33°)	7. SSE (147°-168°)	13. WNW (282°-303°)
2. NE (34°-56°)	8. S (169°-191°)	14. NW (304°-326°)
3. ENE (57°-78°)	9. SSW (192°-213°)	15. NNW (327°-348°)
4. E (79°-101°)	10. SW (214°-236°)	16. N (349°-11°)
5. ESE (102°-123°)	11. WSW (237°-258°)	17. V (variable)
6. SE (124°-146°)	12. W (259°-281°)	18. CM (calm)

MONTHLY AND ANNUAL PREVAILING WIND DIRECTIONS, AVERAGE SPEEDS, AND PEAK GUSTS

The prevailing direction is either WNW or NW in every month of the year. The highest monthly average wind speeds occur in June, and the lowest in November and December (see Table 16). There is a greater variability in monthly average wind speeds during winter months than during the summer months. January's highest average is more than 3 times higher than the lowest average, while July's highest is only 1.4 times higher than the lowest. While the wind from 259° to 326° (W, WNW, NW) occurs 39% of the time compared to 18% from 192° to 281° (SSW, SW, WSW), the latter sector accounts for most hourly averages above 31 mph (90% compared to 10%).

JUNE WIND SPEEDS VERSUS DECEMBER WIND SPEEDS

The average wind speed for June is higher than that in December (Table 16); however, December has had 6 times as many hourly average

TABLE 16. Monthly and Annual Prevailing Wind Directions, Average
Speeds and Peak Gusts at 50 Feet: 1945 Through 1980

<u>MONTH</u>	<u>PREV. DIR.</u>	<u>AVG SPEED</u>	<u>HIGHEST AVG</u>	<u>YEAR</u>	<u>LOWEST AVG</u>	<u>YEAR</u>	<u>PEAK GUSTS</u>		
							<u>SPEED</u>	<u>DIR.</u>	<u>YEAR</u>
JAN	NW	6.4	10.3	1972	3.1	1955	80	SW	1972
FEB	NW	7.1	10.8	1976	4.6	1963	65	SW	1971
MAR	WNW	8.5	10.7	1977+	5.9	1958	70	SW	1956
APR	WNW	9.0	11.1	1972+	7.4	1958	73	SSW	1972
MAY	WNW	8.9	10.5	1965+	5.8	1957	71	SSW	1948
JUNE	WNW	9.2	10.7	1949	7.7	1950+	72	SW	1957
JULY	WNW	8.7	9.6	1963	6.8	1955	69	WSW	1979
AUG	WNW	8.0	9.1	1946	6.0	1956	66	SW	1961
SEPT	WNW	7.5	9.2	1961	5.4	1957	65	SSW	1953
OCT	WNW	6.6	9.1	1946	4.4	1952	63	SSW	1950
NOV	NW	6.1	8.2	1977	2.9	1956	64	SSW	1949
DEC	NW	6.1	8.3	1968	3.9	1963+	71	SW	1955
YEAR	WNW	7.7	8.3	1968+	6.3	1957	80	SW	1972

+ ALSO ON EARLIER YEARS

wind speeds in excess of 31 mph (55 for December versus 9 for June during the 1955 through 1980 period of record). There have been 10 cases of wind speeds in the 39 through 46 mph class during December, and 1 in excess of 46 mph (51 mph), but no such cases in June.

December has the highest frequency of low wind speeds (Table 17). Wind speeds in the 1 to 3 mph class occur 33% of the time in December compared to 11% in June. The frequency of calms (zero speed for 1 hour) during December is 7% versus 1% for June.

During the period 1949 through 1980, 323 December days had peak winds no greater than 12 mph compared to only 6 June days.

The hourly average wind speeds for June and December are presented in Figure 20. Note that there is much less diurnal range in December than in June.

The prevailing direction in December is NW and in June WNW. There is a larger diurnal range in wind from the WNW and NW in June than there is in December (Table 18 and Figure 21).

SEASONAL AND DIURNAL VARIATION IN SPEED

July has the highest diurnal range of wind speeds (from 5.5 to 12.9 mph). December has the lowest diurnal range (from 5.6 to 6.7 mph). Table 19 shows the diurnal range in wind speeds for all months.

SEASONAL AND DIURNAL VARIATION IN DIRECTION

The wind at the HMS is from the WNW and NW 32% of the time. The months of June and July have the highest percentage of winds from the WNW and NW (38 and 37%, respectively). October has the lowest percentage (25) from those directions (Table 18). Monthly wind roses for the HMS are presented in Figure 22.

Table 20 shows the monthly and annual diurnal variations in the percentage of wind directions from the SSW, SW, and WSW. Most hourly observations of wind speeds exceeding 31 mph and the most cases of blowing dust occur with winds from these directions.

TABLE 17. Percent Frequency of Monthly and Annual Wind Direction and Speed at 50-Foot Elevation, 1955 Through 1980

PERCENT FREQUENCY OF MONTHLY AND ANNUAL WIND DIRECTION AT 50-FOOT-1955-1980

DIRECTION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1	3.6	4.1	4.2	3.3	3.3	3.2	4.1	3.7	5.1	3.9	3.5	2.8	3.7
2	2.7	3.3	3.2	3.2	3.3	3.3	3.6	3.0	4.2	3.3	2.7	2.2	3.2
3	2.0	1.9	1.8	2.1	2.2	2.0	2.2	2.2	2.3	2.4	2.4	2.1	2.1
4	2.6	2.1	2.0	2.4	2.4	2.3	2.8	2.7	3.2	3.0	2.8	2.4	2.6
5	2.5	2.2	2.4	2.0	2.2	2.3	2.5	2.7	2.9	3.3	3.2	2.7	2.6
6	4.2	3.4	3.8	2.9	2.9	2.7	2.9	3.2	3.5	4.8	4.4	3.9	3.6
7	3.1	2.7	3.0	2.6	2.4	2.2	2.0	2.5	2.7	3.4	3.4	3.3	2.8
8	3.4	3.3	3.9	3.0	2.8	2.7	2.6	2.8	2.9	3.8	4.2	3.7	3.2
9	4.9	4.3	5.2	4.2	3.3	3.2	2.6	3.1	3.3	4.1	4.8	4.7	4.0
10	6.8	7.5	9.4	8.6	6.3	6.2	5.6	6.1	5.6	6.4	6.6	6.9	6.8
11	6.2	7.7	10.3	11.4	10.2	8.7	8.2	8.6	9.0	8.4	6.7	7.0	8.5
12	6.5	9.2	10.3	12.6	12.3	11.5	10.7	11.7	11.9	11.2	8.4	7.8	10.3
13	14.5	15.1	14.7	17.0	18.3	19.3	18.9	17.8	14.5	12.9	12.9	13.6	15.8
14	18.1	17.2	13.1	13.4	16.4	18.8	17.9	16.2	14.0	12.5	15.1	17.1	15.8
15	6.8	6.0	5.1	3.8	3.9	4.0	4.3	4.2	5.2	5.9	6.9	6.5	5.2
16	4.8	5.2	4.8	4.4	4.0	3.7	4.6	4.7	5.8	5.3	4.9	4.7	4.7
17	5.4	3.2	1.0	.7	.7	.0	.4	.7	1.4	3.1	5.5	6.9	2.5
18	1.9	1.6	1.8	2.2	3.2	3.4	4.0	4.0	2.7	2.0	1.6	1.9	2.5
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

PERCENT FREQUENCY OF MONTHLY AND ANNUAL WIND SPEED AT 50-FOOT - 1955-1980

SPEED CLASS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
0	5.4	3.2	1.0	.7	.7	.6	.4	.8	1.4	3.1	5.5	6.8	2.5
1-3	31.9	26.8	18.4	14.8	14.2	11.0	13.2	16.9	20.7	28.5	32.9	32.9	21.8
4-7	31.4	31.4	32.7	31.9	32.9	34.2	37.8	38.6	37.4	35.2	32.0	29.9	33.8
8-12	19.6	23.9	26.5	27.8	29.0	28.7	27.9	26.3	25.4	21.8	18.9	19.0	24.6
13-18	7.3	9.4	13.7	15.9	16.1	17.5	14.3	12.5	10.8	7.9	6.9	7.1	11.6
19-24	2.8	3.3	5.5	6.7	6.0	6.7	5.4	4.2	3.6	2.7	2.7	2.9	4.4
25-31	1.1	1.5	1.9	2.0	1.1	1.3	.9	.7	.7	.7	.9	1.1	1.2
32-38	.3	.4	.4	.2	.1	.0	.0	.0	.0	.1	.2	.2	.2
39-46	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
47-66	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

FIGURE 20. Hourly Average 50-Foot Wind Speeds: June Versus December, 1955 Through 1980

TABLE 18. Monthly and Annual Diurnal Variation in the Percentage of Wind
From WNW and NW at 50-Foot Level 1955 Through 1980

FLUR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1	35.1	34.8	38.3	39.4	47.8	57.6	62.3	55.0	45.0	34.1	32.1	33.3	42.9
2	35.9	35.8	34.2	36.0	43.1	53.3	59.1	50.7	40.9	31.9	33.1	31.5	40.5
3	34.0	35.4	35.2	34.5	40.0	48.1	50.9	44.7	37.2	31.1	30.4	30.3	37.7
4	32.8	38.1	35.1	33.1	37.5	40.9	44.2	39.5	35.0	29.0	30.4	33.3	35.7
5	36.7	36.1	33.0	31.5	37.5	36.5	43.2	36.6	33.8	29.3	29.6	32.1	34.8
6	35.2	35.4	32.0	32.2	35.7	40.6	45.5	35.2	33.3	29.2	28.6	31.0	34.5
7	34.8	35.2	32.5	33.6	45.4	50.3	54.1	47.6	31.4	29.3	29.7	31.3	38.0
8	32.5	37.4	35.0	37.6	44.4	42.4	46.0	46.3	37.1	29.3	28.6	30.9	37.3
9	35.9	26.7	34.0	34.6	33.0	29.2	25.8	30.0	27.6	29.9	28.4	31.0	31.3
10	34.3	38.2	23.4	22.6	22.7	19.5	14.3	15.4	17.7	21.6	27.0	30.6	23.9
11	31.9	21.8	19.3	19.1	14.1	16.0	9.4	12.4	13.6	18.4	24.7	30.6	20.1
12	27.6	26.5	14.7	17.1	14.0	14.0	10.0	10.4	10.9	13.8	21.0	26.9	17.2
13	27.1	24.9	16.4	15.6	14.6	11.4	8.4	7.7	11.3	11.0	20.8	25.1	16.1
14	24.1	20.5	15.7	15.1	16.0	15.8	9.3	8.7	11.5	11.5	19.0	25.4	16.0
15	23.6	21.8	16.0	16.8	17.7	17.8	12.0	12.4	13.1	14.0	19.9	26.2	17.6
16	26.0	22.6	16.5	21.5	21.0	23.1	14.9	16.6	14.2	15.5	24.4	30.0	20.5
17	32.3	25.6	21.3	26.4	27.8	27.8	20.6	21.6	17.8	22.5	28.2	31.2	25.3
18	31.7	31.3	24.4	29.2	33.0	36.7	25.7	26.1	24.9	25.8	29.2	30.4	29.0
19	33.5	34.4	27.5	33.8	40.6	42.7	35.7	34.2	29.6	27.7	29.9	31.8	33.4
20	34.0	33.7	31.6	38.6	47.3	51.3	46.2	43.2	33.3	25.7	29.9	33.0	37.3
21	36.1	32.2	30.0	41.2	49.5	57.6	56.5	51.1	37.7	27.4	32.4	34.3	40.5
22	36.0	33.5	32.0	41.9	51.2	60.1	61.8	56.0	40.8	31.6	30.9	31.6	42.3
23	35.5	36.5	34.4	40.9	50.6	61.9	63.5	56.9	42.4	34.4	31.8	31.9	43.4
24	36.8	35.5	35.4	38.8	48.0	60.5	63.4	56.2	43.7	35.7	32.7	32.2	43.3
AVC	32.6	32.3	27.8	30.5	34.7	38.1	36.8	33.9	28.5	25.4	28.0	30.7	31.6

FIGURE 21. Percentage of 50-Foot Wind Direction From WNW and NW by Hour: June Versus December, 1955 Through 1980

TABLE 19. Monthly and Annual Hourly Average Wind Speed at 50-Foot Level: 1955 Through 1980

FOUR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1	6.2	7.0	8.1	8.9	9.1	10.0	9.8	9.2	7.9	6.6	6.0	6.2	7.9
2	6.1	6.8	8.0	8.6	8.6	9.1	9.1	8.3	7.3	6.3	6.0	6.0	7.5
3	6.0	6.8	7.8	8.2	8.1	8.4	8.2	7.5	7.0	6.0	5.8	6.0	7.2
4	5.9	6.7	7.4	7.7	7.7	7.7	7.7	6.9	6.8	5.9	5.8	5.9	6.6
5	5.9	6.6	7.3	7.3	7.4	7.4	7.1	6.6	6.4	5.8	5.9	5.9	6.6
6	6.0	6.4	7.1	7.0	6.8	6.8	6.5	6.0	6.2	5.6	5.6	5.8	6.3
7	5.8	6.2	6.9	6.7	7.2	7.7	7.1	5.7	5.6	5.5	5.4	5.6	6.3
8	5.8	6.1	6.6	7.7	7.5	7.6	7.0	6.2	6.0	5.2	5.2	5.6	6.4
9	5.8	6.4	7.6	8.4	7.1	6.9	5.8	5.8	6.4	5.4	5.2	5.7	6.4
10	5.9	6.9	8.1	8.2	6.9	6.6	5.5	5.3	6.3	6.0	5.7	5.6	6.4
11	6.4	7.2	8.5	8.4	7.1	6.9	5.8	5.3	6.3	6.2	6.2	6.0	6.7
12	6.7	7.4	8.9	8.7	7.6	7.4	6.2	5.7	6.5	6.2	6.5	6.4	7.0
13	7.0	7.6	9.3	9.2	8.0	7.7	6.7	6.3	6.9	6.5	6.6	6.6	7.4
14	6.9	8.1	9.8	9.6	8.5	8.4	7.3	6.8	7.1	6.7	6.7	6.7	7.7
15	6.8	8.2	10.1	10.1	9.0	8.8	7.6	7.3	7.5	7.0	6.4	6.4	7.9
16	6.4	8.2	10.2	10.4	9.6	9.6	8.3	7.9	8.1	7.0	6.2	6.1	8.2
17	6.3	7.9	10.2	11.0	10.3	10.6	9.1	8.7	8.5	7.0	6.1	6.1	8.5
18	6.5	7.6	9.6	11.2	10.9	12.0	10.2	9.7	8.8	7.1	6.5	6.3	8.9
19	6.8	7.8	9.5	10.9	11.2	12.9	11.4	10.4	9.0	7.7	6.4	6.4	9.2
20	6.9	7.8	9.6	11.0	11.4	12.8	11.6	11.0	9.6	7.8	6.3	6.4	9.4
21	6.7	7.7	9.5	11.1	11.6	12.8	12.6	11.7	9.6	7.6	6.3	6.3	9.5
22	6.5	7.5	9.1	10.6	11.6	12.7	12.9	11.8	9.2	7.4	6.2	6.2	9.3
23	6.2	7.3	8.6	10.1	10.8	12.2	12.2	11.0	8.6	7.0	6.1	6.2	8.9
24	6.2	7.2	8.4	9.4	10.0	11.0	10.6	9.9	8.2	6.8	6.1	6.2	8.3
AVG	6.3	7.2	8.6	9.2	8.9	9.3	8.6	8.0	7.5	6.5	6.1	6.1	7.7

FIGURE 22. Monthly Wind Roses for HMS Based on 50-Foot Wind Data, 1955 Through 1980. (The numbers in the centers are the percentages of calm [top numbers] and variable [bottom numbers] winds. The points of the rose represent the directions from which the winds blow.)

TABLE 20. Monthly and Annual Diurnal Variation in the Percentage of Wind
From SSW, SW and WSW at 50-Foot Level, 1955 Through 1980

FOUR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1	20.2	22.7	24.4	21.5	16.1	12.6	8.6	12.2	16.9	19.6	19.9	19.4	17.8
2	18.9	18.9	25.6	23.2	22.2	13.2	8.9	14.9	19.5	21.8	18.7	21.2	18.9
3	18.5	18.9	24.4	27.1	20.3	18.7	15.5	17.9	23.5	20.5	19.6	22.1	20.6
4	17.2	18.2	23.8	26.8	24.9	23.3	19.6	24.8	24.2	21.1	19.2	20.7	22.0
5	18.2	18.0	23.9	26.3	25.8	25.6	24.0	27.5	20.6	21.3	19.2	19.7	22.5
6	17.4	20.3	23.7	27.1	25.3	20.6	24.8	25.9	17.6	18.9	17.6	18.1	21.5
7	17.1	19.6	24.9	24.9	17.6	14.2	13.6	18.2	18.5	20.5	17.1	18.1	18.7
8	18.5	19.3	20.7	17.8	12.9	11.8	8.2	9.4	11.9	16.3	16.2	17.6	15.0
9	16.4	16.9	18.6	17.6	13.4	14.5	8.7	7.6	9.0	13.2	17.1	17.5	14.2
10	14.0	14.3	18.9	19.1	17.6	18.1	10.2	9.8	9.4	11.3	14.1	15.3	14.3
11	16.1	14.8	20.7	22.8	21.3	22.4	15.9	13.2	11.4	12.3	13.1	15.5	16.6
12	15.3	15.5	24.1	25.0	24.8	25.9	19.4	16.9	13.6	14.5	14.6	14.8	18.7
13	14.1	17.8	25.6	28.6	26.4	26.8	23.8	20.1	15.9	16.5	15.3	14.1	20.6
14	16.3	19.3	28.4	30.8	27.3	29.6	26.9	26.2	19.4	18.6	15.5	15.5	22.8
15	15.3	19.0	28.6	30.1	26.1	30.3	27.4	27.4	20.5	17.9	15.1	15.5	22.8
16	15.4	19.7	27.7	26.9	25.3	23.8	24.4	25.1	19.1	17.0	14.5	16.6	21.3
17	15.3	18.2	26.3	24.5	21.0	19.6	23.0	22.5	17.2	16.6	14.5	16.7	19.6
18	19.2	19.2	24.2	21.9	18.4	16.0	19.5	18.2	12.6	16.5	18.2	21.1	18.8
19	20.5	20.8	24.2	20.3	13.6	12.6	14.0	12.4	15.5	25.4	22.6	20.0	18.5
20	22.0	23.4	26.2	20.8	10.7	10.3	9.8	12.2	23.7	28.0	24.5	19.9	19.4
21	21.6	24.6	30.8	26.4	14.9	8.3	9.8	18.6	27.8	27.9	22.2	20.5	21.1
22	19.2	23.8	28.4	26.0	18.9	12.7	14.3	20.1	25.5	21.2	22.4	21.5	21.1
23	20.7	21.2	25.3	23.3	16.4	12.4	15.9	15.8	18.2	18.7	21.0	22.1	19.2
24	19.5	22.9	26.7	22.4	12.8	10.4	9.7	11.0	15.3	20.1	19.9	21.3	17.6
AVG	17.8	19.5	25.0	24.2	19.8	18.2	16.5	17.8	17.8	19.0	18.0	18.5	19.3

There is little seasonal or diurnal variation in the frequency of occurrence of wind directions of ENE, E, and ESE. These directions occur the least often (7% of the time), and have the lowest hourly average wind speeds (4.2 mph). See Table 42, in Section X, page 19 for additional information.

WIND SPEED AND DIRECTION DURING PERIODS OF PRECIPITATION

An analysis of the 50-foot wind direction and speed during observations of precipitation, by seasons, is presented in Tables 21 and 22, respectively.

TABLE 21. Percentage of Wind From Various Directions During Observations of Precipitation: 1960 Through 1980

Season	Direction Class (see Text)									TOTAL
	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	18	
Winter (D,J,F)	3.4	3.5	5.8	6.3	3.9	6.7	43.2	9.6	17.6	100
Spring (M,A,M)	4.4	3.8	7.7	8.4	12.9	18.8	28.4	9.2	6.2	100
Summer (J,J,A)	2.5	3.4	5.3	7.2	16.3	27.2	26.7	5.5	6.0	100
Fall (S,O,N)	3.4	4.8	7.9	8.6	8.7	12.0	27.5	11.1	16.0	100
ANNUAL	3.5	3.8	6.5	7.3	8.1	12.5	35.2	9.4	13.8	100

West-southwest and west winds (direction classes 11 and 12) are more than four times as frequent during periods of summer precipitation as during periods of winter precipitation. During the winter months, WNW and NW winds (direction classes 13 and 14) account for nearly half of all wind directions during precipitation (Table 21). Precipitation during calm wind conditions (18) occurs less frequently during the spring and summer than during fall and winter.

Average wind speeds during precipitation are higher during the spring and summer (Table 22).

TABLE 22. Percentage of Wind in Various Speed Classes During
Hourly Observations of Precipitation: 1960-1980

Season	Speed Class (mph)										Avg. Speed
	Calm	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	>46	
Winter (D,J,F)	16.3	21.9	30.3	23.8	6.3	0.9	0.2	0.2	0.1	0	5.7
Spring (M,A,M)	5.7	12.6	28.2	32.2	14.8	5.0	1.2	0.3	0	0	8.7
Summer (J,J,A)	5.5	8.6	28.2	33.1	18.9	4.3	1.1	0.3	0.1	0	9.2
Fall (S,O,N)	14.2	19.6	30.4	24.5	8.3	2.2	0.6	0.2	0	0	6.3
ANNUAL	12.5	18.1	29.7	26.6	9.8	2.4	0.6	0.3	0.1	0	6.8

WIND DURING PERIODS OF FOG

Most fog at the HMS is radiation fog, and occurs during periods of low wind speeds. Table 23 shows that 73% of all fog occurs when wind speeds are 3 mph or less. Fog occurs most frequently with NNW and N winds (direction classes 15 and 16). The next most frequent directions during fog are WNW and NW (direction classes 13 and 14).

TABLE 23. Frequency Distribution (%) of Wind Directions and Speeds During Hourly Observations of Fog With Visibility 1/2 Mile or Less: 1960 Through 1980

Direction Classes (see p. V-1)									
<u>1-2</u>	<u>3-4</u>	<u>5-6</u>	<u>7-8</u>	<u>9-10</u>	<u>11-12</u>	<u>13-14</u>	<u>15-16</u>	<u>18</u>	<u>TOTAL</u>
7.8	6.2	4.9	7.6	5.3	6.0	13.9	16.0	32.3	100

Speed Classes (mph)						
<u>Calm</u>	<u>1-3</u>	<u>4-7</u>	<u>8-12</u>	<u>>12</u>	<u>Total</u> <u>%</u>	<u>Average</u> <u>Speed</u>
30.1	42.9	24.0	2.7	0.4	100	2.3

WIND PROFILES

Refer to Section X, page 11.

EXTREME VALUE ANALYSIS OF PEAK GUSTS

Refer to Section XI, page 6.

VI. SKY COVER, VISIBILITY AND SOLAR RADIATION

VI. SKY COVER, VISIBILITY AND SOLAR RADIATION

SKY COVER

The term sky cover is used to express the portion of the celestial dome that is described by one of the following conditions:

1. Amount of sky covered, but not necessarily hidden, by clouds or obscuring phenomena aloft.
2. Amount of sky hidden by an obscuring phenomenon on the ground (such as fog or smoke).
3. A combination of 1 and 2.

The sky cover is determined hourly by scanning the sky and estimating the number of tenths that are covered (0 denotes clear sky and 10 denotes overcast). Average monthly sunrise to sunset sky cover values for 1946 through 1980 are shown in Table 24. The portion of Table 24 summarizing clear, partly cloudy and cloudy days covers the period 1954 through 1980.

Sunrise to sunset sky cover observations for any particular month include only the hourly observations when the sun is near or above the horizon. These hours are the same for any given month, but do vary from month to month corresponding to changes in sunrise and sunset times.

The number of clear, partly cloudy and cloudy days in Table 24 is the result of assigning each day to one of the following categories:

<u>Category</u>	<u>Average Sky Cover (Tenths From Sunrise to Sunset)</u>
Clear	0-3
Partly Cloudy	4-7
Cloudy	8-10

During the period of record (1954 through 1980), there has been an average of 192 sunny days per year at the HMS, (the sum of the clear and partly cloudy days from Table 24).

TABLE 24. Average Sky Cover (Sunrise to Sunset) and Number of Days Clear, Partly Cloudy and Cloudy, 1946 Through 1980*

MONTH	SKY COVER (SCALE 0-10)					NUMBER OF CLEAR DAYS					PARTLY CLOUDY DAYS	NUMBER OF CLOUDY DAYS				
	AVG	RECORD GREATEST	YEAR	RECORD LEAST	YEAR	AVG	RECORD GREATEST	YEAR	RECORD LEAST	YEAR		AVG	RECORD GREATEST	YEAR	RECORD LEAST	YEAR
JAN	7.9	9.2	1978	4.3	1949	3	7	1963	0	1955+	5	22	28	1978	17	1963
FEB	7.6	9.3	1980	5.9	1964	4	9	1968+	0	1980+	5	19	26	1980+	12	1964
MAR	6.8	8.5	1978	4.9	1965	6	12	1979+	1	1978+	8	17	23	1977	9	1979+
APR	6.4	8.1	1963	3.7	1951	6	12	1962	1	1963	9	15	21	1979+	6	1956
MAY	5.9	7.7	1977+	4.5	1949	8	14	1973	1	1977	11	12	19	1977+	6	1958
JUNE	5.3	7.0	1950	2.8	1961	10	21	1961	5	1972+	10	10	15	1980+	5	1979+
JULY	2.9	4.7	1976	0.9	1953	19	26	1960	13	1976+	7	5	12	1976	0	1967
AUG	3.4	5.9	1968	0.6	1955	18	30	1955	9	1978	7	6	13	1968	0	1969+
SEPT	4.1	6.7	1978	1.4	1975	15	27	1975	6	1978	7	8	16	1977	1	1975
OCT	5.8	8.0	1975	3.9	1952	10	14	1980+	1	1975	7	14	22	1973	9	1970
NOV	7.7	9.1	1972	6.2	1957	4	10	1957	1	1973+	5	21	25	1973+	15	1961
DEC	8.1	9.2	1962	6.4	1978	3	9	1978	1	1980+	5	23	28	1962	17	1978
YEAR	6.0	6.6	1978+	5.1	1949	106	134	1967	80	1977	86	172	193	1978	151	1967

* NUMBER OF CLEAR, PARTLY CLOUDY, AND CLOUDY DAYS 1954-1980

+ ALSO IN EARLIER YEARS

VISIBILITY

Visibility is determined during each hourly observation. The values recorded are miles and fractions of a mile. If the visibility exceeds 15 miles, it is recorded as 15+.

If the visibility is 6 miles or less, one or more phenomena must be recorded to explain the restriction. Fog and precipitation (usually snow) are the most common restrictions, but dust or blowing dust, volcanic ash, smoke, and blowing snow have also been observed. Table 25 gives the percent of all observations during the period 1955 to 1980 during which any of the above phenomena were recorded.

TABLE 25. Percent of Hourly Observations With Visibility Restricted to 6 Miles or Less by Various Phenomena (1960 Through 1980)

<u>Season</u>	<u>Phenomena</u>					<u>Total</u>
	<u>Fog</u>	<u>Precip.</u>	<u>D-BD^(a)</u>	<u>Smoke</u>	<u>Blowing Snow</u>	
Winter (D,J,F)	2.1	0.7	#	#	0	2.8
Spring (M,A,M)	0.1	#	0.1	0	#	0.2
Summer (J,J,A)	#	#	#	#	0	#
Fall (S,O,N)	<u>0.7</u>	<u>0.1</u>	<u>#</u>	<u>#</u>	<u>0</u>	<u>0.8</u>
ANNUAL TOTAL	2.9	0.8	0.1	#	#	3.8

(a) Includes volcanic ash
Denotes less than 0.05%

SOLAR RADIATION

An Eppley^(a) 10-junction pyranometer (Stone 1964) was used for the period 1957 through 1977 to measure both diffuse and direct solar radiation on a horizontal surface. The same measurements were made for the period 1978 through 1980 with an Eppley, Model PSP pyranometer. These data were recorded on a Leeds & Northrup^(b) Speedomax recorder,

(a) Eppley Laboratories, Inc., Newport, Rhode Island
(b) Leeds & Northrup Company, North Wales, Pennsylvania

which was designed to record langleys^(a) per minute. Hourly averages were determined visually by the "equal area" method. These data are summarized in Table 26 and Figure 23.

The highest daily totals occur with a clear sky and clean air. The highest peaks, which are of short duration, occur when the sun's rays are in close proximity to highly reflective clouds. When this occurs the sensor receives both direct and reflected radiation. Instantaneous values may approach 2.00 langleys per minute.

The lowest daily totals commonly occur with low stratus overcasts, usually without precipitation. Instantaneous low readings occur in conjunction with cumulonimbus clouds. These low values sometimes approach zero on the chart, but are of short duration. The lowest mid-day values of hourly solar radiation occurred on May 18, 1980, as the dense ash cloud from the eruption of the Mount St. Helens volcano passed over eastern Washington. Hourly solar radiation dropped to 0 at 1100 and remained at 0 for the rest of the day.

Figure 23 graphically shows the least, average and greatest daily solar radiation totals for the period 1953 through 1980. It is interesting to note that the average daily solar radiation for the months of November through February (winter months) is about 45% of the greatest daily values, while for June through September (summer months) the percentages are between 70 and 80%. This is due to the greater cloud cover during the winter (Table 24).

The highest average daily solar radiation totals do not occur in June as might be expected, but in July. The sun is above the horizon longer in June, but cloudiness in July is about one-half that in June. Also, clear days outnumber cloudy days 19 to 5 in July, compared to 10 to 10 in June (Table 24).

(a) A langley is defined as 1 gram calorie per square centimeter

TABLE 26. Hourly and Daily Average Solar Radiation Totals
(Langleys) Period of Record 1955 Through 1980

HOUR PST	J	F	M	A	M	J	J	A	S	O	N	D	Y
04-05	0	0	0	T	1.8	3.2	2.5	0.6	0	0	0	0	0.7
05-06	0	0	T	1.9	8.6	11.5	9.8	4.4	0.8	T	0	0	3.1
06-07	0	T	2.1	9.8	20.1	24.0	22.1	14.6	6.9	1.6	0	0	8.5
07-08	0.2	2.2	9.6	22.3	33.6	38.0	36.6	28.3	18.7	8.7	2.0	0.3	16.8
08-09	3.7	9.0	20.7	35.4	46.3	50.1	49.9	42.1	31.9	19.2	7.7	3.3	26.7
09-10	10.0	17.4	32.1	46.9	56.4	59.4	60.7	53.1	43.4	29.0	14.5	8.4	36.0
10-11	16.3	25.3	41.4	55.2	62.6	66.2	68.3	61.4	51.3	36.5	19.9	13.3	43.2
11-12	20.2	30.5	47.1	58.2	64.9	69.1	72.1	65.2	54.8	40.2	22.4	16.4	46.8
12-13	21.3	31.9	47.6	57.5	62.8	68.9	71.9	65.8	54.8	39.4	22.2	16.9	46.8
13-14	18.9	29.6	44.0	53.7	58.8	64.3	67.8	61.7	50.4	34.7	18.9	14.7	43.2
14-15	14.3	23.9	37.2	46.9	52.2	56.7	60.5	54.0	42.3	27.0	13.5	10.2	36.6
15-16	7.8	16.1	28.0	36.3	41.7	46.5	49.9	43.2	31.5	17.1	6.7	4.4	27.5
16-17	2.2	7.2	16.6	24.3	29.9	34.3	37.2	30.3	18.6	7.1	1.5	0.7	17.5
17-18	0	1.5	6.1	12.2	17.7	22.2	23.6	17.0	7.2	1.2	0	0	9.1
18-19	0	0	0.9	3.4	7.4	11.0	11.3	6.0	1.2	T	0	0	3.5
19-20	0	0	0	0.3	1.5	3.3	2.9	0.9	0	0	0	0	0.7
SUM	114.9	194.6	333.4	464.3	566.3	628.7	647.1	548.6	413.9	261.6	129.3	88.6	366.7
HM	136	238	388	535	634	698	714	613	463	303	180	116	390
YEAR	1973	1960	1965	1973	1970	1960	1973	1955	1975	1976	1957	1970	1973
LM	78	128	293	374	472	537	588	475	326	216	97	57	324
YEAR	1978	1980	1978	1963	1980	1980	1955	1968	1977	1975	1979+	1980+	1980

HM - HIGHEST MONTHLY AND ANNUAL (1953-1980)

LM - LOWEST MONTHLY AND ANNUAL (1953-1980)

+ - ALSO IN EARLIER YEARS

T - LESS THAN 0.1

FIGURE 23. Average, Greatest and Least Daily Solar Radiation Totals: 1953 Through 1980

VII. PSYCHROMETRIC DATA

VII. PSYCHROMETRIC DATA

Psychrometric data comprise observations of dry bulb, wet bulb, and dew point temperatures and relative humidity. The dry bulb temperature is the temperature of the ambient air and the wet bulb temperature is the lowest temperature to which a parcel of air, under constant pressure, can be cooled by evaporating water into it. The dew point temperature is the temperature to which a given parcel of air, under constant pressure and water-vapor content, must be cooled to attain saturation. Relative humidity is the ratio of the actual water-vapor content of the air to that at which saturation would occur if the pressure and temperature remained unchanged.

Psychrometric observations at HMS began in March 1946. Observations, taken at 3-hourly intervals, consisted of sling psychrometer readings of dry and wet bulb temperatures. Values for relative humidity and dew point temperatures were computed from the dry and wet bulb temperatures. Hourly psychrometric observations began in 1956.

In 1956 a Foxboro^(a) Dew Point Measuring System was installed (Stone 1964). Starting August 1, dry bulb and dew point temperatures were recorded on Leeds & Northrup^(b) Speedomax recorders and the values for relative humidity and wet bulb temperatures were computed. These data for the period 1957 through 1980 are depicted in Tables 27 through 30 and Figure 24.

Figure 25 is a bar diagram of average 1300 PST relative humidity for each July of record for the years 1946 through 1980. The 10-year moving average line on the diagram does not indicate a significant trend. The HMS is surrounded by irrigation projects but none are closer than 10 miles, so these data cannot be considered representative of conditions in irrigated areas.

Before 1975, wet bulb temperatures $\geq 75^{\circ}\text{F}$ had not been observed. On July 8, 9 and 10, 1975, there were 7 hourly observations of wet bulb

(a) Foxboro Company, Foxboro, Massachusetts

(b) Leeds & Northrup Company, North Wales, Pennsylvania

TABLE 2/. Monthly Averages of Psychrometric Data, 1950 through 1980
(Dry Bulb, Wet Bulb and Dewpoint in °F, Relative Humidity in %)

		<u>AVERAGES</u>												
		<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUNE</u>	<u>JULY</u>	<u>AUG</u>	<u>SEPT</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>YEAR</u>
DRY BULB		30	37	44	53	62	70	77	75	66	53	40	33	53
WET BULB		27	34	37	43	49	54	58	57	52	45	36	31	44
REL. HUM.		76	71	56	47	43	40	32	36	42	57	73	80	54
DEWPOINT		23	28	28	31	36	41	43	43	40	36	31	27	34
		<u>MONTHLY AVERAGE EXTREMES</u>												
DRY BULB	HIGHEST	43	44	49	58	69	76	83	82	72	59	46	39	56
	YEAR	1953	1958	1968	1977	1958	1969	1960	1967	1967	1952	1954	1953	1958
	LOWEST	13	26	40	48	57	64	73	71	61	50	32	26	51
	YEAR	1950	1956	1955	1955	1962	1953	1963	1964	1977	1968	1978+	1964	1955+
WET BULB	HIGHEST	39	41	41	46	55	59	62	61	56	48	42	36	46
	YEAR	1953	1958	1978+	1980+	1958	1958	1975	1961	1963	1962	1954	1966	1958
	LOWEST	12	23	33	39	45	51	56	55	48	42	29	25	42
	YEAR	1950	1956	1955	1955	1959	1954	1977+	1980+	1970	1970	1978	1978	1955
REL. HUM.	HIGHEST	89	87	66	64	62	54	40	48	56	74	89	90	59
	YEAR	1960	1963	1950	1963	1948	1950	1955	1976	1977	1962	1979	1950	1978
	LOWEST	60	54	44	37	31	30	22	24	33	42	63	69	49
	YEAR	1963	1967	1965	1966	1966	1949	1959	1967	1974	1952	1976	1968	1967
DEWPOINT	HIGHEST	34	37	34	37	44	48	50	48	45	44	38	34	38
	YEAR	1953	1958	1961	1963	1957	1958	1975	1976	1963	1962	1954	1950	1958
	LOWEST	6	17	21	26	30	38	35	38	34	31	23	20	32
	YEAR	1950	1956	1965+	1955	1964	1954	1959	1955	1970	1974	1978	1978	1955

TABLE 28. Percent Frequency Distribution of Dry Bulb Temperature
Versus Wet Bulb Temperature °F (1955 Through 1980)

DRYBULB TEMP	LT-2C	WET BULB TEMPERATURE																				TOTAL	
		-2C/ -16	-15/ -11	-10/ -6	-5/ -1	0/ 4	5/ 9	10/ 14	15/ 19	20/ 24	25/ 29	30/ 34	35/ 39	40/ 44	45/ 49	50/ 54	55/ 59	60/ 64	65/ 69	70/ 74	75/ 79		80/ 84
-30/-21	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	
-20/-16	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	
-15/-11	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	
-10/-6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	
-5/-1	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	
0/ 4	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	
5/ 9	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	
10/ 14	.0	.0	.0	.0	.0	.0	.1	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.7	
15/ 19	.0	.0	.0	.0	.0	.0	.0	.3	.9	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.1	
20/ 24	.0	.0	.0	.0	.0	.0	.0	.0	.4	1.9	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	2.3	
25/ 29	.0	.0	.0	.0	.0	.0	.0	.0	.0	.9	3.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	4.5	
30/ 34	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	2.6	5.5	.1	.0	.0	.0	.0	.0	.0	.0	.0	8.3	
35/ 39	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	4.5	3.4	.0	.0	.0	.0	.0	.0	.0	.0	8.1	
40/ 44	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	6.0	2.4	.0	.0	.0	.0	.0	.0	.0	9.4	
45/ 49	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	2.6	5.5	1.1	.0	.0	.0	.0	.0	.0	.0	9.3	
50/ 54	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	4.8	3.6	.5	.0	.0	.0	.0	.0	.0	9.2	
55/ 59	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.5	4.9	1.9	.2	.0	.0	.0	.0	.0	8.5	
60/ 64	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	3.1	4.3	.9	.1	.0	.0	.0	.0	8.5	
65/ 69	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.7	4.4	2.1	.2	.0	.0	.0	.0	7.5	
70/ 74	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	2.4	3.7	.5	.0	.0	.0	.0	6.6	
75/ 79	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	3.3	1.3	.0	.0	.0	5.1	
80/ 84	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.8	2.1	.1	.0	.0	4.0	
85/ 89	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	1.9	.3	.0	.0	2.7	
90/ 94	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.3	.5	.0	.0	1.9	
95/ 99	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	.7	.0	.0	1.1	
100/104	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.4	
105/109	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.1	
110/114	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	
115/119	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	
120/124	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	
TOTAL	.0	.0	.0	.1	.1	.2	.4	.8	1.3	2.9	6.4	11.2	12.4	14.3	13.4	14.0	12.4	7.8	2.1	.1	.0	.0	100.0

TABLE 29. Percent Frequency Distribution of Dry Bulb Temperature, °F, Versus Relative Humidity, 1955 Through 1980

SEASON-(DEC JAN FEB)							
RELATIVE HUMIDITY							
DRY BULB	LT.30	30/44	45/59	60/74	75/89	GT.89	TOTAL
-30/-21	.00	.00	.00	.00	.00	.00	.01
-20/-16	.00	.00	.00	.02	.01	.00	.03
-15/-11	.00	.00	.02	.03	.01	.00	.05
-10/-6	.00	.04	.04	.12	.02	.00	.22
-5/-1	.00	.05	.06	.27	.11	.02	.51
0/ 4	.00	.05	.11	.32	.28	.06	.81
5/ 9	.02	.04	.21	.40	.61	.17	1.46
10/ 14	.04	.10	.32	.46	.92	.68	2.52
15/ 19	.06	.18	.35	.61	1.41	1.47	4.07
20/ 24	.05	.16	.48	1.03	2.71	3.20	7.63
25/ 29	.06	.24	.62	1.68	5.21	6.07	13.89
30/ 34	.10	.27	1.03	3.36	7.87	10.44	23.09
35/ 39	.03	.32	2.20	4.61	5.33	4.98	17.48
40/ 44	.05	.72	3.25	4.31	2.68	2.29	13.30
45/ 49	.11	1.18	2.99	2.76	1.02	.30	8.35
50/ 54	.12	1.06	1.80	1.14	.16	.03	4.34
55/ 59	.08	.37	.93	.31	.01	.00	1.71
60/ 64	.02	.17	.24	.02	.00	.00	.46
65/ 69	.01	.04	.03	.00	.00	.00	.07
70/ 74	.01	.00	.00	.00	.00	.00	.01
75/ 79	.00	.00	.00	.00	.00	.00	.00
80/ 84	.00	.00	.00	.00	.00	.00	.00
85/ 89	.00	.00	.00	.00	.00	.00	.00
90/ 94	.00	.00	.00	.00	.00	.00	.00
95/ 99	.00	.00	.00	.00	.00	.00	.00
100/104	.00	.00	.00	.00	.00	.00	.00
105/109	.00	.00	.00	.00	.00	.00	.00
110/114	.00	.00	.00	.00	.00	.00	.00
115/119	.00	.00	.00	.00	.00	.00	.00
120/124	.00	.00	.00	.00	.00	.00	.00
TOTAL	.77	5.03	14.67	21.46	28.35	29.72	100.00

SEASON-(MAR APR MAY)							
RELATIVE HUMIDITY							
DRY BULB	LT.30	30/44	45/59	60/74	75/89	GT.89	TOTAL
-30/-21	.00	.00	.00	.00	.00	.00	.00
-20/-16	.00	.00	.00	.00	.00	.00	.00
-15/-11	.00	.00	.00	.00	.00	.00	.00
-10/-6	.00	.00	.00	.00	.00	.00	.00
-5/-1	.00	.00	.00	.00	.00	.00	.00
0/ 4	.00	.00	.00	.00	.00	.00	.00
5/ 9	.00	.00	.00	.00	.00	.00	.00
10/ 14	.00	.00	.00	.00	.01	.00	.01
15/ 19	.02	.01	.04	.04	.03	.01	.16
20/ 24	.02	.04	.09	.11	.08	.05	.59
25/ 29	.04	.06	.20	.38	.40	.23	1.32
30/ 34	.04	.12	.74	1.37	1.23	.49	3.99
35/ 39	.09	.37	2.27	2.35	1.42	.45	6.96
40/ 44	.13	1.29	4.88	3.67	1.98	.65	12.60
45/ 49	.33	3.35	6.17	3.54	1.60	.64	15.63
50/ 54	1.17	5.56	6.08	2.65	.96	.41	16.83
55/ 59	2.26	5.92	3.77	1.26	.51	.12	13.83
60/ 64	2.92	5.15	2.31	.51	.10	.01	11.00
65/ 69	2.82	3.40	.90	.10	.01	.00	7.24
70/ 74	2.57	1.86	.27	.01	.00	.00	4.72
75/ 79	1.92	.71	.02	.00	.00	.00	2.66
80/ 84	1.38	.18	.01	.00	.00	.00	1.57
85/ 89	.69	.04	.00	.00	.00	.00	.73
90/ 94	.30	.00	.00	.00	.00	.00	.30
95/ 99	.06	.00	.00	.00	.00	.00	.06
100/104	.00	.00	.00	.00	.00	.00	.00
105/109	.00	.00	.00	.00	.00	.00	.00
110/114	.00	.00	.00	.00	.00	.00	.00
115/119	.00	.00	.00	.00	.00	.00	.00
120/124	.00	.00	.00	.00	.00	.00	.00
TOTAL	16.77	28.08	27.76	16.00	8.33	3.07	100.00

TABLE 29. Continued

SEASON-(JUN JUL AUG)							
RELATIVE HUMIDITY							
DRY BULB	LT.30	30/44	45/59	60/74	75/89	GT.89	TOTAL
-30/-21	.00	.00	.00	.00	.00	.00	.00
-20/-16	.00	.00	.00	.00	.00	.00	.00
-15/-11	.00	.00	.00	.00	.00	.00	.00
-10/-6	.00	.00	.00	.00	.00	.00	.00
-5/-1	.00	.00	.00	.00	.00	.00	.00
0/ 4	.00	.00	.00	.00	.00	.00	.00
5/ 9	.00	.00	.00	.00	.00	.00	.00
10/ 14	.00	.00	.00	.00	.00	.00	.00
15/ 19	.00	.00	.00	.00	.00	.00	.00
20/ 24	.00	.00	.00	.00	.00	.00	.00
25/ 29	.00	.00	.00	.00	.00	.00	.00
30/ 34	.00	.00	.00	.00	.00	.00	.00
35/ 39	.00	.00	.00	.01	.00	.00	.01
40/ 44	.00	.00	.00	.07	.01	.00	.09
45/ 49	.00	.02	.23	.18	.10	.02	.56
50/ 54	.02	.26	1.16	.81	.32	.14	2.70
55/ 59	.06	1.48	3.28	1.29	.63	.26	7.00
60/ 64	.35	4.17	5.26	1.64	.64	.21	12.27
65/ 69	1.57	7.26	4.74	.82	.24	.02	14.64
70/ 74	3.96	9.02	2.32	.25	.03	.00	15.58
75/ 79	6.41	6.74	.61	.03	.00	.00	13.79
80/ 84	8.45	3.34	.13	.00	.00	.00	11.92
85/ 89	7.59	.93	.01	.00	.00	.00	8.53
90/ 94	6.58	.16	.00	.00	.00	.00	6.74
95/ 99	4.12	.03	.00	.00	.00	.00	4.15
100/104	1.66	.00	.00	.00	.00	.00	1.66
105/109	.35	.00	.00	.00	.00	.00	.35
110/114	.02	.00	.00	.00	.00	.00	.02
115/119	.00	.00	.00	.00	.00	.00	.00
120/124	.00	.00	.00	.00	.00	.00	.00
TOTAL	41.13	33.42	17.74	5.10	1.97	.65	100.00

SEASON-(SEP OCT NOV)							
RELATIVE HUMIDITY							
DRY BULB	LT.30	30/44	45/59	60/74	75/89	GT.89	TOTAL
-30/-21	.00	.00	.00	.00	.00	.00	.00
-20/-16	.00	.00	.00	.00	.00	.00	.00
-15/-11	.00	.00	.00	.00	.00	.00	.00
-10/-6	.00	.00	.00	.00	.00	.00	.00
-5/-1	.00	.00	.00	.00	.00	.00	.00
0/ 4	.00	.00	.00	.00	.00	.00	.00
5/ 9	.00	.00	.01	.00	.00	.00	.01
10/ 14	.00	.01	.01	.05	.02	.01	.12
15/ 19	.00	.06	.04	.09	.06	.08	.34
20/ 24	.01	.11	.12	.22	.32	.35	1.17
25/ 29	.01	.10	.22	.50	.98	1.18	2.98
30/ 34	.02	.16	.41	1.23	2.29	2.38	6.49
35/ 39	.02	.25	.95	2.07	2.86	1.82	7.98
40/ 44	.06	.46	2.19	3.46	3.46	2.14	11.76
45/ 49	.10	1.01	3.58	3.79	2.75	1.27	12.50
50/ 54	.22	2.41	4.80	3.33	1.57	.44	12.77
55/ 59	.45	3.32	4.58	2.15	.73	.17	11.40
60/ 64	1.03	3.95	3.95	1.15	.19	.05	10.32
65/ 69	1.41	3.89	2.24	.22	.03	.00	7.78
70/ 74	2.10	3.30	.65	.02	.00	.00	6.08
75/ 79	2.01	1.76	.08	.00	.00	.00	3.84
80/ 84	1.89	.58	.01	.00	.00	.00	2.47
85/ 89	1.25	.08	.00	.00	.00	.00	1.36
90/ 94	.53	.01	.00	.00	.00	.00	.54
95/ 99	.09	.00	.00	.00	.00	.00	.09
100/104	.00	.00	.00	.00	.00	.00	.00
105/109	.00	.00	.00	.00	.00	.00	.00
110/114	.00	.00	.00	.00	.00	.00	.00
115/119	.00	.00	.00	.00	.00	.00	.00
120/124	.00	.00	.00	.00	.00	.00	.00
TOTAL	11.24	21.42	23.83	18.30	15.27	5.94	100.00

TABLE 29. Continued

SEASON - (ANNUAL)

RELATIVE HUMIDITY

DRY BULB	LT.30	30/44	45/59	60/74	75/89	GT.89	TOTAL
-30/-21	.00	.00	.00	.00	.00	.00	.00
-20/-16	.00	.00	.00	.00	.00	.00	.01
-15/-11	.00	.00	.00	.01	.00	.00	.01
-10/-6	.00	.01	.01	.03	.00	.00	.05
-5/-1	.00	.01	.01	.07	.03	.01	.13
0/ 4	.00	.01	.03	.08	.07	.01	.20
5/ 9	.01	.01	.05	.10	.15	.04	.36
10/ 14	.01	.03	.08	.13	.23	.17	.65
15/ 19	.02	.06	.11	.18	.37	.39	1.13
20/ 24	.02	.08	.17	.34	.77	.90	2.28
25/ 29	.02	.10	.26	.63	1.63	1.85	4.51
30/ 34	.04	.13	.54	1.48	2.83	3.31	8.33
35/ 39	.04	.24	1.35	2.25	2.40	1.80	8.06
40/ 44	.06	.61	2.57	2.87	2.03	1.27	9.41
45/ 49	.13	1.38	3.24	2.57	1.37	.56	9.25
50/ 54	.38	2.32	3.46	1.99	.76	.26	9.17
55/ 59	.71	2.77	3.15	1.26	.47	.14	8.51
60/ 64	1.08	3.37	2.96	.84	.24	.07	8.55
65/ 69	1.45	3.66	1.99	.28	.07	.01	7.47
70/ 74	2.17	3.57	.82	.07	.01	.00	6.63
75/ 79	2.60	2.31	.18	.01	.00	.00	5.10
80/ 84	2.94	1.03	.04	.00	.00	.00	4.01
85/ 89	2.40	.26	.00	.00	.00	.00	2.67
90/ 94	1.86	.04	.00	.00	.00	.00	1.90
95/ 99	1.07	.01	.00	.00	.00	.00	1.08
100/104	.42	.00	.00	.00	.00	.00	.42
105/109	.09	.00	.00	.00	.00	.00	.09
110/114	.00	.00	.00	.00	.00	.00	.00
115/119	.00	.00	.00	.00	.00	.00	.00
120/124	.00	.00	.00	.00	.00	.00	.00
TOTAL	17.53	22.04	21.02	15.19	13.43	10.78	100.00

V11-7

NB TEMP	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
-30/-21	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
-20/-16	.1	.0	.0	.0	.0	.C	.0	.0	.0	.C	.0	.0	.0
-15/-11	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
-10/-6	.4	.0	.0	.0	.0	.C	.0	.0	.0	.C	.0	.3	.1
-5/-1	1.0	.1	.0	.0	.0	.C	.0	.0	.0	.C	.0	.5	.1
0/ 4	1.8	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.6	.2
5/ 9	3.6	.5	.0	.0	.0	.0	.0	.0	.0	.C	.1	.8	.4
10/ 14	5.8	1.4	.2	.0	.0	.0	.0	.0	.0	.C	.5	2.0	.8
15/ 19	7.8	1.6	.8	.0	.0	.0	.0	.0	.0	.1	1.6	3.5	1.3
20/ 24	12.3	5.0	2.1	.1	.0	.0	.0	.0	.0	.2	4.7	9.9	2.9
25/ 29	19.2	13.9	8.5	1.2	.0	.0	.0	.0	.0	1.1	12.4	2C.3	6.4
30/ 34	22.9	28.1	18.1	7.4	1.0	.0	.0	.0	.5	6.5	21.5	29.0	11.2
35/ 39	14.5	25.4	27.7	19.0	4.9	.2	.0	.0	1.7	13.5	23.5	19.3	12.4
40/ 44	7.7	17.3	26.9	32.2	16.6	3.3	.8	.8	7.7	26.1	23.1	9.8	14.3
45/ 49	2.1	5.3	12.2	25.8	27.2	14.8	5.8	6.1	19.4	28.5	10.3	3.2	13.4
50/ 54	.6	1.2	3.1	11.2	28.9	30.2	19.7	21.1	32.4	16.7	2.1	.6	14.0
55/ 59	.1	.0	.4	2.7	16.1	29.9	31.7	34.6	25.6	6.7	.2	.1	12.4
60/ 64	.0	.C	.0	.4	4.7	17.3	3C.1	28.4	11.7	.8	.0	.0	7.8
65/ 69	.0	.0	.0	.0	.5	4.2	11.0	8.8	1.1	.0	.0	.0	2.1
70/ 74	.0	.0	.0	.0	.0	.1	1.0	.3	.0	.0	.0	.0	.1
75/ 79	.0	.0	.0	.0	.0	.C	.0	.0	.0	.C	.0	.0	.0
80/ 84	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
85/ 89	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
90/ 94	.0	.C	.0	.0	.0	.C	.0	.0	.0	.C	.0	.0	.0
95/ 99	.0	.0	.0	.0	.0	.0	.0	.0	.0	.C	.0	.0	.0
100/104	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
105/109	.0	.C	.C	.0	.0	.C	.0	.0	.0	.C	.0	.0	.0
110/114	.0	.C	.0	.0	.0	.C	.0	.0	.0	.C	.0	.0	.0
115/119	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
120/124	.0	.C	.0	.0	.0	.0	.0	.0	.0	.C	.0	.0	.0
TOTAL	100.0	100.C	1C0.0	10C.0	100.0	100.C	1CC.0	10C.0	100.0	10C.C	1C0.0	10C.0	100.0

FIGURE 24. Monthly and Annual Hourly Averages of Dry Bulb (D.B.) and Wet Bulb (W.B.) Temperature, Relative Humidity (R.H.), and Temperature of the Dew Point (D.P.) (1956 Through 1980)

FIGURE 24. Continued

FIGURE 24. Continued

FIGURE 24. Continued

FIGURE 25. Mean Relative Humidity (%) at 1300 PST in July: Each Year From 1946 to 1980

temperature $\geq 75^{\circ}\text{F}$ (not shown in Table 30 because the total was $<0.1\%$).
The average wet bulb temperature for the month was 62°F which is a
record high for the period of record (1950-1980).

VIII. ATMOSPHERIC PRESSURE

VIII. ATMOSPHERIC PRESSURE

Monthly averages of the hourly sea level and station pressures are summarized in millibars, inches of mercury (Hg), and millimeters of mercury (Hg) for the period of record 1955 through 1980. Station pressure is obtained from 6-hourly readings from a mercurial barometer and hourly observations from an aneroid barograph. Station pressure reduced to sea level is calculated hourly.

The atmospheric pressure averages are higher in the winter than in the summer. Both the absolute high and low records have occurred during the winter months. The extremes of sea level and station pressure are summarized in Table 31 (for the period 1950 through 1980). The diurnal ranges of sea level and station pressure are presented in Tables 32 through 37; sea level pressure is shown in Tables 32 through 34, and station pressure in Tables 35 through 37.

Records have not been kept on the rate of pressure changes, but some information has been obtained from one memorable storm. As a frontal system approached the HMS on November 3, 1958, the pressure fall averaged 0.082 inch Hg/hour over a 6-hour period. The maximum hourly fall was 0.160 inch Hg. The rise for the same time period following the frontal passage averaged 0.090 inch of Hg/hour, and the maximum hourly rise was 0.145 inch Hg.

TABLE 31. Average and Extreme Station and Sea Level Pressure Data,
1950 Through 1980 (Units = Inches of Mercury)

	STATION PRESSURE				SEA LEVEL PRESSURE			
	EXTREME			MAXIMUM	EXTREME			
	AVERAGE	HIGHEST	LOWEST	MONTHLY RANGE	HIGHEST	YEAR	LOWEST	YEAR
JANUARY	29.30	30.23	28.18	2.05	31.12	1979	28.96	1980
FEBRUARY	29.27	30.07	28.23	1.84	30.97	1956	28.98	1958
MARCH	29.20	29.92	28.29	1.63	30.79	1955	29.05	1951
APRIL	29.20	29.84	28.49	1.35	30.64	1973	29.26	1962
MAY	29.17	29.75	28.62	1.13	30.53	1949	29.38	1957
JUNE	29.13	29.54	28.60	0.94	30.32	1961+	29.36	1952
JULY	29.14	29.52	28.65	0.87	30.30	1959	29.41	1951
AUGUST	29.13	29.55	28.56	0.99	30.32	1968	29.32	1951
SEPTEMBER	29.18	29.72	28.65	1.07	30.52	1970	29.41	1962
OCTOBER	29.25	29.82	28.19	1.63	30.63	1980+	28.95	1950
NOVEMBER	29.30	30.06	28.43	1.63	30.90	1979	29.19	1951
DECEMBER	29.30	30.19	28.10	2.09	31.06	1978	28.86	1951
YEAR	29.21	30.23	28.10	2.13 ^(a)	31.12	1979	28.86	1951

(a) GREATEST RANGE OVER THE PERIOD OF RECORD

TABLE 32. Monthly Hourly Average Sea Level Pressure 1955 Through 1980 (Units = Millibars)

Hour (PST)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
0	1020.25	1018.36	1015.71	1015.12	1013.99	1012.61	1012.47	1012.15	1013.91	1017.10	1019.31	1019.53	1015.86
1	1020.18	1018.36	1015.79	1015.15	1014.06	1012.71	1012.62	1012.27	1014.04	1017.22	1019.24	1019.46	1015.91
2	1020.29	1018.40	1015.81	1015.18	1014.14	1012.85	1012.76	1012.41	1014.15	1017.28	1019.33	1019.57	1016.00
3	1020.36	1018.35	1015.77	1015.29	1014.29	1013.00	1012.96	1012.60	1014.27	1017.29	1019.29	1019.64	1016.08
4	1020.31	1018.34	1015.84	1015.41	1014.47	1012.18	1013.21	1012.79	1014.41	1017.35	1019.22	1019.58	1016.17
5	1020.25	1018.45	1016.06	1015.65	1014.76	1013.51	1013.61	1013.14	1014.70	1017.62	1019.38	1019.54	1016.38
6	1020.31	1018.55	1016.33	1015.98	1015.03	1013.76	1013.93	1013.53	1015.11	1017.88	1019.50	1019.62	1016.62
7	1020.45	1018.69	1016.59	1016.28	1015.31	1013.98	1014.23	1013.89	1015.50	1018.18	1019.73	1019.75	1016.87
8	1020.75	1018.97	1016.64	1016.40	1015.41	1014.09	1014.39	1014.07	1015.68	1018.46	1020.05	1019.97	1017.08
9	1021.00	1019.14	1016.99	1016.42	1015.33	1013.99	1014.23	1014.08	1015.77	1018.61	1020.24	1020.22	1017.17
10	1021.25	1019.20	1017.02	1016.35	1015.07	1013.63	1013.99	1013.87	1015.66	1018.56	1020.34	1020.51	1017.11
11	1021.15	1019.17	1016.79	1016.04	1014.68	1013.27	1013.63	1013.51	1015.32	1018.27	1020.20	1020.34	1016.85
12	1020.63	1018.76	1016.42	1015.59	1014.24	1012.83	1013.15	1013.03	1014.87	1017.77	1019.75	1019.87	1016.40
13	1020.15	1018.24	1015.90	1015.18	1013.81	1012.34	1012.63	1012.53	1014.34	1017.23	1019.36	1019.47	1015.92
14	1019.89	1017.84	1015.44	1014.73	1013.39	1011.90	1012.12	1011.98	1013.81	1016.82	1019.06	1019.26	1015.51
15	1019.90	1017.70	1015.16	1014.32	1012.95	1011.49	1011.03	1011.43	1013.37	1016.56	1018.98	1019.28	1015.17
16	1019.90	1017.56	1014.87	1014.03	1012.64	1011.14	1010.55	1010.96	1013.02	1016.34	1018.93	1019.34	1014.93
17	1019.99	1016.95	1014.78	1013.95	1012.45	1010.91	1010.20	1010.70	1012.89	1016.34	1019.02	1019.59	1014.80
18	1020.00	1017.09	1014.91	1013.92	1012.38	1010.91	1010.06	1010.57	1012.94	1016.51	1019.12	1019.62	1014.82
19	1020.06	1017.22	1015.11	1014.10	1012.56	1011.09	1010.18	1010.72	1013.13	1016.66	1019.20	1019.66	1014.96
20	1020.08	1017.24	1015.29	1014.47	1012.95	1011.40	1010.54	1011.11	1013.41	1016.75	1019.23	1019.59	1015.16
21	1020.10	1017.34	1015.42	1014.71	1013.33	1011.83	1010.99	1011.41	1013.61	1016.90	1019.28	1019.64	1015.37
22	1020.16	1017.48	1015.65	1014.95	1013.65	1012.22	1011.43	1011.73	1013.83	1017.07	1019.34	1019.72	1015.59
23	1020.18	1017.52	1015.68	1015.06	1013.84	1012.42	1012.25	1011.98	1013.98	1017.12	1019.33	1019.80	1015.76
AVG	1020.32	1018.12	1015.84	1015.18	1013.95	1012.54	1012.39	1012.35	1014.24	1017.33	1019.43	1019.69	1015.95

TABLE 33. Monthly Hourly Average Sea Level Pressure 1955 Through 1980
(Units = Inches of Mercury)

HOUR (PST)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
0	30.13	30.07	29.99	29.98	29.94	29.90	29.90	29.89	29.94	30.03	30.10	30.11	30.00
1	30.13	30.07	30.00	29.98	29.95	29.91	29.90	29.89	29.94	30.04	30.10	30.10	30.00
2	30.13	30.07	30.00	29.98	29.95	29.91	29.91	29.90	29.95	30.04	30.10	30.11	30.00
3	30.13	30.07	30.00	29.98	29.95	29.91	29.91	29.90	29.95	30.04	30.10	30.11	30.00
4	30.13	30.07	30.00	29.99	29.96	29.92	29.92	29.91	29.96	30.04	30.10	30.11	30.01
5	30.13	30.07	30.00	29.99	29.97	29.93	29.93	29.92	29.96	30.05	30.10	30.11	30.01
6	30.13	30.08	30.01	30.00	29.97	29.94	29.94	29.93	29.98	30.06	30.11	30.11	30.02
7	30.13	30.08	30.02	30.01	29.98	29.94	29.95	29.94	29.99	30.07	30.11	30.11	30.03
8	30.14	30.09	30.03	30.01	29.99	29.95	29.95	29.95	29.99	30.08	30.12	30.12	30.03
9	30.15	30.10	30.03	30.01	29.98	29.94	29.95	29.95	30.00	30.08	30.13	30.13	30.04
10	30.16	30.10	30.03	30.01	29.97	29.93	29.94	29.94	29.99	30.06	30.13	30.14	30.04
11	30.15	30.10	30.03	30.00	29.96	29.92	29.93	29.93	29.98	30.07	30.13	30.13	30.03
12	30.14	30.08	30.01	29.99	29.95	29.91	29.92	29.91	29.97	30.05	30.11	30.12	30.01
13	30.13	30.07	30.00	29.98	29.94	29.89	29.90	29.90	29.95	30.04	30.10	30.10	30.00
14	30.12	30.06	29.99	29.96	29.93	29.88	29.89	29.88	29.94	30.03	30.09	30.10	29.99
15	30.12	30.05	29.98	29.95	29.91	29.87	29.86	29.87	29.92	30.02	30.09	30.10	29.98
16	30.12	30.05	29.97	29.94	29.90	29.86	29.84	29.85	29.91	30.01	30.09	30.10	29.97
17	30.12	30.03	29.97	29.94	29.90	29.85	29.83	29.85	29.91	30.01	30.09	30.11	29.97
18	30.12	30.03	29.97	29.94	29.90	29.85	29.83	29.84	29.91	30.02	30.09	30.11	29.97
19	30.12	30.04	29.98	29.95	29.90	29.86	29.83	29.85	29.92	30.02	30.10	30.11	29.97
20	30.12	30.04	29.98	29.96	29.91	29.87	29.84	29.86	29.93	30.02	30.10	30.11	29.98
21	30.12	30.04	29.99	29.96	29.92	29.88	29.85	29.87	29.93	30.03	30.10	30.11	29.98
22	30.13	30.05	29.99	29.97	29.93	29.89	29.87	29.88	29.94	30.03	30.10	30.11	29.99
23	30.13	30.05	29.99	29.97	29.94	29.90	29.89	29.88	29.94	30.04	30.10	30.11	30.00
AVG	30.13	30.07	30.00	29.98	29.94	29.90	29.90	29.89	29.95	30.04	30.10	30.11	30.00

TABLE 34. Monthly Hourly Average Sea Level Pressure 1955 Through 1980
(Units = Millimeters of Mercury)

HCUR (PST)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
0	765.18	763.77	761.78	761.34	760.50	759.46	759.35	759.11	760.43	762.82	764.48	764.64	761.90
1	765.14	763.77	761.84	761.37	760.55	759.53	759.46	759.20	760.53	762.92	764.43	764.59	761.94
2	765.22	763.80	761.86	761.38	760.61	759.63	759.57	759.31	760.61	762.96	764.50	764.68	762.00
3	765.27	763.77	761.83	761.46	760.72	759.75	759.72	759.45	760.70	762.97	764.47	764.73	762.06
4	765.24	763.76	761.88	761.56	760.85	759.89	759.91	759.59	760.81	763.01	764.42	764.69	762.13
5	765.19	763.84	762.05	761.74	761.07	760.13	760.21	759.86	761.02	763.21	764.53	764.65	762.28
6	765.23	763.91	762.25	761.98	761.27	760.32	760.44	760.14	761.34	763.41	764.62	764.71	762.46
7	765.34	764.02	762.45	762.21	761.48	760.49	760.67	760.42	761.63	763.63	764.80	764.81	762.66
8	765.56	764.23	762.63	762.30	761.56	760.57	760.79	760.55	761.76	763.84	765.04	764.98	762.81
9	765.75	764.35	762.74	762.32	761.50	760.49	760.75	760.56	761.83	763.95	765.18	765.16	762.88
10	765.94	764.40	762.77	762.26	761.30	760.22	760.49	760.40	761.74	763.92	765.25	765.38	762.83
11	765.87	764.37	762.59	762.03	761.01	759.95	760.23	760.13	761.49	763.70	765.15	765.25	762.64
12	765.47	764.07	762.32	761.69	760.68	759.62	759.86	759.77	761.15	763.33	764.81	764.90	762.30
13	765.11	763.68	761.92	761.38	760.36	759.26	759.47	759.40	760.76	762.92	764.52	764.60	761.94
14	764.92	763.38	761.58	761.05	760.04	758.93	759.09	758.99	760.36	762.61	764.30	764.45	761.62
15	764.92	763.27	761.37	760.74	759.71	758.61	758.27	758.57	760.02	762.42	764.23	764.46	761.38
16	764.93	763.17	761.16	760.52	759.48	758.36	757.92	758.22	759.76	762.26	764.20	764.50	761.20
17	764.99	762.71	761.08	760.46	759.34	758.16	757.65	758.02	759.67	762.25	764.26	764.69	761.10
18	765.00	762.82	761.18	760.44	759.29	758.18	757.54	757.93	759.70	762.38	764.34	764.72	761.12
19	765.04	762.91	761.34	760.58	759.42	758.31	757.63	758.04	759.85	762.49	764.40	764.75	761.22
20	765.06	762.93	761.47	760.85	759.71	758.55	757.90	758.34	760.06	762.56	764.42	764.69	761.37
21	765.07	763.01	761.57	761.03	760.00	758.87	758.24	758.56	760.21	762.67	764.46	764.73	761.52
22	765.12	763.11	761.74	761.21	760.23	759.16	758.57	758.79	760.37	762.81	764.50	764.79	761.69
23	765.14	763.14	761.76	761.30	760.38	759.31	759.19	758.98	760.49	762.84	764.50	764.85	761.82
AVG	765.24	763.59	761.88	761.38	760.46	759.41	759.29	759.26	760.68	763.00	764.58	764.77	761.96

TABLE 35. Monthly Hourly Average Station Pressure 1955 Through 1980 (Units = Millibars)

HOURLY (PST)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
0	992.72	991.16	988.84	988.57	987.76	986.73	986.78	986.42	987.88	990.55	992.20	992.16	989.31
1	992.66	991.17	988.94	988.62	987.83	986.80	986.92	986.54	988.01	990.69	992.15	992.11	989.36
2	992.77	991.23	988.96	988.64	987.92	986.92	987.07	986.68	988.11	990.74	992.21	992.23	989.45
3	992.83	991.19	988.92	988.72	988.05	987.06	987.25	986.86	988.22	990.73	992.17	992.28	989.52
4	992.76	991.13	988.96	988.83	988.20	987.23	987.48	987.02	988.37	990.77	992.10	992.19	989.58
5	992.64	991.18	989.14	989.01	988.46	987.53	987.86	987.33	988.57	990.95	992.17	992.10	989.74
6	992.67	991.22	989.31	989.31	988.75	987.81	988.20	987.72	988.91	991.16	992.25	992.20	989.95
7	992.81	991.34	989.57	989.61	989.00	988.01	988.50	988.05	989.29	991.41	992.46	992.29	990.19
8	993.06	991.63	989.84	989.74	989.10	988.10	988.62	988.22	989.49	991.74	992.79	992.50	990.40
9	993.44	991.83	990.02	989.79	989.04	987.97	988.56	988.23	989.60	991.91	993.01	992.81	990.51
10	993.64	991.95	990.05	989.73	988.79	987.65	988.24	988.05	989.52	991.90	993.15	993.07	990.47
11	993.57	991.92	989.88	989.45	988.43	987.32	987.90	987.71	989.21	991.66	993.04	992.95	990.25
12	993.08	991.56	989.54	989.03	988.01	986.91	987.44	987.27	988.80	991.20	992.58	992.50	989.82
13	992.64	991.06	989.05	988.63	987.59	986.43	986.94	986.79	988.28	990.68	992.23	992.12	989.36
14	992.37	990.73	988.60	988.22	987.18	986.04	986.44	986.26	987.78	990.29	991.96	991.92	988.97
15	992.38	990.52	988.33	987.79	986.74	985.56	985.92	985.75	987.33	990.01	991.87	991.94	988.67
16	992.35	990.39	988.04	987.50	986.46	985.24	985.45	985.27	986.99	989.79	991.78	991.95	988.43
17	992.39	990.35	987.90	987.37	986.22	985.01	985.09	984.97	986.80	989.69	991.82	992.04	988.29
18	992.38	990.43	987.95	987.33	986.19	985.03	984.99	984.86	986.78	989.78	991.86	992.04	988.29
19	992.43	990.53	988.13	987.50	986.35	985.21	985.12	985.00	986.98	989.94	991.94	992.06	988.42
20	992.43	990.58	988.35	987.88	986.71	985.48	985.42	985.35	987.28	990.07	991.99	992.10	988.63
21	992.49	990.70	988.51	988.14	987.09	985.90	985.85	985.64	987.50	990.26	992.08	992.20	988.85
22	992.56	990.87	988.74	988.38	987.41	986.29	986.29	985.96	987.73	990.46	992.16	992.30	989.09
23	992.63	990.93	988.60	988.51	987.62	986.49	986.56	986.22	987.92	990.53	992.20	992.40	989.23
AVG	992.74	991.07	988.93	988.59	987.70	986.61	986.87	986.59	988.14	990.71	992.26	992.27	989.37

TABLE 36. Monthly Hourly Average Station Pressure 1955 Through 1980
(Units = Inches of Mercury)

HOUR (PST)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
0	29.32	29.27	29.20	29.19	29.17	29.14	29.14	29.13	29.17	29.25	29.30	29.30	29.21
1	29.31	29.27	29.20	29.19	29.17	29.14	29.14	29.13	29.18	29.26	29.30	29.30	29.22
2	29.32	29.27	29.20	29.19	29.17	29.14	29.15	29.14	29.18	29.26	29.30	29.30	29.22
3	29.32	29.27	29.20	29.20	29.18	29.15	29.15	29.14	29.18	29.26	29.30	29.30	29.22
4	29.32	29.27	29.20	29.20	29.18	29.15	29.16	29.15	29.19	29.26	29.30	29.30	29.22
5	29.31	29.27	29.21	29.21	29.19	29.16	29.17	29.16	29.19	29.26	29.30	29.30	29.23
6	29.31	29.27	29.21	29.21	29.20	29.17	29.18	29.17	29.20	29.27	29.30	29.30	29.23
7	29.32	29.27	29.22	29.22	29.21	29.18	29.19	29.18	29.21	29.28	29.31	29.30	29.24
8	29.33	29.28	29.23	29.23	29.21	29.18	29.19	29.18	29.22	29.29	29.32	29.31	29.25
9	29.34	29.29	29.24	29.23	29.21	29.17	29.19	29.18	29.22	29.29	29.32	29.32	29.25
10	29.34	29.29	29.24	29.23	29.20	29.17	29.18	29.18	29.22	29.29	29.33	29.33	29.25
11	29.34	29.29	29.23	29.22	29.19	29.16	29.17	29.17	29.21	29.28	29.32	29.32	29.24
12	29.33	29.28	29.22	29.21	29.18	29.14	29.16	29.15	29.20	29.27	29.31	29.31	29.23
13	29.31	29.27	29.21	29.19	29.16	29.13	29.14	29.14	29.18	29.25	29.30	29.30	29.22
14	29.30	29.26	29.19	29.18	29.15	29.12	29.13	29.12	29.17	29.24	29.29	29.29	29.20
15	29.31	29.25	29.19	29.17	29.14	29.10	29.11	29.11	29.16	29.24	29.29	29.29	29.20
16	29.30	29.25	29.18	29.16	29.13	29.09	29.10	29.10	29.15	29.23	29.29	29.29	29.19
17	29.31	29.25	29.17	29.16	29.12	29.09	29.09	29.09	29.14	29.23	29.29	29.29	29.18
18	29.31	29.25	29.17	29.16	29.12	29.09	29.09	29.08	29.14	29.23	29.29	29.30	29.18
19	29.31	29.25	29.18	29.16	29.13	29.09	29.09	29.09	29.15	29.23	29.29	29.30	29.19
20	29.31	29.25	29.19	29.17	29.14	29.10	29.10	29.10	29.15	29.24	29.29	29.30	29.19
21	29.31	29.26	29.19	29.18	29.15	29.11	29.11	29.11	29.16	29.24	29.30	29.30	29.20
22	29.31	29.26	29.20	29.19	29.16	29.13	29.13	29.12	29.17	29.25	29.30	29.30	29.21
23	29.31	29.26	29.20	29.19	29.16	29.13	29.13	29.12	29.17	29.25	29.30	29.31	29.21
AVG	29.32	29.27	29.20	29.19	29.17	29.13	29.14	29.13	29.18	29.26	29.30	29.30	29.22

TABLE 37. Monthly Hourly Average Station Pressure 1955 Through 1980
(Units = Millimeters of Mercury)

Hour (PST)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
0	744.54	743.37	741.63	741.43	740.82	740.05	740.09	739.81	740.91	742.92	744.15	744.12	741.98
1	744.50	743.38	741.71	741.46	740.87	740.10	740.19	739.90	741.01	743.02	744.11	744.09	742.02
2	744.58	743.42	741.72	741.48	740.94	740.15	740.30	740.01	741.08	743.05	744.16	744.18	742.09
3	744.62	743.39	741.69	741.54	741.04	740.29	740.44	740.15	741.16	743.05	744.13	744.21	742.14
4	744.57	743.35	741.72	741.62	741.15	740.42	740.61	740.26	741.28	743.08	744.07	744.14	742.18
5	744.48	743.38	741.85	741.76	741.34	740.65	740.89	740.50	741.43	743.22	744.13	744.08	742.30
6	744.50	743.42	741.98	741.98	741.56	740.86	741.15	740.79	741.68	743.37	744.19	744.15	742.47
7	744.60	743.51	742.18	742.20	741.75	741.01	741.38	741.04	741.96	743.56	744.35	744.22	742.64
8	744.80	743.72	742.38	742.31	741.83	741.07	741.47	741.16	742.11	743.81	744.59	744.37	742.80
9	745.08	743.87	742.51	742.34	741.78	740.98	741.42	741.18	742.20	743.93	744.76	744.61	742.88
10	745.23	743.97	742.54	742.30	741.59	740.74	741.18	741.04	742.14	743.93	744.87	744.80	742.85
11	745.18	743.94	742.41	742.09	741.32	740.49	740.92	740.79	741.91	743.75	744.76	744.71	742.69
12	744.81	743.67	742.15	741.77	741.01	740.18	740.58	740.45	741.60	743.40	744.44	744.38	742.30
13	744.48	743.30	741.79	741.47	740.69	739.83	740.20	740.09	741.21	743.01	744.17	744.09	742.02
14	744.28	743.04	741.45	741.16	740.38	739.53	739.83	739.69	740.84	742.72	743.97	743.94	741.73
15	744.29	742.89	741.25	740.84	740.06	739.19	739.44	739.31	740.50	742.51	743.90	743.96	741.51
16	744.26	742.79	741.03	740.62	739.85	738.93	739.08	738.95	740.24	742.34	743.84	743.96	741.32
17	744.29	742.76	740.92	740.53	739.66	738.76	738.82	738.73	740.10	742.27	743.86	744.03	741.22
18	744.29	742.82	740.96	740.49	739.64	738.77	738.74	738.64	740.08	742.34	743.90	744.03	741.22
19	744.32	742.90	741.10	740.62	739.76	738.91	738.84	738.75	740.24	742.46	743.96	744.04	741.32
20	744.33	742.93	741.26	740.91	740.03	739.11	739.07	739.01	740.46	742.56	743.99	744.07	741.47
21	744.37	743.03	741.38	741.11	740.32	739.43	739.39	739.23	740.63	742.69	744.06	744.15	741.64
22	744.42	743.15	741.56	741.28	740.56	739.72	739.72	739.47	740.80	742.84	744.12	744.23	741.82
23	744.48	743.20	741.60	741.36	740.71	739.87	739.92	739.66	740.94	742.90	744.15	744.30	741.92
AVG	744.55	743.30	741.70	741.45	740.78	739.96	740.15	739.94	741.10	743.03	744.19	744.20	742.03

IX. MISCELLANEOUS PHENOMENA

IX. MISCELLANEOUS PHENOMENA

The different meteorological phenomena and the number of days per month and year that each occurs at the HMS are presented in Table 38.

THUNDERSTORMS

A thunderstorm day is one in which thunder is heard at the observing station one or more times in a calendar day. If a thunderstorm begins just before midnight, it is possible to have two thunderstorm days from a single storm.

Table 38 shows that thunderstorms have occurred in every month except January and November; however, on January 18, 1953, one occurred in Richland which is about 25 miles southeast of the HMS. The thunderstorm season essentially is April through September. The average number of thunderstorm days per year is 10, but the total has varied from 3 in 1949 to 23 in 1948. The record monthly total is 8 and has occurred 3 times: in June 1948, August 1953 and June 1972.

See Appendix II for additional information about thunderstorms.

HAIL

Hail is seldom observed at the HMS. Two days with hail in any year is the maximum recorded. Hail is associated with thunderstorms in most cases.

The most unseasonable hailstorms occurred on January 25, 1953, February 22, 1962 (with thunder), and December 22, 1971 (with thunder) when hail occurred in Richland but not at the HMS.

DUST AND BLOWING DUST

The criterion for both of these phenomena is that horizontal visibility be reduced to 6 miles or less. Dust is carried into the area from a distant source and may occur with little wind. Blowing dust occurs when dust is being picked up locally and occurs with stronger winds. Both dust and blowing dust occur at the HMS but in most cases it is blowing dust.

TABLE 38. Average Number of Days of Various Meteorological Phenomena at the HMS (1945 Through 1980)

PHENOMENON	J	F	M	A	M	J	J	A	S	O	N	D	Y
THUNDERSTORM	0	#	#	1	2	2	2	2	1	#	0	#	10
HAIL	#	#	#	#	#	#	#	#	#	0	0	0	1*
D OR BD (1)	#	#	1	1	1	#	1	#	1	#	#	#	5
FOG (2)	10	6	2	#	#	#	#	#	#	2	9	13	42
FOG, DENSE (3)	6	3	1	#	#	#	0	#	#	1	6	8	25
GLAZE	2	1	#	0	0	0	0	0	0	0	1	2	6
WARM FRONT	2	2	1	#	#	0	0	0	#	1	2	2	10
COLD FRONT	4	4	5	5	5	4	4	4	4	5	4	4	52

1. DUST OR BLOWING DUST

2. ALL FOG WITH VISIBILITY $\leq$ 6 MILES

3. VISIBILITY $\leq$ 1/4 MILE

LESS THAN 1/2 DAY

* ALTHOUGH THE AVERAGE IS LESS THAN 1/2 DAY FOR ANY SINGLE MONTH, THERE HAVE BEEN 29 DAYS WITH HAIL IN 34 YEARS OF RECORD FOR AN AVERAGE ANNUAL NUMBER OF 1.

Blowing dust has occurred with wind speeds ranging from 19 to 80 mph, while the speed range has been from 4 to 30 mph when dust has been observed. An unusual case of dust occurred on September 13, 1950, when dust obscured the sky, and restricted visibility to a range of 5/16 to 3 miles, during 5 consecutive hours. The hourly wind speeds ranged from 4 to 9 mph during the period.

Observations of dust or blowing dust may occur with any wind direction, however, the strongest winds at the HMS are from the southwest and therefore there are more cases of blowing dust from that direction. Dust most often is associated with winds from the north and northeast.

ASH

On May 18, 1980, Mount St. Helens, a volcano 135 miles west of the Hanford area, erupted. The upper 2500 feet of the 9,677-foot mountain were blown off in the initial explosion. Pulverized rock and ash were carried eastward, covering the area with an ash cloud and falling ash. The falling ash reduced visibility to less than 6 miles from 1100 on May 18 until 0100 on May 19. From then until 2100 on May 21 (except for the hours 1300 and 1400 on May 20) visibility continued less than 6 miles due to dust and ash. Ceilings as low as 600 feet and visibilities down to 3/16 mile were recorded during that time. Surface winds were generally light during the entire period; however, there were a few gusts in the 20 to 30 mph range on the 19th and 21st.

FOG

Fog has occurred in every month of the year; however, 95% of the occurrences are during the months of November, December, January and February. Less than 1% occurs during the months April through September. Table 39 summarizes the statistics on fog at the HMS.

Most fog at the HMS is of the radiation type and occurs during periods of low wind speeds. See Table 23, Section V, page 13.

TABLE 39. Total Duration* and Maximum Persistence of Fog
Tabulated in Hours for the Period 1945 Through 1980⁽¹⁾

ALL FOG (VIS 0-6 MILES)	AVG TOTAL DURATION	MAX TOTAL DURATION	YEAR	MIN TOTAL DURATION	YEAR	AVG DURATION PER DAY OF OCCURRENCE	MAX. PERSISTENCE ⁽⁴⁾	YEAR
JAN	88.4	317.5	1979	0	1949	7.8	89.4	1977
FEB	39.1	206.2	1963	0	1967	5.7	58.0	1963
MAR	6.4	35.1	1978	0	1968+	3.3	14.8	1978
APR	0.4	4.2	1975	0	1980+	1.5	3.2	1975
MAY	0.3	2.7	1958	0	1980+	1.3	2.7	1958
JUNE	0.2	4.8	1971	0	1979+	1.9	2.2	1980
JULY	#	0.7	1966	0	1980+	0.7	0.7	1966
AUG	0.2	3.3	1978	0	1980+	1.8	3.0	1978
SEPT	0.4	5.5	1957	0	1979+	2.1	2.9	1977
OCT	9.6	82.4	1980	0	1978+	4.5	39.0	1962
NOV	64.1	168.5	1979	1.0	1960	6.4	65.4	1963
DEC	118.2	248.2	1976	6.5	1968	8.6	83.2	1980
YEAR	327.3	746.3 ⁽²⁾	1979-80	147.7 ⁽³⁾	1948-49	7.0	89.4	1976-77

DENSE FOG (VIS 1/4 MI OR LESS)								
JAN	22.7	92.5	1976	0	1949	3.5	16.4	1976
FEB	11.9	86.7	1963	0	1977+	3.6	24.8	1980
MAR	1.4	7.8	1949	0	1980+	2.0	5.0	1961
APR	0.1	1.9	1975	0	1980+	1.8	0	----
MAY	#	1.6	1958	0	1980+	1.6	1.6	1958
JUNE	#	0.5	1971	0	1980+	0.5	0.5	1971
JULY	0	0	----	0	----	0	0	----
AUG	#	1.0	1959	0	1980+	1.0	0.7	1959
SEPT	0.1	3.2	1957	0	1980+	2.1	1.4	1957
OCT	3.9	36.5	1980	0	1978+	3.5	15.8	1962
NOV	21.4	71.4	1952	0	1960	3.5	20.6	1963
DEC	43.2	119.8	1947	1.3	1968	5.3	47.0	1957
YEAR	104.7	201.5 ⁽²⁾	1962-63	36.7 ⁽³⁾	1977-78	4.0	47.0	1957-58

* TOTAL DURATION DENOTES TOTAL NUMBER OF HOURS AND TENTHS IN WHICH FOG IS OBSERVED

DENOTES LESS THAN 0.05 HOUR

(1) DATA FOR JULY 1, 1971 THROUGH JUNE 30, 1974 MISSING

(2) DENOTES THE GREATEST NUMBER OF HOURS IN A SEASON

(3) DENOTES THE LEAST NUMBER OF HOURS IN A SEASON

(4) MAXIMUM PERSISTENCE OF DENSE FOG BASED ON THE PERIOD 1953-80

GLAZE

Glaze (sometimes called silver thaw) is a coating of ice formed when rain or drizzle freezes on contact with any surface which has a temperature that is below freezing. During the HMS period of record 1947 to 1980, there have been an average of 6 glaze days per year (Table 38). While many of these days cause little or no problem, some create major traffic hazards.

WARM AND COLD FRONTS

A warm front is a line of discontinuity formed when an advancing current of relatively warm air is replacing a retreating colder air mass. A cold front is a line of discontinuity along which a wedge of cold air is underrunning and displacing a warmer air mass.

During the period of record 1945 to 1980, an average of 10 warm fronts and 52 cold fronts passed the HMS each year. These averages have not changed significantly from those reported in an earlier work (Jenne and Kerns 1959).

Temperature changes have been quite large with frontal passages. Some of the data from frontal passages was presented by Stone, Jenne and Thorp (1972). It is not unusual for temperatures to rise or fall more than 10°F in a 15-minute period following frontal passages.

BLOWING AND DRIFTING SNOW

Both of these are phenomena of wind-driven snow. They are distinguished by the fact that blowing snow restricts visibility to a height of at least 6 feet above the surface, while drifting snow does not. Falling snow is not a requisite condition for either phenomenon; however, both are dependent upon a quantity of dry, powdery snow on the ground, subfreezing temperatures, and sufficient wind to blow the snow about. This combination of meteorological events is rarely experienced at HMS and so blowing and drifting snow do not often occur.

In the period of record 1945 through 1980, the most memorable storm with blowing snow was that of February 4 and 5, 1948. There were

5 inches of freshly fallen snow on the ground the evening of the 4th when the wind began to increase from the north. During the 14-hour period of blowing snow the temperature ranged from 22°F to 30°F and the peak wind was from the NNE at 47 mph. No new snow was recorded, but dust was mixed with the blowing snow and visibility was reduced to 2 miles.

DUST DEVILS

A dust devil is a small column of whirling wind which may carry dust and debris several hundred feet into the air. The diameter may vary from a few feet to more than 100 feet.

Dust devils usually occur on sunny days with light winds. Sometimes the peak gust for a day occurs in conjunction with a dust devil. A characteristic of those which have hit the meteorology tower is that the peak gust is strongest near the surface and decreases with height.

SMOKE

Smoke sufficiently thick to restrict visibility to 6 miles or less occurs, on the average, only about 2 days per year at the HMS. The most common sources in this area are forest fires, orchard smudging and agricultural field burning. None of these sources are near the HMS, and therefore the station is seldom affected.

Another situation which occasionally causes smoke at the HMS is the slow buildup from many small sources due to adverse meteorological conditions. These conditions are typified by an inversion aloft and by light surface winds.

TORNADOES

On June 16, 1948, a tornado was observed near the east end of Rattlesnake Mountain about 10 miles south of the HMS. It was in barren country and no damage resulted. Funnel clouds (not reaching the ground) were observed on March 24, 1961, and on July 15, 1970. The former was estimated 10 to 15 miles south-southeast of HMS and the latter about 9 miles south-southwest on the north slope of Rattlesnake Mountain.

Daubek (1970) has published a study on these and similar observations occurring within an approximate 100-mile radius of the HMS. The probability for an occurrence in any year at any one point within the 100-mile radius is 0.000006824 or one tornado each 146,000 years. It also indicates that the best estimates of the maximum tangential wind speed expected from a tornado similar to those which have occurred within the 100-mile radius over the past quarter of a century is 145 mph.

Data on the tornadoes that have been observed within an approximate 100-mile radius of the HMS are presented in Table 40.

RIME

Rime occurs during periods of supercooled fog. It resembles frost and is sometimes called hoarfrost. Rime, however, occurs from rapid freezing of supercooled water droplets, whereas frost is deposited by direct condensation of aqueous vapor in the same manner as dew, except that the temperature is below freezing.

Rime deposits are not uncommon on the Hanford Reservation, particularly at the higher elevations. Hills around the HMS are shrouded in fog for extended periods of time in winter and the rime deposits are heavy.

Rime amounts at the HMS are generally less than those on the surrounding hills, but during the period November 21 to 23, 1952, deposits were sufficiently heavy to break some local electrical distribution lines (Jenne and Kerns 1959).

AURORAS

An aurora, although not strictly a meteorological phenomenon, is nevertheless customarily observed by meteorologists. It is closely connected with the appearance of magnetic disturbances. The particles originate on the sun and become luminous when attracted by the earth's magnetic field and pass through the atmosphere.

Auroras are observed an average of 9 nights per year at the HMS. The months of July, September and October account for 39% of the auroras

TABLE 40. Tornado Occurrences Within 100-Mile Radius of the Hanford Meteorology Station

NO.	DATE	LOCATION
1	JUNE 26, 1916	WALLA WALLA (SOUTHEAST), WASHINGTON
2	APRIL 15, 1925	CONDON, OREGON
3	SEPTEMBER 2, 1936	WALLA WALLA, WASHINGTON
4	MAY 20, 1948	YAKIMA, WASHINGTON
5	MAY 29, 1948	YAKIMA, WASHINGTON
6	JUNE 11, 1948	EPHRATA, WASHINGTON
7	JUNE 16, 1948	HANFORD METEOROLOGY STATION (10 MILES SOUTH SOUTHEAST), WASHINGTON
8	MAY 9, 1956	KENNEWICK (10 MILES SOUTHEAST), WASHINGTON
9	APRIL 12, 1957	IONE, OREGON
10	APRIL 30, 1957	YAKIMA, WASHINGTON
11	MAY 6, 1957	HARRINGTON, WASHINGTON
12	APRIL 24, 1958	WALLA WALLA (20 MILES NORTHWEST), WASHINGTON
13	JUNE 26, 1958	WALLULA JUNCTION, WASHINGTON
14	MARCH 14, 1966	LITTLE GOOSE DAM, WASHINGTON
15	AUGUST 30, 1971	COLFAX, WASHINGTON (NEAR)
16	APRIL 5, 1972	SPOKANE, WASHINGTON (40-80 MILES WEST OF GEIGER FIELD)
17	JULY 1, 1978	HATTON, WASHINGTON (SOUTHEAST)
18	AUGUST 15, 1978	ALMIRA, WASHINGTON
19	MAY 1, 1979	DAVENPORT, WASHINGTON (NEAR)
20	JULY 1, 1979	MOSES LAKE, WASHINGTON (10 MILES SOUTH)
21	MAY 12, 1980	RITZVILLE, WASHINGTON (2 MILES EAST)

TORNADOES ACCEPTED AS AUTHENTIC WHEN RECORDED OR REFERENCED IN OFFICIAL NWS DOCUMENTS AND NOT AUTHENTIC WHEN USED INTERCHANGEABLY WITH WORD FUNNEL CLOUD.

observed at the HMS. Some of the displays are barely visible while others are quite spectacular. The dates when the more spectacular auroral displays occurred are listed below:

September 12-13, 1957

February 10, 1958

May 25-26, 1967

July 6, 1974

October 12, 1974.

X. DIFFUSION CLIMATOLOGY

X. DIFFUSION CLIMATOLOGY

The transport of airborne particles, gases, water vapor, kinetic energy, etc. is primarily a result of the horizontal and vertical distribution of temperature, moisture and wind velocity in the atmosphere. Previous sections have dealt only with observations made at a single level near the ground surface. The study of diffusion requires, in addition, a knowledge of the vertical distribution of these parameters, particularly temperature and wind. The decrease of temperature with height is called the temperature lapse rate. In the free atmosphere the temperature decreases at about $6^{\circ}\text{C km}^{-1}$ to heights of about 10 km at temperate latitudes. This, of course, is an average; the actual lapse rate of any particular place or time may be quite different. For example, during nights with clear skies and light wind, sufficient heat from the earth's surface is radiated to space to cool the lowest layers of the atmosphere. This cooling produces a temperature profile in which temperature increases with height through the cooled layer. This condition is called a temperature inversion and is very common.

Of great importance in the process of diffusion is the stability of the atmospheric layer in which diffusion is taking place. If a parcel of air near the surface rises within its surroundings, but there is no exchange of heat between the parcel and its environment, the process is said to be adiabatic. The rate of decrease of temperature with height of adiabatically ascending dry air is known as the dry adiabatic lapse rate, and it is equal to $9.8^{\circ}\text{C km}^{-1}$ (5.4°F per 1000 feet). In any specific atmospheric layer then, if the decrease of temperature with height is greater than $9.8^{\circ}\text{C km}^{-1}$, the dry adiabatic lapse rate, the layer is defined as being unstable; if the decrease of temperature is equal to $9.8^{\circ}\text{C km}^{-1}$ the layer has neutral stability; and if the decrease of temperature with height is less than $9.8^{\circ}\text{C km}^{-1}$ the layer is stable.

VERTICAL TEMPERATURE PROFILES

Figure 26 depicts profiles of the hourly average temperature for each month (see Tables 53-60). The profiles show a breakup of the

FIGURE 26. Monthly Average Temperature Profiles by Hour Based on 26 Years of Record: 1955 Through 1980 (see Tables 53 Through 60)

FIGURE 26. Continued

FIGURE 26. Continued

average nocturnal inversion by the second or third hourly observation after sunrise and formation again by the first hourly observation after sunset. The profiles also show that the intensity of both lapses and inversions is greatest in the first 50 feet above ground surface. Even above 50 feet, however, lapse rates average adiabatic or superadiabatic ($>9.8^{\circ}\text{C km}^{-1}$) during part of the day for a good portion of the year. Overall, June is the most unstable month and October the most stable (Figure 27).

Figure 28 shows the diurnal course of temperature at 3 levels during 4 months of the year. During most of the inversion period for all months, there is a greater difference in temperature between the surface and 50-foot levels than in the remainder of the height to 400 feet.

PERSISTENCE OF INVERSIONS

Because of the long winter nights, and lower average wind speeds from December through February, an inversion formed during this period is likely to persist longer than inversions observed during the other seasons.

The nocturnal inversion forms about 1/2 hour before sunset and lasts until about 1-1/2 hours after sunrise. The length of the inversion period averages 13.7 hours, but varies seasonally from 10.0 hours in June to 17.7 hours in December.

TYPES OF INVERSIONS

The radiation inversion is by far the most commonly observed inversion type at the HMS. It accounts for nearly all summertime inversions and a good percentage of those in winter. It forms from radiational cooling near the ground and builds upward. It is a diurnal phenomenon and may be less important from an air pollution standpoint than other types with greater persistence. Temperature differences between the surface and 200 feet may exceed 10°F at times, but rarely, if ever, exceed 15°F . Wind speeds are usually below 13 mph. However, wind speed is not as closely related to the temperature profile as its

FIGURE 27. Monthly and Annual Average Temperature ($^{\circ}\text{F}$) Profiles: 1955 Through 1980 (see Tables 53 Through 60 for Temperature Values)

FIGURE 28. Diurnal Course of Temperature for Three Levels, January, April, July and October: 1955 Through 1980

gustiness (Singer and Smith 1963). Large inversions are sometimes observed in connection with wind speeds exceeding 20 mph if the winds are not gusty in character.

A chinook inversion, although never observed except during the cold season, is the second most common inversion type at the HMS. It forms when advecting warm air overrides and erodes the cold and more dense surface air. As the cold surface layer is eroded away to less than 400 feet in thickness the temperature will rise atop the 410-foot HMS meteorological tower; sometimes the increase will be temporary if the overriding warm wind is of insufficient strength or duration.

Chinook inversions are characterized by stability and strong wind shear. Temperature differences between the surface and 200-foot levels may exceed 20°F and the wind may be blowing northeast at the surface and southeast at 400 feet. Surface speeds are usually under 10 mph until the warm air reaches the surface.

Chinook inversions may form at any time of the day or night. Although most last from 4 to 8 hours, some last less than 1 hour and others for days. A 99-hour chinook inversion occurred in February 1963. At 1330 PST on February 3 the 200-foot temperature exceeded that at the surface by 17.8°F, and the 250-foot temperature exceeded the 50-foot temperature by 15.2°F.

The decay of a chinook inversion may bring rather dramatic warming at the surface, as in the case below for February 10, 1971.

<u>Time (PST)</u>	<u>Temperature (°F at 3-ft Level)</u>	<u>Temperature Rise (°F)</u>
1022	40.1	
1026	47.3	7.2° in 4 min
1030	53.1	13.0° in 8 min
1034	56.3	16.2° in 12 min

INVERSION TRAPPING

Occasionally, atmospheric contaminants are trapped below the mountain tops surrounding the Hanford Area. This is a wintertime

situation and occurs when an unstable or neutral layer of air at the surface is capped by an inversion layer aloft (Figure 29). Low clouds or fog, low surface wind speeds, and a high barometric pressure are usually associated with this trapping. The inversion is formed by adiabatic warming of subsiding air or by a frontal surface aloft over the area. The average recurrence interval for 10 consecutive days of this situation at the HMS is 2 years (Jenne 1963).

PERSISTENCE OF SUPERADIABATIC LAPSE RATES

When the decrease in temperature with height exceeds the dry adiabatic lapse rate, the condition is known as superadiabatic. Recall that the dry adiabatic lapse rate is $9.8^{\circ}\text{C km}^{-1}$ (or $5.4^{\circ}\text{F per 1000 feet}$). Superadiabatic lapse rates in the 3 to 200 foot atmospheric layer at the HMS occur ~50% of the time during the summer months compared to less than 15% of the time in December and January (Stone, Jenne and Thorp 1972).

WIND PROFILES

Wind profiles on the Hanford Meteorology Tower (HMT) are characterized by large seasonal and diurnal variations in speed (Figure 30).

Speed variation with height, on the average, is least at mid-day and greatest during the night. The magnitude of the diurnal variation has a seasonal dependency, reaching a maximum in June and July and becoming very slight in December and January. An interesting feature in Figure 30 is the 1 to 2 hour temporary increase in speed at elevations up to ~100 feet shortly after sunrise in the summer months.

Tables 41 through 43 show the monthly and annual joint percent frequency distribution between wind speed and direction for the 50-, 200- and 400-foot levels on the HMT. Tables 44 through 49 show monthly and annual percent frequency of hourly wind direction and speed for these same levels.

FIGURE 29. A Schematic Representation of an Inversion Trapping Situation

FIGURE 30. Monthly Hourly Average Wind Speeds for Five Levels, 1955 Through 1980

FIGURE 30. Continued

TABLE 41. Monthly and Annual Percent Frequency Distribution of 50-Foot Wind Direction Versus Speed Class, 1955 Through 1980

JAN												
SPEED CLASS (MPH)												
DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	1.9	1.0	.3	.2	.1	.0	.0	.0	.0	3.5	5.1
NE	.0	1.6	.8	.1	.1	.1	.0	.0	.0	.0	2.7	4.5
ENE	.0	1.4	.5	.0	.0	.0	.0	.0	.0	.0	2.0	2.9
E	.0	1.7	.8	.1	.0	.0	.0	.0	.0	.0	2.6	3.1
ESE	.0	1.6	.7	.1	.0	.0	.0	.0	.0	.0	2.5	3.3
SE	.0	2.4	1.4	.3	.1	.0	.0	.0	.0	.0	4.2	3.8
SSE	.0	1.6	1.0	.3	.2	.1	.0	.0	.0	.0	3.1	5.2
S	.0	1.4	1.1	.3	.4	.2	.1	.0	.0	.0	3.5	7.0
SSW	.0	1.2	1.0	.6	.9	.6	.4	.1	.0	.0	4.5	11.4
SW	.0	1.2	1.3	1.3	1.5	.8	.4	.1	.0	.0	6.8	12.1
WSW	.0	1.3	1.6	1.6	.9	.5	.2	.0	.0	.0	6.2	9.5
W	.0	1.8	2.7	1.4	.5	.1	.0	.0	.0	.0	6.5	6.2
WNW	.0	2.3	5.6	5.5	1.0	.1	.0	.0	.0	.0	14.5	7.3
NW	.0	3.1	7.5	6.3	1.1	.1	.0	.0	.0	.0	18.1	7.0
NNW	.0	2.8	3.0	.8	.1	.0	.0	.0	.0	.0	6.8	4.6
N	.0	2.6	1.4	.4	.2	.1	.0	.0	.0	.0	4.8	4.5
CALM	5.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	5.4	.0
VAR	.0	1.8	.1	.0	.0	.0	.0	.0	.0	.0	1.9	1.7
TOTAL	5.4	31.9	31.4	19.6	7.3	2.8	1.2	.3	.1	.0	100.0	6.3

FEB												
SPEED CLASS (MPH)												
DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	1.9	1.2	.6	.3	.1	.0	.0	.0	.0	4.1	5.8
NE	.0	2.0	.5	.1	.1	.1	.1	.0	.0	.0	3.2	4.5
ENE	.0	1.2	.6	.1	.0	.0	.0	.0	.0	.0	1.9	3.3
E	.0	1.3	.8	.0	.0	.0	.0	.0	.0	.0	2.1	3.3
ESE	.0	1.2	.8	.2	.0	.0	.0	.0	.0	.0	2.2	3.7
SE	.0	1.8	1.2	.4	.0	.0	.0	.0	.0	.0	3.4	4.1
SSE	.0	1.2	.8	.4	.2	.1	.0	.0	.0	.0	2.7	5.4
S	.0	1.3	.9	.5	.4	.2	.1	.0	.0	.0	3.3	7.1
SSW	.0	1.0	.5	.9	.8	.5	.2	.1	.0	.0	4.3	10.9
SW	.0	.9	1.4	1.3	1.8	1.2	.6	.2	.1	.0	7.5	13.5
WSW	.0	1.1	2.0	2.2	1.4	.5	.4	.1	.0	.0	7.7	10.6
W	.0	1.5	3.6	2.9	1.0	.2	.1	.0	.0	.0	9.2	7.7
WNW	.0	1.8	4.8	6.6	1.6	.3	.1	.0	.0	.0	15.1	8.3
NW	.0	2.6	6.8	6.3	1.3	.1	.1	.0	.0	.0	17.2	7.4
NNW	.0	2.1	2.9	.9	.1	.0	.0	.0	.0	.0	6.0	5.0
N	.0	2.5	1.7	.6	.3	.0	.0	.0	.0	.0	5.2	4.8
CALM	3.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	3.2	.0
VAR	.0	1.4	.2	.0	.0	.0	.0	.0	.0	.0	1.6	1.9
TOTAL	3.2	26.8	31.4	23.9	9.4	3.3	1.5	.4	.1	.0	100.0	7.2

TABLE 41. Continued

MAR												
SPEED CLASS (MPH)												
DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	1.4	1.5	.8	.5	.0	.0	.0	.0	.0	4.2	6.4
NE	.0	1.5	1.1	.3	.2	.0	.0	.0	.0	.0	3.2	4.8
ENE	.0	.8	.8	.1	.0	.0	.0	.0	.0	.0	1.8	4.5
E	.0	1.0	.9	.2	.0	.0	.0	.0	.0	.0	2.0	4.0
ESE	.0	1.0	1.2	.2	.0	.0	.0	.0	.0	.0	2.4	4.5
SE	.0	1.3	1.8	.6	.1	.0	.0	.0	.0	.0	3.8	5.1
SSE	.0	.7	1.2	.8	.2	.0	.0	.0	.0	.0	3.0	6.8
S	.0	.9	1.5	.8	.5	.3	.0	.0	.0	.0	3.9	7.9
SSH	.0	.6	1.5	1.1	1.1	.6	.3	.0	.0	.0	5.2	11.5
SW	.0	.8	2.0	1.8	2.4	1.5	.8	.2	.0	.0	9.4	13.4
WSW	.0	.7	2.5	3.2	2.4	1.0	.4	.1	.0	.0	10.3	11.6
W	.0	1.0	3.8	3.7	1.3	.3	.1	.0	.0	.0	10.3	8.5
WNW	.0	.9	4.1	6.0	2.6	.9	.1	.0	.0	.0	14.7	10.0
NW	.0	1.4	4.1	5.1	1.8	.6	.1	.0	.0	.0	13.1	9.1
NNW	.0	1.3	2.5	1.0	.2	.0	.0	.0	.0	.0	5.1	5.8
N	.0	1.7	1.9	.9	.2	.1	.0	.0	.0	.0	4.8	5.7
CALM	1.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	.0
VAR	.0	1.5	.3	.0	.0	.0	.0	.0	.0	.0	1.8	2.3
TOTAL	1.0	18.4	32.7	26.6	13.6	5.5	1.9	.4	.0	.0	100.0	8.6

APR												
SPEED CLASS (MPH)												
DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	1.0	1.4	.6	.3	.1	.0	.0	.0	.0	3.2	6.5
NE	.0	1.2	1.2	.3	.3	.1	.0	.0	.0	.0	3.2	6.3
ENE	.0	.7	1.0	.3	.1	.0	.0	.0	.0	.0	2.1	5.6
E	.0	.8	1.2	.4	.0	.0	.0	.0	.0	.0	2.4	5.1
ESE	.0	.7	1.2	.2	.0	.0	.0	.0	.0	.0	2.0	4.6
SE	.0	.9	1.5	.5	.1	.0	.0	.0	.0	.0	2.9	5.2
SSE	.0	.5	1.1	.9	.2	.0	.0	.0	.0	.0	2.6	6.9
S	.0	.7	1.3	.7	.3	.1	.0	.0	.0	.0	3.0	6.8
SSH	.0	.6	1.4	.9	.8	.4	.1	.0	.0	.0	4.2	9.6
SW	.0	.6	2.2	1.9	1.8	1.5	.5	.1	.0	.0	8.6	12.5
WSW	.0	.8	2.8	4.0	2.4	1.0	.4	.1	.0	.0	11.4	11.2
W	.0	1.0	4.2	5.1	1.9	.4	.1	.0	.0	.0	12.6	9.0
WNW	.0	.7	3.6	6.3	4.4	1.7	.4	.0	.0	.0	17.0	11.5
NW	.0	1.0	3.4	4.3	3.0	1.4	.4	.0	.0	.0	13.4	11.1
NNW	.0	.8	2.0	.8	.2	.0	.0	.0	.0	.0	3.8	6.1
N	.0	1.5	1.8	.8	.3	.1	.0	.0	.0	.0	4.4	5.8
CALM	.7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.7	.0
VAR	.0	1.6	.6	.0	.0	.0	.0	.0	.0	.0	2.2	2.7
TOTAL	.7	14.8	31.9	27.8	15.9	6.7	2.0	.2	.0	.0	100.0	9.2

TABLE 41. Continued

MAY

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	.7	1.5	.8	.3	.1	.0	.0	.0	.0	3.3	6.8
NE	.0	.8	1.4	.8	.1	.1	.0	.0	.0	.0	3.3	6.5
ENE	.0	.7	1.0	.4	.1	.0	.0	.0	.0	.0	2.2	5.7
E	.0	.8	1.2	.3	.0	.0	.0	.0	.0	.0	2.4	4.8
ESE	.0	.8	1.1	.3	.0	.0	.0	.0	.0	.0	2.2	4.8
SE	.0	.9	1.4	.5	.1	.0	.0	.0	.0	.0	2.9	5.3
SSE	.0	.5	1.1	.6	.1	.0	.0	.0	.0	.0	2.4	6.2
S	.0	.6	1.6	.5	.1	.0	.0	.0	.0	.0	2.8	5.7
SSH	.0	.5	1.2	.8	.4	.1	.0	.0	.0	.0	3.3	8.0
SH	.0	.6	2.2	1.7	1.2	.5	.1	.0	.0	.0	6.3	9.8
WSH	.0	.8	2.7	3.7	2.1	.7	.2	.0	.0	.0	10.2	10.3
W	.0	1.0	4.1	5.1	1.8	.3	.0	.0	.0	.0	12.3	8.7
WNW	.0	.7	3.7	6.9	4.9	1.8	.2	.0	.0	.0	18.3	11.4
NW	.0	1.0	3.2	4.8	4.5	2.4	.5	.0	.0	.0	16.4	12.2
NNW	.0	.9	2.0	.9	.1	.0	.0	.0	.0	.0	3.9	6.0
N	.0	1.0	1.5	.8	.2	.0	.0	.0	.0	.0	4.0	5.9
CALM	.7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.7	.0
VAR	.0	1.9	1.3	.0	.0	.0	.0	.0	.0	.0	3.2	3.2
TOTAL	.7	14.2	32.9	29.0	16.1	6.0	1.1	.1	.0	.0	100.0	8.9

JUN

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	.6	1.6	.7	.3	.0	.0	.0	.0	.0	3.2	6.8
NE	.0	.7	1.4	.7	.3	.1	.0	.0	.0	.0	3.3	7.0
ENE	.0	.4	1.0	.5	.1	.0	.0	.0	.0	.0	2.0	6.3
E	.0	.4	1.4	.4	.1	.0	.0	.0	.0	.0	2.2	5.8
ESE	.0	.5	1.4	.4	.0	.0	.0	.0	.0	.0	2.2	5.3
SE	.0	.6	1.6	.4	.0	.0	.0	.0	.0	.0	2.7	5.3
SSE	.0	.5	1.2	.4	.0	.0	.0	.0	.0	.0	2.2	5.7
S	.0	.5	1.7	.4	.1	.0	.0	.0	.0	.0	2.7	5.7
SSH	.0	.5	1.6	.8	.2	.1	.0	.0	.0	.0	3.2	7.1
SH	.0	.6	2.3	1.9	1.0	.4	.0	.0	.0	.0	6.2	9.1
WSH	.0	.6	2.5	3.2	1.7	.5	.1	.0	.0	.0	8.7	10.0
W	.0	.7	4.0	4.7	1.8	.3	.0	.0	.0	.0	11.5	8.9
WNW	.0	.6	3.2	7.1	5.9	2.0	.4	.0	.0	.0	19.3	12.1
NW	.0	.7	3.4	5.2	5.6	3.2	.7	.0	.0	.0	18.8	13.1
NNW	.0	.5	2.1	1.0	.2	.0	.0	.0	.0	.0	4.0	6.9
N	.0	.8	1.9	.8	.1	.0	.0	.0	.0	.0	3.7	6.0
CALM	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.6	.0
VAR	.0	1.7	1.7	.0	.0	.0	.0	.0	.0	.0	3.4	3.4
TOTAL	.6	11.0	34.2	28.7	17.5	6.7	1.3	.0	.0	.0	100.0	9.3

TABLE 41. Continued

JUL

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	.8	2.2	.9	.3	.0	.0	.0	.0	.0	4.1	6.2
NE	.0	.7	2.0	.5	.2	.0	.0	.0	.0	.0	3.6	6.1
ENE	.0	.5	1.3	.4	.1	.0	.0	.0	.0	.0	2.2	5.6
E	.0	.6	1.6	.6	.0	.0	.0	.0	.0	.0	2.6	5.6
ESE	.0	.7	1.5	.4	.0	.0	.0	.0	.0	.0	2.5	5.2
SE	.0	.8	1.8	.4	.0	.0	.0	.0	.0	.0	2.9	5.1
SSE	.0	.5	1.1	.4	.0	.0	.0	.0	.0	.0	2.0	5.7
S	.0	.7	1.5	.3	.1	.0	.0	.0	.0	.0	2.6	5.4
SSW	.0	.5	1.4	.6	.2	.0	.0	.0	.0	.0	2.6	6.6
SW	.0	.6	2.1	1.7	.9	.3	.1	.0	.0	.0	5.6	9.0
WSW	.0	.6	2.9	2.8	1.4	.3	.2	.0	.0	.0	8.2	9.5
W	.0	.9	4.5	4.0	1.1	.1	.0	.0	.0	.0	10.7	8.0
WNN	.0	.6	3.8	7.9	4.7	1.6	.2	.0	.0	.0	18.9	11.2
NN	.0	.7	3.5	5.5	5.0	2.8	.5	.0	.0	.0	17.9	12.5
NNN	.0	.7	2.3	1.0	.2	.0	.0	.0	.0	.0	4.3	6.4
N	.0	1.0	2.7	.8	.1	.0	.0	.0	.0	.0	4.6	5.6
CALM	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0
VAR	.0	2.3	1.7	.0	.0	.0	.0	.0	.0	.0	4.0	3.3
TOTAL	.4	13.2	37.8	27.9	14.3	5.4	.9	.0	.0	.0	100.0	8.6

AUG

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	1.0	2.1	.6	.1	.0	.0	.0	.0	.0	3.7	5.3
NE	.0	1.1	1.6	.2	.1	.0	.0	.0	.0	.0	3.0	4.6
ENE	.0	.7	1.3	.1	.0	.0	.0	.0	.0	.0	2.2	4.7
E	.0	.9	1.5	.3	.0	.0	.0	.0	.0	.0	2.7	4.7
ESE	.0	.8	1.6	.3	.0	.0	.0	.0	.0	.0	2.7	4.9
SE	.0	.9	1.6	.4	.0	.0	.0	.0	.0	.0	3.2	4.9
SSE	.0	.6	1.2	.6	.0	.0	.0	.0	.0	.0	2.5	5.6
S	.0	.8	1.4	.5	.1	.0	.0	.0	.0	.0	2.8	5.2
SSW	.0	.5	1.5	.7	.3	.1	.0	.0	.0	.0	3.1	7.0
SW	.0	.9	2.4	1.6	.8	.3	.1	.0	.0	.0	6.1	8.4
WSW	.0	.8	3.1	3.1	1.4	.2	.0	.0	.0	.0	8.6	8.6
W	.0	1.1	5.0	4.5	.9	.1	.0	.0	.0	.0	11.7	7.7
WNN	.0	.8	4.0	7.2	4.2	1.4	.1	.0	.0	.0	17.8	10.8
NN	.0	1.0	3.5	4.8	4.3	2.2	.4	.0	.0	.0	16.2	11.8
NNN	.0	1.0	2.4	.7	.1	.0	.0	.0	.0	.0	4.2	5.8
N	.0	1.2	2.8	.6	.1	.0	.0	.0	.0	.0	4.7	5.2
CALM	.7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.7	.0
VAR	.0	2.7	1.3	.0	.0	.0	.0	.0	.0	.0	4.0	3.0
TOTAL	.8	16.9	38.6	26.3	12.5	4.2	.7	.0	.0	.0	100.0	8.0

TABLE 41. Continued

SEP
SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	CT.46	TOTAL	AV. SPEED
NNE	.0	1.5	2.0	1.1	.4	.1	.0	.0	.0	.0	5.1	6.3
NE	.0	1.6	1.7	.5	.3	.1	.0	.0	.0	.0	4.2	5.8
ENE	.0	1.1	.9	.1	.1	.0	.0	.0	.0	.0	2.3	4.2
E	.0	1.5	1.4	.2	.0	.0	.0	.0	.0	.0	3.2	4.0
ESE	.0	1.1	1.6	.1	.0	.0	.0	.0	.0	.0	2.6	4.1
SE	.0	1.2	1.9	.4	.0	.0	.0	.0	.0	.0	3.5	4.6
SSE	.0	.7	1.2	.7	.1	.0	.0	.0	.0	.0	2.7	5.8
S	.0	.9	1.4	.5	.1	.0	.0	.0	.0	.0	2.9	5.6
SSW	.0	.7	1.6	.6	.3	.1	.1	.0	.0	.0	3.2	7.1
SW	.0	.7	2.0	1.3	1.0	.4	.2	.0	.0	.0	5.6	9.5
WSW	.0	1.0	3.1	3.1	1.2	.5	.1	.0	.0	.0	9.0	9.1
W	.0	1.2	5.3	4.3	.9	.2	.0	.0	.0	.0	11.9	7.7
WNW	.0	1.1	4.0	5.6	2.8	.9	.1	.0	.0	.0	14.5	9.9
NW	.0	1.2	3.5	4.8	3.1	1.3	.1	.0	.0	.0	14.0	10.6
NNW	.0	1.2	2.7	1.1	.2	.0	.0	.0	.0	.0	5.2	6.0
N	.0	1.7	2.8	1.0	.2	.0	.0	.0	.0	.0	5.8	5.6
CALM	1.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.4	.0
VAR	.0	2.1	.6	.0	.0	.0	.0	.0	.0	.0	2.7	2.5
TOTAL	1.4	20.6	37.4	25.4	10.8	3.6	.7	.0	.0	.0	100.0	7.5

OCT
SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	CT.46	TOTAL	AV. SPEED
NNE	.0	2.1	1.3	.3	.2	.0	.0	.0	.0	.0	3.6	4.5
NE	.0	2.2	.9	.1	.1	.0	.0	.0	.0	.0	3.3	3.6
ENE	.0	1.6	.8	.0	.0	.0	.0	.0	.0	.0	2.4	3.3
E	.0	1.9	1.0	.1	.0	.0	.0	.0	.0	.0	3.0	3.1
ESE	.0	1.7	1.4	.2	.0	.0	.0	.0	.0	.0	3.3	3.7
SE	.0	2.3	2.0	.5	.0	.0	.0	.0	.0	.0	4.8	4.2
SSE	.0	1.1	1.5	.6	.1	.0	.0	.0	.0	.0	3.4	5.3
S	.0	1.2	1.7	.9	.2	.1	.0	.0	.0	.0	3.6	6.1
SSW	.0	1.0	1.5	.7	.5	.4	.1	.0	.0	.0	4.1	8.7
SW	.0	.9	1.9	1.3	1.2	.8	.3	.0	.0	.0	6.4	10.8
WSW	.0	1.0	2.8	2.6	1.4	.5	.1	.0	.0	.0	8.4	9.2
W	.0	1.6	5.2	3.8	.6	.1	.0	.0	.0	.0	11.2	7.0
WNW	.0	1.5	4.3	5.3	1.4	.3	.0	.0	.0	.0	12.9	8.2
NW	.0	2.0	4.1	4.3	1.7	.4	.1	.0	.0	.0	12.5	8.3
NNW	.0	1.9	2.7	1.1	.2	.0	.0	.0	.0	.0	5.9	5.4
N	.0	2.5	2.2	.4	.2	.1	.0	.0	.0	.0	5.3	4.5
CALM	3.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	3.1	.0
VAR	.0	1.8	.2	.0	.0	.0	.0	.0	.0	.0	2.0	1.8
TOTAL	3.1	28.5	35.2	21.8	7.9	2.7	.7	.1	.0	.0	100.0	6.5

TABLE 41. Continued

NEV

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	47-46	TOTAL	AV. SPEED
NNL	.0	2.0	.8	.4	.3	.0	.0	.0	.0	.0	3.5	4.6
NE	.0	1.8	.6	.2	.1	.0	.0	.0	.0	.0	2.7	3.6
ENE	.0	1.7	.6	.1	.0	.0	.0	.0	.0	.0	2.4	3.1
E	.0	1.9	.6	.1	.0	.0	.0	.0	.0	.0	2.8	3.0
ESE	.0	2.0	1.1	.1	.0	.0	.0	.0	.0	.0	3.2	3.2
SE	.0	2.5	1.5	.4	.1	.0	.0	.0	.0	.0	4.4	3.9
SSE	.0	1.5	1.3	.4	.1	.0	.0	.0	.0	.0	3.4	5.0
S	.0	1.7	1.2	.5	.4	.3	.0	.0	.0	.0	4.2	6.6
SSH	.0	1.3	1.2	.7	.7	.5	.2	.1	.0	.0	4.8	9.5
SH	.0	1.4	1.6	1.2	1.3	.7	.3	.1	.0	.0	6.6	10.6
WSH	.0	1.3	2.1	1.7	1.1	.4	.1	.0	.0	.0	6.7	9.0
W	.0	2.0	3.6	2.0	.6	.2	.1	.0	.0	.0	8.4	6.9
NNW	.0	2.1	4.7	4.7	1.0	.3	.1	.0	.0	.0	12.9	7.6
NW	.0	3.1	6.1	4.9	.8	.2	.1	.0	.0	.0	15.1	6.9
NNW	.0	2.6	3.0	1.0	.2	.0	.0	.0	.0	.0	6.9	4.9
N	.0	2.6	1.6	.5	.2	.0	.0	.0	.0	.0	4.9	4.3
CALM	5.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	5.5	.0
VAR	.0	1.5	.1	.0	.0	.0	.0	.0	.0	.0	1.6	1.6
TOTAL	5.5	32.9	32.0	18.9	6.9	2.7	.9	.2	.0	.0	100.0	6.1

DEC

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	47-46	TOTAL	AV. SPEED
NNC	.0	1.7	.7	.2	.2	.0	.0	.0	.0	.0	2.8	4.2
NE	.0	1.6	.5	.1	.0	.0	.0	.0	.0	.0	2.2	2.8
ENE	.0	1.5	.6	.0	.0	.0	.0	.0	.0	.0	2.1	2.8
E	.0	1.7	.7	.1	.0	.0	.0	.0	.0	.0	2.4	2.9
ESE	.0	1.6	.8	.2	.1	.0	.0	.0	.0	.0	2.7	3.6
SE	.0	2.3	1.2	.3	.1	.0	.0	.0	.0	.0	3.9	3.7
SSE	.0	1.6	1.2	.3	.2	.1	.0	.0	.0	.0	3.3	4.7
S	.0	1.7	1.0	.5	.3	.2	.0	.0	.0	.0	3.7	6.2
SSH	.0	1.4	.5	.6	.8	.6	.4	.1	.0	.0	4.7	11.1
SH	.0	1.4	1.4	1.1	1.3	1.1	.5	.1	.0	.0	6.8	11.9
WSH	.0	1.5	1.8	1.3	1.3	.5	.2	.0	.0	.0	7.0	9.3
W	.0	2.0	2.9	1.8	.8	.2	.1	.0	.0	.0	7.8	7.0
NNW	.0	2.5	5.3	4.9	.7	.1	.0	.0	.0	.0	13.6	7.0
NW	.0	3.2	6.9	5.8	1.0	.1	.0	.0	.0	.0	17.1	6.9
NNW	.0	2.7	2.7	1.0	.1	.0	.0	.0	.0	.0	6.5	4.6
N	.0	2.8	1.2	.4	.2	.0	.0	.0	.0	.0	4.7	4.0
CALM	6.9	.0	.0	.0	.0	.0	.0	.0	.0	.0	6.9	.0
VAR	.0	1.8	.1	.0	.0	.0	.0	.0	.0	.0	1.9	1.7
TOTAL	6.9	32.9	29.9	19.0	7.1	2.9	1.1	.2	.1	.0	100.0	6.1

TABLE 41. Continued

ANNUAL

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	1.4	1.4	.6	.3	.1	.0	.0	.0	.0	3.7	5.7
NE	.0	1.4	1.2	.3	.2	.1	.0	.0	.0	.0	3.2	5.1
ENE	.0	1.0	.9	.2	.0	.0	.0	.0	.0	.0	2.1	4.3
E	.0	1.2	1.1	.2	.0	.0	.0	.0	.0	.0	2.6	4.1
ESE	.0	1.1	1.2	.2	.0	.0	.0	.0	.0	.0	2.6	4.2
SE	.0	1.5	1.6	.4	.1	.0	.0	.0	.0	.0	3.6	4.5
SSE	.0	.9	1.2	.5	.1	.0	.0	.0	.0	.0	2.8	5.6
S	.0	1.0	1.3	.5	.2	.1	.0	.0	.0	.0	3.3	6.4
SSW	.0	.8	1.3	.7	.6	.3	.1	.0	.0	.0	4.0	9.4
SW	.0	.9	1.9	1.5	1.4	.8	.3	.1	.0	.0	6.8	11.1
WSW	.0	.9	2.5	2.8	1.6	.6	.2	.0	.0	.0	8.5	9.9
W	.0	1.3	4.1	3.6	1.1	.2	.0	.0	.0	.0	10.3	7.9
WYW	.0	1.3	4.3	6.2	2.9	1.0	.1	.0	.0	.0	15.8	9.8
NW	.0	1.7	4.7	5.2	2.8	1.2	.2	.0	.0	.0	15.8	9.8
NNW	.0	1.5	2.5	.9	.2	.0	.0	.0	.0	.0	5.2	5.5
N	.0	1.8	2.0	.7	.2	.0	.0	.0	.0	.0	4.7	5.1
CALM	2.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	2.5	.0
VAK	.0	1.9	.7	.0	.0	.0	.0	.0	.0	.0	2.5	2.6
TOTAL	2.5	21.8	33.8	24.6	11.6	4.4	1.2	.2	.0	.0	100.0	8.0

TABLE 42. Monthly and Annual Percent Frequency Distribution of 200-Foot Wind Direction Versus Speed Class, 1955 Through 1980

JAN												
SPEED CLASS (MPH)												
DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	1.7	1.1	.4	.3	.1	.1	.0	.0	.0	3.8	6.1
NE	.0	1.6	.9	.3	.1	.1	.1	.0	.0	.0	3.1	5.4
ENE	.0	1.3	.7	.1	.0	.0	.0	.0	.0	.0	2.1	3.4
E	.0	1.6	.7	.1	.0	.0	.0	.0	.0	.0	2.5	3.4
ESE	.0	1.9	.8	.1	.0	.0	.0	.0	.0	.0	2.8	3.2
SE	.0	2.3	1.2	.4	.1	.0	.0	.0	.0	.0	4.1	4.5
SSE	.0	1.5	1.0	.4	.1	.1	.1	.0	.0	.0	3.3	6.0
S	.0	1.0	.8	.3	.3	.3	.2	.1	.0	.0	3.0	9.3
SSW	.0	.7	.6	.4	.5	.6	.5	.3	.1	.0	3.8	16.1
SW	.0	.7	.7	.6	1.1	1.4	.9	.4	.1	.1	6.1	17.6
WSW	.0	.8	1.0	1.0	1.3	.8	.5	.1	.1	.1	5.7	13.7
W	.0	1.2	1.8	1.6	1.1	.4	.1	.0	.0	.0	6.2	8.7
WNW	.0	1.3	2.7	4.2	3.8	.6	.1	.0	.0	.0	12.7	10.4
NW	.0	2.0	4.3	8.0	5.7	.8	.1	.0	.0	.0	21.0	10.2
NNW	.0	2.1	3.4	2.3	.6	.1	.0	.0	.0	.0	8.5	6.5
N	.0	2.5	2.2	.8	.3	.1	.1	.0	.0	.0	6.0	5.7
CALM	3.9	.0	.0	.0	.0	.0	.0	.0	.0	.0	3.9	.0
VAR	.0	1.1	.1	.0	.0	.0	.0	.0	.0	.0	1.2	1.8
TOTAL	3.9	25.4	24.1	21.2	15.6	5.5	2.8	1.0	.4	.1	100.0	8.7
FEB												
SPEED CLASS (MPH)												
DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	1.6	1.2	.6	.5	.2	.1	.0	.0	.0	4.4	7.2
NE	.0	1.5	1.1	.3	.1	.1	.1	.0	.0	.0	3.3	5.7
ENE	.0	1.1	.7	.2	.0	.0	.0	.0	.0	.0	2.0	4.6
E	.0	1.2	.8	.1	.0	.0	.0	.0	.0	.0	2.2	3.5
ESE	.0	1.4	.7	.2	.0	.0	.0	.0	.0	.0	2.4	3.8
SE	.0	1.9	1.0	.6	.1	.0	.0	.0	.0	.0	3.7	4.7
SSE	.0	1.0	.8	.4	.2	.1	.1	.0	.0	.0	2.6	6.8
S	.0	.9	.7	.4	.3	.3	.1	.0	.0	.0	2.8	9.4
SSW	.0	.6	.6	.6	.6	.5	.5	.2	.1	.0	3.8	14.8
SW	.0	.6	.9	.9	1.2	1.5	1.0	.5	.1	.1	6.8	17.6
WSW	.0	.7	.9	1.3	1.8	1.1	.5	.3	.1	.0	6.6	14.9
W	.0	1.2	1.8	2.5	2.1	.7	.2	.1	.0	.0	8.6	10.9
WNW	.0	1.2	2.5	4.4	4.8	1.2	.3	.0	.0	.0	14.5	11.6
NW	.0	1.6	3.9	6.8	5.6	1.2	.2	.1	.0	.0	19.4	10.9
NNW	.0	1.9	3.1	2.0	.7	.1	.0	.0	.0	.0	7.7	6.6
N	.0	2.1	2.2	.7	.5	.2	.0	.0	.0	.0	5.8	6.0
CALM	2.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	2.5	.0
VAR	.0	.9	.1	.0	.0	.0	.0	.0	.0	.0	1.0	1.8
TOTAL	2.5	21.5	23.1	22.2	18.7	7.1	3.2	1.3	.3	.1	100.0	9.7

TABLE 42. Continued

MAR

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	1.1	1.4	.9	.7	.2	.0	.0	.0	.0	4.4	7.9
NE	.0	1.3	1.3	.5	.2	.1	.0	.0	.0	.0	3.4	5.8
ENE	.0	.7	.8	.2	.1	.0	.0	.0	.0	.0	1.9	5.2
E	.0	.9	1.0	.2	.1	.0	.0	.0	.0	.0	2.2	4.7
ESE	.0	1.0	1.0	.2	.1	.0	.0	.0	.0	.0	2.4	4.6
SE	.0	1.0	1.8	.8	.2	.1	.0	.0	.0	.0	3.9	6.1
SSE	.0	.6	1.0	.8	.5	.1	.0	.0	.0	.0	3.0	8.4
S	.0	.6	1.1	.7	.5	.3	.2	.0	.0	.0	3.3	10.3
SSH	.0	.5	.9	1.1	1.0	.8	.5	.2	.0	.0	5.0	14.2
SW	.0	.6	.9	1.4	1.8	1.6	1.4	.5	.2	.0	8.4	17.4
WSW	.0	.5	1.2	1.7	2.6	1.8	.9	.2	.1	.0	9.1	15.7
W	.0	.7	1.9	3.0	2.9	.8	.3	.1	.0	.0	9.6	11.7
WNW	.0	.6	2.1	4.2	4.6	2.2	.9	.1	.0	.0	14.7	13.7
NNW	.0	.9	2.7	5.0	4.7	1.5	.7	.1	.0	.0	15.6	12.3
NNb	.0	1.1	2.6	1.8	.6	.1	.0	.0	.0	.0	6.2	7.3
N	.0	1.4	2.2	1.1	.4	.1	.0	.0	.0	.0	5.3	6.8
CALM	.7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.7	.0
VAR	.0	.8	.1	.0	.0	.0	.0	.0	.0	.0	1.0	2.0
TOTAL	.7	14.4	24.1	23.4	21.1	9.7	5.0	1.2	.4	.1	100.0	11.2

APR

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	.9	1.2	.8	.5	.2	.1	.0	.0	.0	3.6	8.1
NE	.0	1.0	1.4	.5	.3	.1	.1	.0	.0	.0	3.3	6.8
ENE	.0	.6	1.1	.4	.2	.0	.1	.0	.0	.0	2.5	6.9
E	.0	.8	1.1	.4	.1	.0	.0	.0	.0	.0	2.5	6.2
ESE	.0	.7	1.1	.3	.0	.0	.0	.0	.0	.0	2.1	5.0
SE	.0	.7	1.5	.5	.2	.0	.0	.0	.0	.0	3.0	6.1
SSE	.0	.4	.5	.7	.5	.1	.0	.0	.0	.0	2.6	8.6
S	.0	.4	1.0	.7	.4	.2	.0	.0	.0	.0	2.7	8.6
SSH	.0	.4	1.0	1.0	.7	.5	.2	.1	.0	.0	3.8	11.7
SW	.0	.4	1.3	1.4	1.5	1.4	1.3	.4	.1	.0	7.8	16.4
WSW	.0	.3	1.4	2.3	3.0	1.8	.7	.2	.0	.0	9.8	15.0
W	.0	.7	2.0	3.5	3.6	.9	.3	.1	.0	.0	11.1	11.8
WNW	.0	.5	2.0	4.2	6.0	3.4	1.3	.3	.0	.0	17.8	15.0
NNW	.0	.7	2.6	4.0	4.5	2.7	1.5	.4	.0	.0	16.4	14.6
NNb	.0	.8	2.0	1.4	.5	.1	.0	.0	.0	.0	4.8	7.6
N	.0	1.2	2.0	.9	.4	.1	.0	.0	.0	.0	4.6	6.8
CALM	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0
VAR	.0	.8	.3	.0	.0	.0	.0	.0	.0	.0	1.0	2.5
TOTAL	.4	11.4	23.7	23.0	22.5	11.8	5.7	1.4	.2	.0	100.0	11.9

TABLE 42. Continued

MAY

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	.6	1.3	.9	.5	.1	.0	.0	.0	.0	3.5	8.2
NE	.0	.8	1.4	1.0	.5	.1	.0	.0	.0	.0	3.7	7.7
ENE	.0	.6	1.1	.5	.2	.1	.0	.0	.0	.0	2.4	6.8
E	.0	.7	1.2	.4	.1	.0	.0	.0	.0	.0	2.4	5.6
ESE	.0	.6	1.1	.4	.0	.0	.0	.0	.0	.0	2.1	5.1
SE	.0	.9	1.5	.6	.2	.0	.0	.0	.0	.0	3.1	5.9
SSE	.0	.4	1.0	.6	.4	.1	.0	.0	.0	.0	2.5	7.9
S	.0	.5	1.2	.6	.2	.0	.0	.0	.0	.0	2.6	7.0
SSW	.0	.3	1.0	.8	.5	.2	.1	.0	.0	.0	2.9	9.8
SW	.0	.4	1.4	1.5	1.2	.7	.3	.1	.0	.0	5.6	12.1
WSW	.0	.3	1.4	2.0	2.8	1.3	.4	.1	.0	.0	8.4	13.7
W	.0	.7	1.5	3.7	3.5	.9	.1	.0	.0	.0	10.5	11.5
WNW	.0	.6	2.1	4.6	7.2	3.6	1.5	.2	.0	.0	19.8	14.9
NW	.0	.7	2.3	3.9	5.2	3.8	2.3	.4	.0	.0	18.7	15.7
NNW	.0	.8	1.8	1.5	.6	.1	.0	.0	.0	.0	4.7	7.7
N	.0	1.0	1.9	1.0	.5	.0	.0	.0	.0	.0	4.4	6.7
CALM	.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0
VAR	.0	1.1	.6	.0	.0	.0	.0	.0	.0	.0	1.7	3.1
TOTAL	.5	11.0	24.1	24.1	23.4	11.0	5.0	.8	.1	.0	100.0	11.5

JUN

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	.5	1.6	1.0	.4	.1	.0	.0	.0	.0	3.5	8.0
NE	.0	.5	1.4	.9	.4	.2	.1	.0	.0	.0	3.4	8.4
ENE	.0	.3	1.1	.5	.2	.1	.0	.0	.0	.0	2.1	7.4
E	.0	.5	1.3	.5	.2	.0	.0	.0	.0	.0	2.4	6.5
ESE	.0	.5	1.2	.5	.1	.0	.0	.0	.0	.0	2.3	5.7
SE	.0	.5	1.6	.5	.1	.0	.0	.0	.0	.0	2.7	6.0
SSE	.0	.4	1.1	.4	.3	.0	.0	.0	.0	.0	2.2	7.1
S	.0	.6	1.3	.5	.1	.0	.0	.0	.0	.0	2.5	6.2
SSW	.0	.3	1.3	.8	.4	.1	.0	.0	.0	.0	3.0	8.6
SW	.0	.5	1.5	1.7	1.2	.4	.2	.0	.0	.0	5.6	10.8
WSW	.0	.5	1.5	2.2	2.3	.9	.4	.1	.0	.0	7.9	12.8
W	.0	.5	2.1	3.6	2.9	.7	.1	.0	.0	.0	9.9	11.3
WNW	.0	.4	1.8	4.3	7.0	4.3	1.7	.2	.0	.0	19.8	15.6
NW	.0	.5	2.2	4.0	5.7	5.2	3.3	.6	.0	.0	21.5	16.9
NNW	.0	.5	2.0	1.5	.6	.1	.1	.0	.0	.0	4.7	8.3
N	.0	.6	2.0	1.1	.3	.0	.0	.0	.0	.0	4.0	6.9
CALM	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	.2
VAR	.0	1.0	1.0	.0	.0	.0	.0	.0	.0	.0	1.9	3.5
TOTAL	.3	8.5	25.8	23.9	22.1	12.4	5.9	1.0	.1	.0	100.0	12.0

TABLE 42. Continued

JUL											
SPEED CLASS (MPH)											
DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL AV. SPEED
NNE	.0	.7	2.1	1.2	.4	.1	.0	.0	.0	.0	4.5 7.1
NE	.0	.8	1.5	.9	.4	.1	.0	.0	.0	.0	4.0 7.0
ENE	.0	.4	1.2	.5	.2	.0	.0	.0	.0	.0	2.3 6.8
E	.0	.5	1.5	.8	.1	.0	.0	.0	.0	.0	2.9 6.3
ESE	.0	.6	1.4	.6	.0	.0	.0	.0	.0	.0	2.6 5.7
SE	.0	.6	1.5	.4	.1	.0	.0	.0	.0	.0	3.0 5.6
SSE	.0	.4	1.1	.5	.1	.0	.0	.0	.0	.0	2.0 6.5
S	.0	.4	1.4	.4	.1	.0	.0	.0	.0	.0	2.4 6.4
SSW	.0	.3	1.1	.6	.2	.1	.0	.0	.0	.0	2.3 7.9
SW	.0	.4	1.3	1.4	1.1	.4	.2	.0	.0	.0	4.9 11.0
WSW	.0	.4	1.4	2.1	1.8	.8	.3	.1	.0	.0	6.9 12.5
W	.0	.6	2.2	3.2	2.4	.5	.1	.0	.0	.0	9.1 10.6
WNW	.0	.5	2.0	4.6	7.6	3.5	1.4	.2	.0	.0	19.8 14.9
NW	.0	.6	2.5	3.9	5.6	4.9	3.2	.3	.0	.0	21.0 16.5
NNW	.0	.5	2.1	1.6	.5	.2	.0	.0	.0	.0	4.5 8.0
N	.0	.9	2.5	1.2	.2	.1	.0	.0	.0	.0	4.9 6.6
CALM	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2 .1
VAR	.0	1.3	.9	.0	.0	.0	.0	.0	.0	.0	2.2 3.4

AUG
SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL AV. SPEED
NNE	.0	.9	2.2	.9	.3	.0	.0	.0	.0	.0	4.2 6.3
NE	.0	1.0	1.5	.5	.1	.0	.0	.0	.0	.0	3.6 5.4
ENE	.0	.7	1.3	.3	.1	.0	.0	.0	.0	.0	2.4 5.4
E	.0	.7	1.4	.4	.1	.0	.0	.0	.0	.0	2.6 5.3
ESE	.0	.7	1.6	.5	.0	.0	.0	.0	.0	.0	2.8 5.3
SE	.0	.8	1.7	.5	.1	.0	.0	.0	.0	.0	3.2 5.4
SSE	.0	.5	1.1	.6	.3	.0	.0	.0	.0	.0	2.2 7.1
S	.0	.6	1.2	.5	.1	.0	.0	.0	.0	.0	2.5 6.1
SSW	.0	.4	1.0	.7	.4	.1	.0	.0	.0	.0	2.6 8.4
SW	.0	.5	1.5	1.4	1.0	.5	.2	.0	.0	.0	5.1 10.5
WSW	.0	.5	1.5	2.2	2.1	.7	.1	.0	.0	.0	7.2 11.6
W	.0	.7	2.2	3.6	2.2	.5	.1	.0	.0	.0	9.5 10.1
WNW	.0	.7	2.4	5.4	7.1	3.3	1.3	.2	.0	.0	20.2 14.2
NW	.0	.8	2.5	4.3	5.2	4.1	2.1	.3	.0	.0	19.4 15.2
NNW	.0	.7	2.4	1.5	.5	.1	.0	.0	.0	.0	5.2 7.5
N	.0	1.2	2.5	1.0	.2	.0	.0	.0	.0	.0	4.8 6.0
CALM	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4 .0
VAR	.0	1.4	.7	.0	.0	.0	.0	.0	.0	.0	2.1 2.9
TOTAL	.4	12.5	29.4	24.2	19.7	9.4	3.9	.5	.0	.0	100.0 10.5

TABLE 42. Continued

SEP

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	CT.46	TOTAL	AV. SPEED
NNE	.0	1.3	2.1	1.4	.7	.1	.0	.0	.0	.0	5.7	7.5
NE	.0	1.5	1.5	.8	.4	.2	.1	.0	.0	.0	4.4	7.2
ENE	.0	1.0	1.1	.3	.1	.1	.0	.0	.0	.0	2.6	5.6
E	.0	1.3	1.3	.3	.1	.0	.0	.0	.0	.0	3.0	4.6
ESE	.0	1.2	1.6	.2	.0	.0	.0	.0	.0	.0	3.0	4.4
SE	.0	1.1	1.7	.5	.1	.0	.0	.0	.0	.0	3.5	5.3
SSE	.0	.6	1.1	.8	.3	.0	.0	.0	.0	.0	2.8	7.0
S	.0	.5	.8	.5	.2	.1	.0	.0	.0	.0	2.2	7.2
SSE	.0	.4	.5	.6	.3	.1	.1	.0	.0	.0	2.5	9.2
SW	.0	.4	1.2	1.2	1.1	.7	.4	.1	.0	.0	5.0	12.8
WSW	.0	.5	1.2	1.9	1.9	.9	.4	.0	.0	.0	6.8	12.6
W	.0	.8	2.2	3.4	2.0	.4	.1	.0	.0	.0	6.9	10.0
WNW	.0	.8	2.5	4.8	5.2	2.3	.8	.0	.0	.0	16.4	13.0
NW	.0	1.0	2.9	4.6	5.3	2.9	1.2	.1	.0	.0	18.0	13.6
NNW	.0	1.2	2.6	2.0	.8	.1	.0	.0	.0	.0	6.7	7.6
N	.0	1.5	2.9	1.3	.4	.0	.0	.0	.0	.0	6.2	6.4
CALM	1.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	.0
VAR	.0	1.2	.3	.0	.0	.0	.0	.0	.0	.0	1.5	2.4
TOTAL	1.0	16.3	27.7	24.6	18.9	7.9	3.3	.4	.0	.0	100.0	9.8

OCT

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	CT.46	TOTAL	AV. SPEED
NNE	.0	2.0	1.5	.5	.3	.1	.0	.0	.0	.0	4.5	5.4
NE	.0	2.1	1.1	.3	.1	.1	.0	.0	.0	.0	3.7	4.4
ENE	.0	1.5	.8	.1	.0	.0	.0	.0	.0	.0	2.5	3.7
E	.0	1.9	1.0	.2	.0	.0	.0	.0	.0	.0	3.1	3.5
ESE	.0	1.8	1.4	.3	.0	.0	.0	.0	.0	.0	3.6	3.9
SE	.0	2.1	1.9	.7	.2	.0	.0	.0	.0	.0	4.6	4.6
SSE	.0	1.0	1.1	.8	.4	.1	.0	.0	.0	.0	3.3	6.7
S	.0	.9	1.0	.5	.3	.2	.1	.0	.0	.0	3.0	7.8
SSE	.0	.5	.9	.5	.5	.4	.3	.1	.0	.0	3.3	12.1
SW	.0	.5	1.0	.9	1.1	1.0	.8	.2	.0	.0	5.5	15.1
WSW	.0	.7	1.2	1.5	1.7	1.0	.3	.1	.0	.0	6.6	12.7
W	.0	1.0	2.1	2.7	1.8	.4	.0	.0	.0	.0	8.0	9.5
WNW	.0	1.0	2.8	4.5	4.1	1.2	.2	.0	.0	.0	13.8	11.2
NW	.0	1.6	3.4	5.2	5.1	1.9	.4	.1	.0	.0	17.6	11.6
NNW	.0	1.7	3.0	2.1	.8	.1	.0	.0	.0	.0	7.7	6.9
N	.0	2.1	2.6	.8	.2	.1	.0	.0	.0	.0	5.9	5.5
CALM	2.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	2.0	.0
VAR	.0	1.1	.1	.0	.0	.0	.0	.0	.0	.0	1.1	1.7
TOTAL	2.0	23.7	26.9	21.5	16.6	6.5	2.2	.5	.1	.0	100.0	8.7

TABLE 42. Continued

NOV

SPEED CLASS (MPH)

DIRECTION	C	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	CT.46	TOTAL	AV. SPEED
NNE	.0	1.9	1.2	.5	.5	.1	.0	.0	.0	.0	4.3	6.1
NE	.0	1.7	.9	.3	.1	.1	.1	.0	.0	.0	3.1	4.7
ENE	.0	1.4	.7	.1	.0	.0	.0	.0	.0	.0	2.3	3.3
E	.0	1.7	1.0	.1	.0	.0	.0	.0	.0	.0	2.9	3.3
ESE	.0	2.0	1.2	.1	.0	.0	.0	.0	.0	.0	3.2	3.4
SE	.0	2.4	1.4	.4	.2	.0	.0	.0	.0	.0	4.6	4.4
SSE	.0	1.2	1.2	.6	.3	.1	.0	.0	.0	.0	3.5	6.5
S	.0	1.2	1.0	.4	.4	.3	.1	.0	.0	.0	3.5	8.3
SSW	.0	.9	.7	.5	.7	.6	.5	.1	.1	.0	4.0	13.3
SW	.0	.9	.8	.7	1.1	1.1	.7	.3	.1	.0	5.7	15.1
WSW	.0	.9	1.1	1.2	1.3	.9	.4	.1	.0	.0	6.0	12.5
W	.0	1.1	1.8	2.0	1.3	.4	.2	.1	.0	.0	6.8	9.8
WNW	.0	1.3	2.5	3.8	3.3	.7	.3	.0	.0	.0	11.8	10.7
NW	.0	2.0	4.5	6.5	4.3	.8	.2	.1	.0	.0	18.4	10.0
NNW	.0	2.4	3.4	2.4	.7	.1	.0	.0	.0	.0	8.9	6.5
N	.0	2.5	2.1	1.0	.4	.1	.0	.0	.0	.0	6.2	5.5
CALM	3.8	.0	.0	.0	.0	.0	.0	.0	.0	.0	3.6	.0
VAR	.0	1.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	1.5
TOTAL	3.8	26.5	25.6	20.7	14.7	5.2	2.5	.7	.2	.0	100.0	8.3

DEC

SPEED CLASS (MPH)

DIRECTION	C	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	CT.46	TOTAL	AV. SPEED
NNE	.0	1.7	1.0	.3	.3	.1	.0	.0	.0	.0	3.3	5.2
NE	.0	1.4	.9	.1	.0	.0	.0	.0	.0	.0	2.4	3.6
ENE	.0	1.3	.8	.1	.0	.0	.0	.0	.0	.0	2.2	3.3
E	.0	1.5	.8	.1	.0	.0	.0	.0	.0	.0	2.4	3.3
ESE	.0	1.8	.8	.2	.1	.0	.0	.0	.0	.0	2.9	3.8
SE	.0	2.3	1.2	.4	.1	.0	.0	.0	.0	.0	4.2	4.2
SSE	.0	1.6	1.1	.4	.2	.1	.0	.0	.0	.0	3.4	5.7
S	.0	1.4	.8	.3	.4	.2	.1	.1	.0	.0	3.2	7.6
SSW	.0	.9	.6	.4	.5	.5	.7	.3	.1	.0	4.2	15.7
SW	.0	.8	.6	.8	1.0	1.1	1.0	.4	.1	.1	6.2	16.9
WSW	.0	.9	.5	1.2	1.5	.9	.6	.2	.0	.0	6.2	13.7
W	.0	1.4	1.5	1.6	1.5	.6	.2	.1	.0	.0	7.2	10.0
WNW	.0	1.5	2.6	4.1	2.8	.6	.1	.0	.0	.0	11.7	10.0
NW	.0	2.0	4.3	7.5	5.2	1.0	.1	.0	.0	.0	20.2	10.2
NNW	.0	2.3	3.3	2.3	.8	.0	.0	.0	.0	.0	8.6	6.6
N	.0	2.2	2.0	.7	.4	.1	.0	.0	.0	.0	5.4	5.2
CALM	4.7	.0	.0	.0	.0	.0	.0	.0	.0	.0	4.7	.0
VAR	.0	1.2	.1	.0	.0	.0	.0	.0	.0	.0	1.3	1.7
TOTAL	4.7	26.2	23.9	20.5	14.9	5.4	2.9	1.1	.3	.1	100.0	8.5

TABLE 42. Continued

DIRECTION	ANNUAL SPEED CLASS (MPH)										TOTAL	AV. SPEED
	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT. 46		
ANE	.0	1.2	1.5	.8	.4	.1	.0	.0	.0	.0	4.1	6.9
NL	.0	1.3	1.3	.5	.2	.1	.0	.0	.0	.0	3.4	6.1
ENE	.0	.9	1.0	.3	.1	.0	.0	.0	.0	.0	2.3	5.2
E	.0	1.1	1.1	.3	.1	.0	.0	.0	.0	.0	2.6	4.7
ESE	.0	1.2	1.2	.3	.0	.0	.0	.0	.0	.0	2.7	4.4
SE	.0	1.4	1.5	.5	.1	.0	.0	.0	.0	.0	3.7	5.2
SSE	.0	.8	1.0	.6	.3	.1	.0	.0	.0	.0	2.8	7.0
S	.0	.7	1.0	.5	.3	.2	.1	.0	.0	.0	2.8	8.0
SSW	.0	.5	.9	.7	.5	.4	.3	.1	.0	.0	3.4	12.3
SW	.0	.6	1.1	1.2	1.2	1.0	.7	.2	.1	.0	6.1	14.8
WSW	.0	.6	1.2	1.7	2.0	1.1	.5	.1	.0	.0	7.3	13.5
W	.0	.9	2.0	2.9	2.3	.6	.2	.0	.0	.0	8.6	10.6
WNW	.0	.9	2.3	4.4	5.3	2.2	.8	.1	.0	.0	16.1	13.3
NW	.0	1.2	3.2	5.3	5.2	2.6	1.3	.2	.0	.0	18.9	13.2
NNW	.0	1.3	2.6	1.9	.6	.1	.0	.0	.0	.0	6.6	7.1
N	.0	1.6	2.3	1.0	.4	.1	.0	.0	.0	.0	5.3	6.1
CALM	1.7	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.7	.0
VAR	.0	1.1	.4	.0	.0	.0	.0	.0	.0	.0	1.4	2.5
TOTAL	1.7	17.3	25.6	22.8	19.1	8.5	4.0	.9	.2	.0	100.0	10.5

TABLE 43. Monthly and Annual Percent Frequency Distribution of 400-Foot Wind Direction Versus Speed Class, 1955 Through 1980

JAN											
SPEED CLASS (MPH)											
DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	47-54	TOTAL AV. SPEED
NNE	.0	1.6	1.0	.5	.4	.2	.1	.0	.0	.0	3.8 7.0
NE	.0	1.2	.6	.2	.1	.1	.1	.0	.0	.0	2.4 6.2
ENE	.0	1.1	.7	.1	.0	.0	.0	.0	.0	.0	1.9 3.7
E	.0	1.9	.6	.1	.0	.0	.0	.0	.0	.0	2.6 2.8
ESE	.0	1.6	.7	.1	.0	.0	.0	.0	.0	.0	2.4 3.1
SE	.0	2.2	1.1	.3	.1	.0	.0	.0	.0	.0	3.8 4.4
SSE	.0	1.2	.7	.3	.2	.1	.1	.1	.0	.0	2.8 7.6
S	.0	.9	.6	.3	.3	.3	.1	.1	.0	.0	2.7 10.0
SSW	.0	.6	.4	.4	.5	.6	.5	.4	.2	.1	3.7 18.6
SW	.0	.7	.7	.7	1.0	1.2	1.2	.6	.4	.1	6.5 19.9
WSW	.0	.7	.9	.9	1.2	1.0	.7	.4	.1	.1	6.0 15.9
W	.0	1.0	1.5	1.6	1.1	.5	.2	.0	.0	.0	5.9 10.1
WNW	.0	1.5	2.4	2.9	2.6	.8	.2	.0	.0	.0	10.3 10.3
NW	.0	2.0	4.4	7.8	6.4	1.2	.1	.1	.0	.0	22.0 10.6
NNW	.0	2.2	3.7	2.8	1.0	.1	.0	.0	.0	.0	9.8 7.0
N	.0	2.4	2.3	1.0	.4	.2	.1	.0	.0	.0	6.3 6.3
CALM	6.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	6.0 .0
VAR	.0	1.0	.1	.0	.0	.0	.0	.0	.0	.0	1.0 1.5
TOTAL	6.0	23.8	22.4	19.7	15.4	6.3	3.6	1.7	.8	.3	100.0 9.3
FEB											
SPEED CLASS (MPH)											
DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	47-54	TOTAL AV. SPEED
NNE	.0	1.4	1.0	.6	.6	.3	.1	.1	.0	.0	4.1 8.8
NE	.0	1.3	.8	.3	.1	.2	.0	.1	.0	.0	2.8 6.8
ENE	.0	1.0	.6	.1	.0	.0	.0	.0	.0	.0	1.8 3.8
E	.0	1.4	.7	.1	.0	.0	.0	.0	.0	.0	2.1 3.3
ESE	.0	1.3	.7	.2	.0	.0	.0	.0	.0	.0	2.3 3.8
SE	.0	1.7	1.0	.5	.2	.0	.0	.0	.0	.0	3.4 5.1
SSE	.0	1.0	.6	.4	.3	.2	.1	.0	.0	.0	2.6 7.5
S	.0	.7	.7	.3	.3	.3	.2	.0	.0	.0	2.5 10.1
SSW	.0	.5	.5	.5	.7	.5	.5	.3	.1	.0	3.6 16.7
SW	.0	.6	.7	.7	1.1	1.3	1.3	.8	.4	.1	7.0 20.7
WSW	.0	.6	.8	1.1	1.6	1.4	.7	.4	.2	.0	6.8 16.9
W	.0	1.1	1.7	2.0	2.1	1.0	.3	.1	.0	.0	8.4 12.0
WNW	.0	1.2	2.2	2.9	3.3	1.2	.6	.2	.0	.0	11.5 12.2
NW	.0	1.7	3.5	6.8	5.9	1.6	.4	.2	.0	.0	20.5 11.4
NNW	.0	1.6	3.5	2.9	1.1	.2	.0	.0	.0	.0	9.3 7.7
N	.0	2.2	2.3	1.1	.6	.1	.0	.0	.0	.0	6.4 6.2
CALM	4.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	4.1 .0
VAR	.0	.9	.0	.0	.0	.0	.0	.0	.0	.0	.9 1.5
TOTAL	4.1	20.2	21.5	20.4	18.0	8.3	4.2	2.2	.8	.2	100.0 10.4

TABLE 43. Continued

MAR

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	.9	1.2	.9	.8	.3	.1	.0	.0	.0	4.1	8.8
NE	.0	1.0	.9	.5	.3	.1	.1	.0	.0	.0	3.0	7.3
ENE	.0	.7	.8	.2	.1	.0	.0	.0	.0	.0	1.8	5.4
E	.0	1.0	.9	.2	.1	.0	.0	.0	.0	.0	2.2	4.8
ESE	.0	.9	.8	.2	.1	.0	.0	.0	.0	.0	2.0	4.6
SE	.0	1.0	1.5	.8	.3	.1	.0	.0	.0	.0	3.7	6.5
SSE	.0	.7	.9	.8	.5	.2	.1	.0	.0	.0	3.2	8.7
S	.0	.6	.9	.7	.5	.3	.2	.1	.0	.0	3.4	11.0
SSH	.0	.4	.8	.9	1.0	.7	.5	.3	.1	.0	4.8	15.8
Sh	.0	.5	.9	1.1	1.6	1.6	1.5	.8	.2	.1	8.5	19.3
WSH	.0	.4	.8	1.3	2.1	2.1	1.3	.5	.2	.0	8.7	18.1
W	.0	.7	1.5	2.1	2.6	1.2	.5	.1	.0	.0	8.7	13.2
WNH	.0	.7	1.6	3.1	4.1	2.3	1.5	.6	.0	.0	13.6	15.5
NH	.0	1.0	2.6	5.1	4.9	1.8	1.0	.3	.0	.0	16.7	13.2
NNH	.0	1.1	2.6	2.5	1.1	.2	.1	.0	.0	.0	7.5	8.5
N	.0	1.2	2.1	1.4	.7	.2	.1	.0	.0	.0	5.7	7.7
CALM	1.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.3	.1
VAR	.0	.8	.1	.0	.0	.0	.0	.0	.0	.0	.8	1.7
TOTAL	1.3	13.7	20.9	21.7	20.8	11.2	6.9	2.7	.6	.2	100.0	12.3

APR

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	.9	1.1	.8	.6	.2	.1	.0	.0	.0	3.7	8.8
NE	.0	.9	1.1	.4	.3	.1	.1	.0	.0	.0	3.0	7.8
ENE	.0	.7	.9	.5	.2	.1	.1	.0	.0	.0	2.6	7.6
E	.0	.8	1.1	.4	.2	.1	.0	.0	.0	.0	2.6	6.0
ESE	.0	.6	1.0	.2	.0	.0	.0	.0	.0	.0	1.8	5.1
SE	.0	.7	1.3	.6	.2	.1	.0	.0	.0	.0	3.0	6.7
SSE	.0	.4	.8	.6	.5	.1	.0	.0	.0	.0	2.5	8.8
S	.0	.4	1.0	.6	.3	.1	.0	.0	.0	.0	2.6	8.4
SSH	.0	.3	.9	.9	.6	.5	.2	.0	.0	.0	3.7	12.4
Sh	.0	.4	1.0	1.2	1.4	1.5	1.4	.6	.1	.0	7.7	18.2
WSH	.0	.4	1.0	1.7	2.2	2.0	1.1	.4	.1	.0	8.9	16.6
W	.0	.6	1.6	2.3	3.6	1.7	.6	.1	.0	.0	10.5	13.7
WNH	.0	.6	1.8	3.3	5.3	4.2	2.7	.9	.1	.0	18.8	17.3
NH	.0	.7	2.3	3.9	4.3	2.5	1.9	.8	.2	.0	16.6	15.8
NNH	.0	.9	2.0	1.6	1.0	.1	.0	.0	.0	.0	5.6	8.3
N	.0	1.1	1.8	1.0	.6	.1	.1	.0	.0	.0	4.7	7.6
CALM	.8	.0	.0	.0	.0	.0	.0	.0	.0	.0	.8	.0
VAR	.0	.8	.1	.0	.0	.0	.0	.0	.0	.0	.9	2.1
TOTAL	.8	11.1	20.9	20.3	21.4	13.4	8.3	3.0	.6	.1	100.0	13.2

TABLE 43. Continued

MAY

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	.6	1.2	1.0	.6	.2	.0	.0	.0	.0	3.7	8.7
NE	.0	.7	1.2	.9	.6	.2	.1	.0	.0	.0	3.6	8.6
ENE	.0	.6	1.0	.5	.2	.1	.0	.0	.0	.0	2.5	7.3
E	.0	.6	1.1	.4	.1	.0	.0	.0	.0	.0	2.3	5.7
ESE	.0	.5	1.1	.3	.1	.0	.0	.0	.0	.0	2.1	5.3
SE	.0	.9	1.3	.6	.2	.1	.0	.0	.0	.0	3.2	6.6
SSE	.0	.4	.8	.7	.3	.1	.0	.0	.0	.0	2.4	8.4
S	.0	.5	1.1	.6	.2	.1	.0	.0	.0	.0	2.6	7.3
SSW	.0	.3	.5	.8	.5	.2	.1	.0	.0	.0	2.6	10.5
SW	.0	.3	1.2	1.4	1.3	.7	.5	.1	.0	.0	5.5	13.3
WSW	.0	.3	1.1	1.6	2.4	1.5	.7	.2	.0	.0	7.9	15.2
W	.0	.6	1.6	2.4	3.5	1.4	.3	.0	.0	.0	9.8	12.9
WNW	.0	.5	1.7	3.5	6.3	5.2	2.9	1.0	.1	.0	21.2	17.5
NW	.0	.8	2.2	3.5	4.5	3.9	2.7	1.1	.1	.0	18.6	17.0
NNW	.0	.7	1.6	1.7	.9	.1	.0	.0	.0	.0	5.2	8.4
N	.0	.9	1.7	1.2	.7	.0	.0	.0	.0	.0	4.5	7.4
CALM	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.6	.0
VAR	.0	1.2	.4	.0	.0	.0	.0	.0	.0	.0	1.6	2.7
TOTAL	.6	10.5	21.5	21.2	22.3	13.8	7.3	2.5	.3	.0	100.0	12.9

JUN

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	.5	1.3	1.0	.5	.2	.0	.0	.0	.0	3.5	8.6
NE	.0	.4	1.3	.8	.5	.3	.1	.0	.0	.0	3.4	9.2
ENE	.0	.4	1.0	.5	.2	.1	.0	.0	.0	.0	2.2	7.5
E	.0	.5	1.1	.6	.2	.1	.0	.0	.0	.0	2.5	6.7
ESE	.0	.6	1.1	.4	.1	.0	.0	.0	.0	.0	2.2	5.7
SE	.0	.6	1.4	.5	.2	.0	.0	.0	.0	.0	2.7	6.2
SSE	.0	.3	1.0	.4	.3	.1	.0	.0	.0	.0	2.2	7.7
S	.0	.5	1.1	.5	.1	.0	.0	.0	.0	.0	2.2	6.4
SSW	.0	.4	1.2	.8	.4	.1	.1	.0	.0	.0	3.1	8.9
SW	.0	.5	1.3	1.4	1.3	.5	.2	.1	.0	.0	5.3	11.4
WSW	.0	.3	1.1	1.9	2.1	1.2	.6	.1	.0	.0	7.5	14.2
W	.0	.6	1.7	2.6	3.2	1.2	.3	.0	.0	.0	9.5	12.4
WNW	.0	.3	1.5	3.2	5.9	5.7	3.5	1.1	.1	.0	21.3	18.5
NW	.0	.5	2.0	3.7	5.2	4.4	4.0	1.5	.2	.0	21.4	18.3
NNW	.0	.5	1.5	1.7	.6	.1	.0	.0	.0	.0	4.9	8.4
N	.0	.7	1.5	1.1	.4	.1	.0	.0	.0	.0	4.1	7.1
CALM	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0
VAR	.0	1.0	.7	.0	.0	.0	.0	.0	.0	.0	1.7	3.1
TOTAL	.4	8.6	22.9	21.1	20.9	14.0	8.8	2.9	.3	.0	100.0	13.3

TABLE 43. Continued

JUL

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	.7	2.0	1.2	.4	.1	.0	.0	.0	.0	4.4	7.6
NE	.0	.8	1.7	.9	.4	.1	.0	.0	.0	.0	4.0	7.3
ENE	.0	.4	1.2	.5	.2	.1	.0	.0	.0	.0	2.4	7.3
E	.0	.5	1.4	.7	.2	.0	.0	.0	.0	.0	2.8	6.4
ESE	.0	.6	1.4	.5	.1	.0	.0	.0	.0	.0	2.6	5.8
SE	.0	.7	1.7	.5	.1	.0	.0	.0	.0	.0	3.0	5.9
SSE	.0	.4	1.1	.4	.2	.0	.0	.0	.0	.0	2.1	6.7
S	.0	.4	1.3	.4	.1	.0	.0	.0	.0	.0	2.2	6.5
SSW	.0	.2	.9	.6	.2	.1	.1	.0	.0	.0	2.1	8.5
SW	.0	.3	1.2	1.3	1.2	.5	.3	.1	.0	.0	4.6	11.9
WSW	.0	.2	1.1	1.7	1.7	1.0	.4	.1	.1	.0	6.4	13.8
W	.0	.5	1.6	2.4	2.7	.7	.2	.0	.0	.0	8.2	12.0
WNW	.0	.6	1.9	3.3	6.2	5.4	3.0	1.1	.1	.0	21.5	17.6
NNW	.0	.6	2.2	3.7	5.0	4.0	3.9	1.2	.1	.0	20.7	17.8
NN	.0	.5	2.1	1.9	.6	.2	.0	.0	.0	.0	5.4	8.4
NNN	.0	.9	2.4	1.4	.4	.1	.0	.0	.0	.0	5.1	7.0
N	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0
CALM	.0	1.4	.5	.0	.0	.0	.0	.0	.0	.0	1.9	2.8
VAR	.0											
TOTAL	.4	9.9	25.5	21.4	19.7	12.4	7.9	2.5	.3	.0	100.0	12.6

AUG

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	.8	1.9	.9	.3	.0	.0	.0	.0	.0	3.9	6.0
NE	.0	1.0	1.7	.5	.1	.0	.0	.0	.0	.0	3.4	5.5
ENE	.0	.7	1.2	.3	.1	.0	.0	.0	.0	.0	2.3	5.4
E	.0	.8	1.3	.4	.1	.0	.0	.0	.0	.0	2.7	5.4
ESE	.0	.6	1.3	.4	.0	.0	.0	.0	.0	.0	2.3	5.3
SE	.0	.6	1.6	.6	.1	.0	.0	.0	.0	.0	3.2	5.8
SSE	.0	.4	.9	.6	.4	.0	.0	.0	.0	.0	2.3	7.6
S	.0	.5	1.1	.5	.1	.0	.0	.0	.0	.0	2.3	6.3
SSW	.0	.3	.9	.7	.4	.1	.0	.0	.0	.0	2.6	8.9
SW	.0	.5	1.2	1.3	1.0	.6	.3	.0	.0	.0	4.9	11.7
WSW	.0	.4	1.1	1.7	1.9	1.1	.3	.1	.0	.0	6.5	13.1
W	.0	.6	1.9	2.6	2.4	.8	.1	.0	.0	.0	8.4	11.3
WNW	.0	.6	2.2	4.3	6.5	5.0	2.5	1.0	.1	.0	22.2	16.7
NNW	.0	.8	2.4	4.1	5.2	3.8	2.7	.9	.1	.0	20.1	16.3
NN	.0	.7	2.2	1.7	.6	.1	.0	.0	.0	.0	5.4	7.8
N	.0	1.1	2.4	1.3	.2	.0	.0	.0	.0	.0	5.1	6.3
CALM	.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.1
VAR	.0	1.4	.5	.0	.0	.0	.0	.0	.0	.0	1.8	2.7
TOTAL	.5	12.1	25.9	21.9	19.5	11.8	6.0	2.1	.1	.0	100.0	11.7

TABLE 43. Continued

SEP

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	1.2	1.8	1.3	.9	.2	.1	.0	.0	.0	5.4	8.4
NE	.0	1.2	1.2	.7	.5	.2	.1	.0	.0	.0	4.0	8.2
ENE	.0	.9	1.0	.3	.1	.1	.0	.0	.0	.0	2.4	5.8
E	.0	1.3	1.3	.2	.1	.0	.0	.0	.0	.0	2.9	5.2
ESE	.0	1.1	1.3	.2	.0	.0	.0	.0	.0	.0	2.6	4.7
SE	.0	1.0	1.8	.5	.2	.0	.0	.0	.0	.0	3.5	5.7
SSE	.0	.5	.9	.7	.3	.0	.0	.0	.0	.0	2.5	7.4
S	.0	.5	.7	.6	.2	.1	.0	.0	.0	.0	2.1	7.8
SSW	.0	.3	.7	.6	.4	.2	.1	.0	.0	.0	2.4	10.9
SW	.0	.4	.8	1.0	1.0	.8	.4	.2	.0	.0	4.7	14.4
WSW	.0	.5	1.0	1.5	1.7	1.2	.5	.1	.0	.0	6.5	14.2
W	.0	.7	1.9	2.3	2.2	.7	.2	.1	.0	.0	8.1	11.3
WNW	.0	.8	2.1	4.0	4.7	3.2	1.9	.4	.0	.0	17.1	15.3
NW	.0	1.1	2.9	5.0	5.1	2.7	1.7	.5	.0	.0	19.1	14.3
NNW	.0	1.1	2.9	2.5	1.1	.1	.0	.0	.0	.0	7.6	8.1
N	.0	1.3	2.7	1.7	.6	.1	.0	.0	.0	.0	6.5	7.2
CALM	1.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.2	.0
VAR	.0	1.1	.1	.0	.0	.0	.0	.0	.0	.0	1.2	2.1
TOTAL	1.2	14.8	25.4	23.1	19.1	9.8	5.3	1.4	.1	.0	100.0	11.0

OCT

SPEED CLASS (MPH)

DIRECTION	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46	TOTAL	AV. SPEED
NNE	.0	1.6	1.3	.5	.4	.2	.0	.0	.0	.0	4.0	6.2
NE	.0	1.7	.8	.3	.1	.1	.1	.0	.0	.0	3.1	5.1
ENE	.0	1.5	.5	.1	.0	.0	.0	.0	.0	.0	2.2	3.7
E	.0	1.9	1.0	.2	.1	.0	.0	.0	.0	.0	3.1	3.5
ESE	.0	1.6	1.2	.3	.0	.0	.0	.0	.0	.0	3.1	3.9
SE	.0	1.9	1.6	.8	.4	.0	.0	.0	.0	.0	4.6	5.5
SSE	.0	.7	.9	.8	.4	.1	.0	.0	.0	.0	3.0	7.7
S	.0	.6	.6	.4	.4	.2	.1	.0	.0	.0	2.4	9.0
SSW	.0	.5	.6	.6	.5	.5	.3	.1	.0	.0	3.1	13.9
SW	.0	.5	.0	.9	1.0	1.0	.6	.4	.1	.0	5.4	17.4
WSW	.0	.6	1.0	1.3	1.7	1.3	.5	.2	.1	.0	6.6	14.5
W	.0	1.0	1.9	1.7	1.8	.7	.2	.0	.0	.0	7.2	10.4
WNW	.0	1.1	2.6	3.7	4.0	2.1	.7	.1	.0	.0	14.3	12.6
NW	.0	1.6	3.4	5.8	5.4	1.9	.8	.2	.0	.0	19.2	12.1
NNW	.0	1.6	2.3	2.4	.9	.1	.0	.0	.0	.0	8.4	7.3
N	.0	2.1	2.4	1.0	.4	.1	.0	.0	.0	.0	6.1	6.1
CALM	3.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	3.2	.0
VAR	.0	.9	.0	.0	.0	.0	.0	.0	.0	.0	.9	1.5
TOTAL	3.2	21.4	23.8	20.7	17.5	8.5	3.7	1.1	.2	.0	100.0	9.7

TABLE 43. Continued

NEV												
SPEED CLASS (MPH)												
DIRECTION	C	1-2	4-7	8-12	13-18	19-24	25-31	32-38	39-46	CT.46	TOTAL	AV.SPEED
RNE	.0	1.7	1.1	.5	.5	.2	.1	.0	.0	.0	4.0	6.8
NE	.0	1.5	.7	.3	.1	.1	.1	.0	.0	.0	2.6	5.1
ENE	.0	1.3	.7	.1	.0	.0	.0	.0	.0	.0	2.0	3.5
E	.0	2.0	.9	.1	.0	.0	.0	.0	.0	.0	3.0	3.2
ESE	.0	1.6	1.1	.1	.0	.0	.0	.0	.0	.0	2.9	3.6
SE	.0	2.3	1.4	.4	.2	.0	.0	.0	.0	.0	4.3	4.5
SSE	.0	1.1	.9	.4	.3	.2	.1	.0	.0	.0	3.0	7.2
S	.0	.9	.8	.4	.4	.3	.2	.0	.0	.0	3.1	10.1
SSW	.0	.6	.5	.5	.6	.7	.5	.3	.1	.0	3.9	16.4
SW	.0	.6	.6	.6	1.1	1.1	.8	.4	.2	.0	5.5	17.8
WSW	.0	.6	.9	1.0	1.3	1.1	.6	.2	.0	.0	5.7	14.7
W	.0	1.1	1.7	1.5	1.6	.6	.2	.1	.0	.0	6.9	11.0
WNW	.0	1.4	2.3	2.6	2.2	.8	.5	.1	.0	.0	9.9	11.1
NW	.0	2.1	4.2	6.7	5.3	1.2	.3	.1	.0	.0	19.9	10.7
NNW	.0	2.5	3.5	2.7	1.0	.1	.0	.0	.0	.0	9.6	6.9
N	.0	2.5	2.2	1.1	.6	.2	.0	.0	.0	.0	6.6	6.1
CALLP	5.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	5.6	.0
VAN	.0	1.1	.0	.0	.0	.0	.0	.0	.0	.0	1.1	1.3
TOTAL	5.6	24.8	23.5	19.0	15.2	6.5	3.4	1.4	.5	.1	100.0	9.0

DEC												
SPEED CLASS (MPH)												
DIRECTION	C	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	CT.46	TOTAL	AV. SPEED
RNE	.0	1.4	.9	.3	.3	.2	.0	.0	.0	.0	3.0	6.0
NE	.0	1.4	.6	.1	.1	.0	.0	.0	.0	.0	2.2	3.5
ENE	.0	1.2	.6	.1	.0	.0	.0	.0	.0	.0	1.9	3.1
E	.0	1.7	.7	.1	.0	.0	.0	.0	.0	.0	2.5	3.1
ESE	.0	1.6	.7	.1	.0	.0	.0	.0	.0	.0	2.5	3.6
SE	.0	2.0	1.3	.4	.2	.1	.0	.0	.0	.0	4.0	4.9
SSE	.0	1.2	.8	.3	.3	.1	.1	.0	.0	.0	2.7	6.4
S	.0	1.0	.7	.3	.4	.2	.2	.1	.0	.0	2.9	9.5
SSW	.0	.6	.5	.4	.5	.6	.6	.4	.2	.1	3.9	18.8
SW	.0	.6	.7	.8	.9	1.1	1.0	.8	.3	.1	6.4	20.0
WSW	.0	.7	.7	.9	1.5	1.2	.7	.4	.1	.0	6.3	16.5
W	.0	1.3	1.5	1.5	1.5	.7	.4	.1	.0	.0	7.1	11.4
WNW	.0	1.6	2.4	3.3	2.5	.7	.3	.0	.0	.0	10.9	10.3
NW	.0	2.2	3.5	7.4	5.4	1.2	.3	.0	.0	.0	20.5	10.6
NNW	.0	2.2	3.3	2.9	1.1	.1	.0	.0	.0	.0	9.5	7.1
N	.0	2.3	1.9	.8	.5	.1	.0	.0	.0	.0	5.6	5.7
CALIP	6.9	.0	.0	.0	.0	.0	.0	.0	.0	.0	6.9	.0
VAK	.0	1.2	.1	.0	.0	.0	.0	.0	.0	.0	1.2	1.5
TOTAL	6.9	24.2	21.2	19.7	15.2	6.3	3.5	2.0	.8	.3	100.0	9.3

TABLE 43. Continued

DIRECTION	ANNUAL SPEED CLASS (MPH)										TOTAL	AV. SPEED
	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	47-54		
NNE	.0	1.1	1.3	.8	.5	.2	.1	.0	.0	.0	4.6	7.7
NE	.0	1.1	1.1	.5	.3	.1	.1	.0	.0	.0	3.1	6.9
ENE	.0	.9	.9	.3	.1	.0	.0	.0	.0	.0	2.2	5.5
E	.0	1.2	1.0	.3	.1	.0	.0	.0	.0	.0	2.6	4.7
ESE	.0	1.1	1.0	.3	.0	.0	.0	.0	.0	.0	2.4	4.5
SE	.0	1.3	1.4	.5	.2	.0	.0	.0	.0	.0	3.5	5.6
SSE	.0	.7	.9	.5	.3	.1	.0	.0	.0	.0	2.6	7.7
S	.0	.6	.9	.5	.3	.2	.1	.0	.0	.0	2.6	8.6
SSW	.0	.4	.7	.7	.5	.4	.3	.2	.1	.0	3.3	14.0
SW	.0	.5	.9	1.0	1.2	1.0	.8	.4	.1	.0	6.0	16.8
WSW	.0	.5	1.0	1.4	1.8	1.3	.7	.3	.1	.0	7.0	15.4
W	.0	.8	1.7	2.1	2.4	.9	.3	.1	.0	.0	8.2	12.0
WNW	.0	.9	2.1	3.3	4.5	3.1	1.7	.5	.1	.0	16.1	15.4
NW	.0	1.3	3.0	5.3	5.2	2.5	1.7	.6	.1	.0	19.6	14.0
NNW	.0	1.3	2.7	2.3	.9	.1	.0	.0	.0	.0	7.4	7.7
N	.0	1.5	2.2	1.2	.5	.1	.0	.0	.0	.0	5.5	6.7
CALM	2.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	2.6	.0
VAR	.0	1.0	.2	.0	.0	.0	.0	.0	.0	.0	1.3	2.2
TOTAL	2.6	16.3	22.9	20.9	18.8	10.2	5.8	2.1	.4	.1	100.0	11.5

TABLE 44. Monthly and Annual Percent Frequency of Hourly Wind Direction at 50-Foot Level, 1955 Through 1980

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 50-FOOT LEVEL-1955-1980 FOR																	JAN		
FOUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	2.9	1.7	1.2	2.4	1.9	2.9	3.4	4.7	5.3	8.1	6.8	7.2	17.2	17.9	5.6	4.1	4.6	2.1	804
2	2.2	1.7	1.5	1.2	3.0	3.6	2.6	5.7	6.6	6.2	6.1	8.0	17.0	18.9	4.9	3.4	5.5	1.9	804
3	2.7	1.0	1.1	1.9	2.6	4.4	3.9	4.1	4.0	8.5	6.1	8.1	16.8	17.2	5.5	4.6	6.2	1.5	804
4	2.1	2.2	1.4	1.2	2.0	4.6	3.4	3.9	4.7	5.8	6.7	9.7	15.3	17.5	5.8	3.6	6.2	3.7	804
5	3.6	1.1	2.1	1.4	1.4	4.7	2.7	3.7	5.1	7.2	6.0	7.2	17.5	19.2	6.0	3.5	5.5	2.1	804
6	2.7	2.4	1.0	2.6	1.9	3.6	2.6	4.1	4.1	6.4	6.8	6.6	17.8	17.4	6.6	4.1	6.6	2.6	803
7	1.9	1.2	1.7	1.9	2.1	4.2	2.5	3.5	4.7	7.0	5.5	8.3	15.2	19.7	7.1	4.6	6.3	2.6	804
8	2.1	2.1	1.2	1.6	1.6	4.0	3.7	3.1	6.5	5.7	6.3	9.1	14.9	17.5	8.0	4.0	6.0	2.5	804
9	2.4	1.5	1.0	2.6	1.4	4.5	3.2	4.5	5.6	5.0	5.8	6.1	13.9	22.0	7.2	4.6	6.3	2.4	804
10	4.0	2.9	2.2	1.4	2.1	4.0	3.2	4.4	3.6	6.3	4.1	5.2	12.3	22.0	8.1	5.1	6.7	2.4	804
11	5.8	4.6	2.7	2.0	1.9	4.5	2.5	3.0	5.1	5.6	5.5	2.5	11.3	20.6	9.3	6.2	4.7	2.2	805
12	6.7	6.1	3.5	3.5	2.2	3.2	1.9	2.5	4.2	5.7	5.3	3.1	8.6	19.0	11.2	8.2	3.5	1.6	805
13	8.6	6.5	4.0	4.0	3.2	3.4	1.7	1.6	4.3	5.0	4.8	2.7	8.0	19.1	10.7	7.8	2.5	2.1	805
14	7.5	5.8	4.3	4.6	4.7	3.7	2.4	1.9	5.3	5.2	5.7	1.5	7.7	16.4	9.7	7.8	3.1	2.6	805
15	5.6	5.7	5.2	4.6	5.0	5.5	2.4	2.5	4.5	5.5	5.3	2.7	8.7	14.9	9.4	8.0	2.7	1.9	805
16	6.2	4.3	3.6	6.0	4.5	5.7	3.0	3.1	5.1	6.1	4.2	3.1	9.7	16.3	6.6	6.5	4.7	1.4	805
17	4.3	3.5	2.9	5.5	2.9	6.7	4.2	2.9	3.9	7.3	4.1	3.0	13.5	18.8	4.6	4.6	7.0	.5	805
18	1.7	2.4	1.4	3.1	3.4	5.8	5.1	3.1	4.2	9.1	6.0	5.8	15.5	16.1	5.1	4.1	7.1	1.0	805
19	.9	1.4	1.4	2.6	3.5	4.6	4.2	2.6	5.0	9.1	6.5	8.7	16.5	17.0	5.8	3.7	5.8	.7	805
20	1.6	1.5	.7	2.1	1.6	3.9	4.0	3.5	4.2	8.4	9.3	10.2	16.1	17.9	4.3	3.9	5.3	1.4	805
21	1.6	1.4	1.0	1.5	2.4	2.7	3.4	3.2	5.7	7.6	8.3	9.1	19.8	16.4	5.3	3.9	5.6	1.2	805
22	2.6	1.0	1.0	1.5	2.1	3.6	2.6	3.7	4.6	7.3	7.3	10.8	18.4	17.6	5.2	2.4	5.5	2.7	805
23	3.0	1.7	1.1	1.5	1.7	3.6	2.1	3.1	5.1	6.2	7.5	9.3	17.5	18.0	5.3	3.5	6.1	1.6	805
24	2.5	2.1	.7	1.7	1.2	3.6	3.2	3.9	5.2	6.6	7.7	8.7	19.8	17.0	5.3	3.4	5.8	1.5	805
TOTAL	3.6	2.7	2.0	2.6	2.5	4.2	3.1	3.4	4.9	6.8	6.2	6.5	14.5	18.1	6.8	4.8	5.4	1.9	19309

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 50-FOOT LEVEL-1955-1980 FOR																	FEB		
HOURLY	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	1.4	1.5	.8	.7	1.8	2.4	3.4	3.1	4.4	8.7	9.7	14.4	18.6	16.2	5.2	2.2	3.8	1.6	735
2	1.9	1.5	.5	1.4	1.8	3.7	4.5	2.9	2.9	6.8	9.3	14.1	19.5	16.3	3.9	2.7	4.8	1.6	735
3	2.2	1.8	1.4	2.0	1.1	3.1	3.1	3.9	3.7	5.7	9.5	13.1	18.8	16.6	4.8	3.1	4.6	1.5	735
4	2.7	2.3	1.2	1.8	1.8	2.9	3.3	3.8	3.9	6.0	8.3	10.9	20.0	18.1	3.8	3.4	3.9	1.9	735
5	2.4	1.9	.3	1.5	2.2	3.0	2.6	3.9	4.4	6.8	6.8	11.4	18.2	19.9	5.6	2.7	4.6	1.8	735
6	2.3	1.5	.8	1.2	2.2	3.1	3.4	4.5	5.3	6.5	8.4	10.1	17.4	18.0	5.9	3.5	3.9	1.9	735
7	2.9	1.8	1.1	2.0	1.4	3.0	2.3	4.4	4.9	6.1	8.6	11.0	17.1	18.1	5.7	2.7	4.5	2.4	735
8	2.4	2.0	1.4	1.1	2.0	3.4	2.2	5.2	5.4	6.4	7.5	7.8	16.7	20.7	5.7	3.5	4.2	2.3	735
9	3.3	2.9	2.0	1.6	1.1	2.4	3.4	4.1	4.2	5.6	7.1	6.5	15.4	21.4	7.1	4.5	4.6	2.9	735
10	3.8	5.0	3.4	1.9	1.1	2.9	2.7	2.9	4.2	5.7	4.4	5.0	13.7	24.5	8.3	6.8	2.4	1.2	735
11	7.9	5.6	3.3	1.6	2.9	2.7	2.2	1.6	3.3	6.4	5.2	3.0	10.9	21.0	10.2	8.3	1.9	2.2	735
12	9.3	7.5	2.9	3.1	2.7	2.7	1.8	2.3	3.0	7.5	5.0	3.5	7.1	19.5	9.8	9.7	1.0	1.8	735
13	7.6	8.6	3.0	3.1	2.6	3.8	1.1	2.0	5.4	7.5	4.9	3.7	7.9	17.0	8.2	10.7	.7	2.2	735
14	9.0	6.4	3.0	3.7	2.7	3.4	1.4	3.0	4.5	8.7	6.1	3.8	6.7	13.9	9.3	12.0	.8	1.8	735
15	10.2	6.7	3.5	4.2	3.8	3.8	1.8	2.3	3.7	9.3	6.1	2.4	9.1	12.7	7.8	9.0	1.9	1.8	735
16	7.5	7.3	3.7	4.4	3.4	4.9	1.8	2.6	5.2	8.6	6.0	3.1	8.8	13.7	7.3	8.8	1.2	1.6	735
17	6.0	4.5	3.8	3.8	4.4	4.2	1.6	3.7	5.4	7.6	5.2	4.8	10.5	15.1	6.8	7.5	4.1	1.1	735
18	5.2	2.9	2.7	2.9	3.9	6.0	3.5	2.6	4.6	7.5	7.1	4.5	14.1	17.1	5.2	5.6	3.8	.8	735
19	2.2	2.7	2.0	2.7	2.3	5.6	4.1	3.0	4.5	9.4	6.9	8.8	17.6	16.9	4.1	4.1	2.3	.8	735
20	1.5	1.1	1.8	1.6	2.0	4.4	4.5	3.8	3.7	8.3	11.4	12.5	17.7	16.1	4.5	1.8	2.3	1.1	735
21	1.0	.8	.3	1.1	1.8	3.4	3.0	3.3	4.8	9.3	10.6	17.1	18.5	13.7	4.2	3.1	3.3	.8	735
22	1.2	1.2	.4	1.5	1.4	2.3	2.7	2.3	4.8	8.6	10.5	18.2	18.8	14.7	3.5	2.7	4.4	.8	735
23	1.9	1.4	.7	1.5	2.0	2.0	2.2	3.4	3.4	8.2	9.7	16.3	21.1	15.4	3.4	3.3	3.3	1.0	735
24	1.9	1.1	.6	1.1	1.2	1.8	3.0	4.4	3.8	8.3	10.7	14.6	19.2	16.3	4.8	2.2	3.3	1.6	735
TOTAL	4.1	3.3	1.9	2.1	2.2	3.4	2.7	3.3	4.3	7.5	7.7	9.2	15.1	17.2	6.0	5.2	3.2	1.6	17640

TABLE 44. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 50-FOOT LEVEL-1955-1980 FOR																	MAR		
HOURL	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	1.1	.7	.9	1.1	1.4	2.4	2.4	2.7	4.5	7.7	12.3	18.0	24.8	13.5	3.0	2.0	.6	1.0	806
2	1.0	1.0	.5	1.0	1.5	2.9	2.5	3.0	4.3	8.1	13.2	18.6	21.1	13.2	3.7	2.0	1.5	1.1	806
3	1.4	1.2	.4	1.2	2.0	3.2	2.5	3.6	3.7	10.0	11.2	15.3	21.2	14.0	5.1	2.0	.9	1.1	806
4	1.9	1.1	.4	1.1	2.1	3.0	3.5	4.1	5.0	7.1	11.8	14.0	20.5	14.6	4.7	2.5	1.2	1.5	806
5	2.2	1.4	1.5	.5	1.6	3.2	2.5	4.6	4.6	9.2	10.2	14.5	18.9	14.1	4.3	3.1	1.9	1.7	806
6	1.6	1.2	.6	1.5	1.7	3.5	2.5	5.0	5.1	7.7	10.9	14.5	17.1	14.9	4.8	2.7	2.5	2.1	806
7	2.0	1.0	1.1	1.7	1.5	2.9	3.0	6.2	5.7	8.3	10.9	10.9	18.0	14.5	4.5	3.5	2.2	2.1	806
8	3.3	2.4	1.9	1.2	1.2	2.4	2.9	4.1	5.3	6.6	8.8	10.9	18.7	16.3	6.6	3.8	1.7	1.9	806
9	5.5	4.3	1.9	1.6	1.7	2.0	2.5	2.9	4.7	6.2	7.7	5.1	13.3	20.7	10.3	6.1	1.5	2.1	806
10	7.1	7.4	2.2	1.7	2.9	2.2	2.0	2.5	4.3	6.1	8.4	3.7	9.6	13.9	13.2	9.8	.9	2.1	806
11	8.6	7.1	4.2	3.4	2.5	2.9	2.5	3.2	4.3	8.7	7.7	2.4	6.6	12.7	8.8	10.2	.6	3.7	805
12	9.7	7.7	3.7	4.0	2.1	3.0	2.5	4.3	6.8	10.8	6.5	3.2	5.0	9.7	7.1	10.2	.2	3.5	805
13	9.6	6.1	1.6	3.7	3.2	4.6	2.9	4.2	8.0	11.4	6.5	3.7	6.7	9.7	5.7	8.8	.0	3.6	805
14	9.7	5.8	3.4	2.2	4.0	4.0	2.5	4.8	7.0	12.9	8.6	4.0	7.6	8.1	5.2	7.1	.1	3.1	805
15	8.0	6.1	4.1	1.6	4.0	4.7	1.9	4.5	7.0	13.2	8.7	4.0	6.1	9.9	5.5	8.0	.0	3.0	805
16	8.7	5.1	2.6	3.1	3.6	6.2	3.4	5.0	4.6	12.3	10.8	3.2	5.8	10.7	3.7	8.0	.2	3.0	805
17	6.2	6.0	2.7	3.3	4.0	6.7	4.8	3.7	6.9	10.8	8.6	3.8	8.3	13.0	3.5	6.3	.5	.7	806
18	4.3	3.6	3.3	4.8	3.1	7.8	3.7	5.3	6.5	8.3	9.4	4.7	11.3	13.2	3.6	4.7	1.7	.5	806
19	2.9	2.5	2.6	3.0	4.5	6.9	5.7	5.1	5.3	10.2	8.7	5.8	14.3	13.3	3.8	3.2	1.7	.5	806
20	1.6	1.7	.5	2.2	2.9	5.3	5.3	5.0	5.2	12.5	10.4	9.9	17.6	14.0	2.4	2.2	.6	.5	806
21	1.7	.7	.6	1.6	1.7	3.7	5.0	3.0	4.3	11.8	14.6	15.9	17.0	13.0	2.5	1.7	.1	.9	806
22	1.4	.5	1.0	1.1	1.4	3.1	2.2	2.7	3.8	9.9	14.6	20.1	18.4	13.6	2.4	2.0	.9	.9	806
23	1.6	.7	.5	.7	1.4	2.6	1.6	2.9	3.3	7.8	14.1	19.9	22.3	12.0	3.3	3.1	.7	1.2	806
24	1.0	.5	.1	1.4	1.7	2.2	1.9	1.6	4.6	8.7	13.4	20.3	22.6	12.8	3.8	2.1	.7	.5	806
TOTAL	4.2	3.2	1.8	2.0	2.4	3.8	3.0	3.9	5.2	9.4	10.3	10.3	14.7	13.1	5.1	4.8	1.0	1.8	19338
PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 50-FOOT LEVEL-1955-1980 FOR																	APR		
HOURL	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	.6	.5	.3	.3	.9	1.5	1.7	1.3	2.9	6.5	12.1	26.8	24.7	14.6	2.7	1.4	.5	.6	780
2	.6	.4	.0	.8	.5	1.5	1.2	3.1	2.7	7.3	13.2	27.3	24.5	11.5	2.2	1.8	.8	.6	780
3	.6	.8	.9	.4	1.4	1.9	1.0	1.8	3.1	8.2	15.8	22.6	21.5	12.9	2.1	2.4	1.2	1.4	780
4	.4	.9	.6	1.0	1.4	2.4	1.4	2.7	5.1	8.6	13.1	21.2	20.4	12.7	2.4	2.4	1.8	1.4	780
5	1.0	.8	.8	1.3	1.5	2.4	2.1	4.4	4.1	8.7	13.5	19.8	18.9	12.6	3.3	1.7	1.3	1.9	779
6	.9	.9	.5	1.4	1.3	2.2	2.9	3.6	4.6	8.2	14.2	17.2	20.9	11.3	4.0	1.4	2.6	1.9	780
7	1.4	1.3	.9	2.1	1.2	2.2	2.4	2.4	4.2	8.8	11.8	15.0	19.9	13.7	5.1	3.1	2.6	1.9	780
8	3.2	4.2	1.9	1.7	1.0	2.3	1.7	2.4	2.8	5.4	9.6	9.2	19.6	17.9	7.7	7.1	1.0	1.2	780
9	5.8	5.9	2.3	2.6	1.5	2.1	.9	1.5	2.7	5.5	9.4	4.1	14.7	19.9	10.1	8.2	.6	2.2	780
10	6.8	7.4	3.2	3.5	2.1	1.9	1.8	1.9	4.0	7.6	7.6	3.5	10.6	11.9	9.4	12.1	.1	4.7	780
11	8.1	6.2	2.3	4.6	3.8	2.6	2.3	2.8	5.5	8.2	9.1	4.6	8.2	10.9	5.4	9.9	.0	5.5	780
12	7.2	6.8	4.1	2.9	2.3	4.6	2.6	4.2	6.0	11.0	7.9	5.0	7.9	9.1	4.4	7.9	.1	5.8	780
13	7.1	5.8	4.1	3.5	2.6	3.8	3.3	4.7	7.4	11.8	9.4	6.0	7.1	8.6	4.2	6.0	.0	4.6	780
14	7.2	5.6	3.3	2.6	3.1	3.7	2.6	4.4	6.7	13.1	11.0	4.9	7.2	7.9	4.2	6.5	.1	5.9	780
15	7.1	5.5	3.2	3.1	2.6	3.1	3.7	4.1	6.4	11.9	11.8	6.3	7.7	9.1	3.2	5.9	.0	5.4	780
16	6.4	5.6	3.6	3.7	2.9	4.7	2.9	3.6	6.5	10.4	10.0	6.0	10.1	11.4	2.6	6.2	.1	3.1	780
17	4.1	5.4	4.2	4.1	3.7	5.3	2.9	3.7	4.7	9.9	9.9	6.4	11.0	15.4	2.9	4.5	.0	1.8	780
18	3.6	3.6	5.5	5.3	4.0	4.6	4.7	3.6	3.6	8.3	10.0	5.8	14.6	14.6	2.9	4.0	.4	.9	780
19	2.2	2.6	3.6	5.6	3.6	5.6	5.4	4.4	3.3	7.4	9.5	5.3	15.9	17.9	1.8	5.0	.8	.1	780
20	1.8	1.4	2.3	4.5	3.2	5.9	4.9	3.2	3.5	8.8	8.5	8.3	20.3	18.3	1.9	2.2	.9	.1	780
21	1.2	1.6	1.3	1.9	1.5	2.8	5.0	1.8	3.3	10.9	12.2	11.9	25.1	16.0	1.7	1.2	.3	.1	780
22	1.0	.6	.6	.5	1.4	1.3	2.4	3.2	2.7	7.2	16.2	16.7	28.2	13.7	1.7	1.5	.4	.6	780
23	.9	.9	.5	.3	.6	.9	1.8	2.2	2.4	5.9	15.0	22.8	25.3	15.6	2.7	1.7	.3	.3	780
24	.5	1.0	.5	.4	.4	.9	1.0	1.8	2.4	6.5	13.5	25.6	24.4	14.5	2.8	2.1	.9	.8	780
TOTAL	3.3	3.2	2.1	2.4	2.0	2.9	2.6	3.0	4.2	8.6	11.4	12.6	17.0	13.4	3.8	4.4	.7	2.2	18719

TABLE 44. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 50-FOOT LEVEL-1955-1980 FOR																MAY			
HOURL	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	.2	.2	.4	.4	.9	1.1	.7	.7	1.6	3.3	11.2	26.7	32.9	14.9	2.6	1.2	.9	.0	806
2	.2	.9	.5	.5	.9	.5	1.0	1.0	1.7	5.1	15.4	23.2	31.8	11.3	4.0	.9	.6	.6	806
3	.9	.4	.4	.9	.4	1.4	1.6	1.7	2.6	5.1	12.7	27.4	28.5	11.4	2.1	1.4	.6	.6	806
4	.5	.5	.6	.5	1.1	2.1	1.6	2.1	4.8	5.2	14.9	22.5	25.3	12.2	3.0	1.1	1.0	1.0	806
5	.2	.2	.5	.6	.9	1.6	2.4	3.5	3.5	6.3	16.0	19.9	24.6	12.9	3.0	1.6	1.5	.9	806
6	.1	1.0	.7	1.2	.9	2.5	2.1	2.7	3.6	6.3	15.4	18.7	22.5	13.3	2.6	2.2	2.7	1.4	806
7	1.7	2.2	.9	1.4	1.4	1.9	2.2	2.6	2.0	3.8	11.8	11.5	22.7	22.7	5.6	2.6	2.2	.7	806
8	5.1	3.6	1.6	1.5	1.1	1.1	1.4	1.9	1.7	3.7	7.4	5.8	18.2	26.2	11.0	6.6	1.0	1.6	806
9	6.0	5.6	2.6	2.7	1.5	2.4	1.2	1.2	1.7	4.3	7.3	4.3	12.5	20.5	10.5	10.4	.4	4.7	806
10	7.8	4.8	2.6	3.2	3.1	2.6	2.2	2.5	3.2	7.4	6.9	4.5	8.8	13.9	6.7	10.9	.1	8.6	806
11	6.8	5.2	2.5	3.1	2.7	4.7	2.9	4.5	5.2	8.8	7.3	7.3	6.7	7.4	5.2	9.7	.1	9.8	806
12	6.2	5.3	2.6	4.1	4.6	3.7	3.0	4.5	5.6	11.2	8.1	6.5	6.7	7.3	4.1	6.5	.0	10.2	806
13	5.2	6.6	4.1	2.9	3.0	3.8	3.3	5.1	5.6	11.7	9.2	6.0	6.3	8.3	3.8	5.0	.2	9.9	806
14	5.6	5.8	4.5	3.1	2.6	5.1	2.7	3.7	6.2	11.9	9.2	6.7	5.8	10.2	3.0	4.7	.2	8.9	806
15	6.2	4.8	4.5	3.1	3.5	3.2	2.9	5.0	5.1	9.7	11.3	6.9	7.2	10.5	3.2	6.2	.1	6.6	806
16	5.5	8.2	3.7	3.0	3.5	4.2	2.5	3.6	5.2	9.9	10.2	5.8	7.2	13.8	3.3	5.6	.0	4.8	806
17	4.8	7.3	4.5	4.1	3.5	4.3	2.4	2.7	4.1	8.1	8.8	6.5	9.1	18.7	2.7	5.2	.2	3.0	806
18	4.0	6.9	5.2	5.5	3.1	4.2	3.5	3.3	4.0	5.8	8.6	4.2	9.7	23.3	2.6	4.3	.4	1.4	806
19	3.6	3.3	4.7	5.7	3.7	5.1	4.6	3.5	2.7	4.5	6.5	5.1	14.0	26.6	1.9	3.0	1.1	.5	806
20	2.6	3.5	2.2	4.2	5.8	5.0	4.0	4.2	1.6	3.7	5.3	5.7	20.2	27.0	2.0	1.9	.6	.4	806
21	1.5	1.7	2.0	2.4	2.5	5.3	4.3	2.9	2.7	5.5	6.7	8.1	25.4	24.1	2.2	1.2	.6	.9	806
22	1.5	1.2	1.2	.9	1.0	2.6	2.5	2.1	1.9	5.5	11.5	13.5	28.4	22.8	1.5	1.2	.5	.1	806
23	1.4	.6	.5	.7	1.1	1.2	1.5	1.1	1.1	2.6	12.7	21.0	32.5	18.1	2.7	.9	.2	.0	806
24	.9	.2	.4	1.0	.5	1.0	1.0	.7	1.1	1.7	9.9	28.0	31.3	16.7	3.1	1.2	.6	.5	806
TOTAL	3.3	3.3	2.2	2.4	2.2	2.9	2.4	2.8	3.3	6.3	10.2	12.3	18.3	16.4	3.9	4.0	.7	3.2	19344
PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 50-FOOT LEVEL-1955-1980 FOR																JUN			
HOURL	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	1.0	.8	.4	.3	.3	.4	.3	.3	.3	2.9	9.4	21.4	40.8	16.8	2.7	.9	.6	.6	780
2	.5	.8	.8	.3	.3	.8	.4	.4	.8	3.2	9.2	25.0	38.1	15.3	1.9	1.3	.4	.8	780
3	.6	.8	.1	.1	.6	.9	.6	1.2	2.1	5.5	11.2	23.6	34.9	13.2	2.4	.6	.6	.8	780
4	1.0	.3	.4	.4	1.3	.6	.8	2.4	2.7	6.0	14.6	22.9	26.7	14.2	2.4	1.3	1.3	.6	780
5	.5	.3	.6	.4	.5	.8	1.8	2.9	5.5	5.9	14.2	22.1	25.1	11.4	3.3	1.5	1.7	1.4	780
6	.8	.4	.4	.5	1.2	1.4	2.2	4.1	3.7	5.9	11.0	19.2	25.3	15.4	2.7	1.0	2.6	2.3	780
7	2.3	2.1	.5	.8	1.5	1.0	2.2	2.1	1.8	5.1	7.3	9.5	23.6	26.7	6.2	4.5	1.9	1.0	780
8	4.9	2.7	1.3	1.0	1.7	1.9	1.3	1.9	2.6	2.6	6.7	6.0	15.8	26.7	11.9	6.7	1.0	3.5	780
9	8.2	5.6	1.8	1.5	1.9	2.2	2.4	1.7	3.2	4.6	6.7	4.4	9.5	19.7	10.1	10.4	.8	5.3	780
10	6.3	5.9	3.1	2.2	3.5	3.5	2.8	3.7	4.2	6.7	7.2	5.4	6.9	12.6	8.5	8.1	.1	9.5	780
11	6.8	5.5	2.3	3.5	2.9	5.6	4.0	4.1	5.6	9.5	7.3	5.6	6.3	9.7	5.1	6.5	.0	9.5	780
12	5.3	8.2	2.4	3.3	2.4	4.9	4.5	4.9	7.2	11.8	6.9	5.8	6.2	7.8	3.7	5.3	.1	9.4	780
13	5.3	5.6	3.7	3.3	2.4	3.7	3.3	6.0	5.4	13.3	10.1	6.5	4.0	7.4	5.0	5.4	.0	9.4	780
14	4.5	4.7	3.1	3.2	3.2	4.2	2.7	5.8	6.3	13.8	9.5	5.9	5.6	10.1	4.1	5.1	.0	8.1	780
15	4.6	4.6	3.5	3.6	2.7	3.3	2.4	4.4	6.4	11.9	11.9	5.8	6.8	11.0	3.5	4.9	.0	8.7	780
16	4.9	6.2	3.5	3.6	3.6	3.2	1.7	4.2	5.4	8.8	9.6	7.7	8.7	14.4	3.1	5.6	.1	5.8	780
17	5.8	5.8	4.1	4.1	3.1	4.4	3.2	2.8	3.1	6.9	9.6	7.3	8.3	19.5	4.4	5.0	.0	2.7	780
18	3.5	5.5	3.6	6.8	4.9	4.0	1.9	2.7	2.2	5.3	8.6	5.5	8.5	28.2	2.8	4.6	.0	1.5	780
19	2.6	4.7	5.1	5.1	5.8	3.8	2.9	2.3	2.4	3.7	6.4	4.1	13.1	29.6	4.6	2.8	.3	.5	780
20	2.2	2.9	3.7	4.5	5.9	5.5	3.2	1.4	1.9	3.3	5.0	3.8	19.4	31.9	1.5	2.9	.5	.3	780
21	2.4	1.8	2.1	3.3	3.8	4.1	3.8	2.1	1.4	2.9	4.0	7.6	26.4	31.2	1.4	1.0	.5	.1	780
22	2.1	1.4	.8	2.2	.8	1.9	2.2	2.3	1.4	4.6	6.7	11.0	29.7	30.4	1.5	.8	.3	.0	780
23	.5	1.2	.5	.8	.5	1.4	.8	.8	1.8	2.2	8.5	17.4	36.4	25.5	.8	.8	.1	.1	780
24	.3	.5	.8	.4	.4	.5	.4	.3	.6	2.3	7.4	21.5	37.7	22.8	1.4	1.4	.4	.9	780
TOTAL	3.2	3.3	2.0	2.3	2.3	2.7	2.2	2.7	3.2	6.2	8.7	11.5	19.3	18.8	4.0	3.7	.6	3.4	18720

TABLE 44. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 50-FOOT LEVEL-1955-1980 FOR																	JUL		
HOURL	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	.2	.4	.4	.0	.2	.2	.0	1.1	.2	1.6	6.7	22.3	41.7	20.6	2.6	1.4	.0	.2	806
2	.4	.2	.1	.4	.2	.5	.2	1.1	.4	2.0	6.6	25.2	41.6	17.5	2.5	.4	.1	.6	806
3	.2	.1	.4	.9	.6	1.0	1.2	1.2	1.1	4.2	10.2	23.7	38.2	12.7	2.4	.6	.5	.7	806
4	.1	.2	.4	.5	.7	.6	1.5	2.0	3.2	4.5	11.9	24.9	32.1	12.0	2.1	1.2	1.2	.6	806
5	.7	.2	.0	.5	.6	1.1	1.0	2.7	3.5	8.1	12.4	20.9	31.4	11.8	1.7	.9	1.6	.7	805
6	.6	.4	.2	.5	.7	1.2	1.4	3.1	5.0	8.4	11.4	15.7	28.6	16.9	2.9	.6	1.1	1.2	805
7	1.2	.7	1.1	.9	1.2	1.0	.9	3.1	2.1	4.5	7.1	9.8	24.6	29.5	6.6	3.6	1.2	.9	806
8	4.6	2.7	1.1	.7	1.5	1.1	1.4	2.2	1.7	2.9	3.6	4.7	14.1	31.9	15.0	8.6	.5	1.4	806
9	10.4	6.1	2.6	1.2	2.0	2.9	2.0	1.4	1.5	2.9	4.3	2.9	7.4	18.4	14.5	13.6	.2	5.7	806
10	12.7	7.6	3.5	3.6	3.1	3.6	3.7	3.8	2.2	4.6	3.3	3.8	5.0	9.3	7.8	12.8	.2	9.3	806
11	8.3	6.3	4.3	4.8	4.8	5.6	4.3	5.5	4.2	6.2	5.5	4.7	3.5	6.0	4.1	10.2	.1	11.5	806
12	7.9	8.3	2.0	3.7	5.3	6.3	4.3	5.5	4.8	8.1	6.5	3.7	4.2	5.8	3.3	6.7	.0	13.4	806
13	7.1	7.2	4.2	3.5	4.6	5.7	4.2	4.2	4.5	11.8	7.6	5.0	3.0	5.5	4.1	5.0	.0	13.0	806
14	6.3	7.1	2.5	3.5	3.7	4.6	3.6	4.5	6.3	11.2	9.4	6.1	3.6	5.7	4.3	7.3	.0	10.3	806
15	5.5	6.1	4.5	4.0	3.5	3.8	2.7	3.7	4.1	12.2	11.2	6.1	4.6	7.4	2.9	8.7	.0	9.2	806
16	6.2	7.2	4.0	4.7	3.2	4.8	1.9	4.0	4.3	9.8	10.3	7.9	5.7	9.2	3.3	6.2	.1	7.1	806
17	6.9	5.3	5.2	6.3	4.2	3.2	2.1	2.1	3.3	7.9	11.7	6.8	6.6	14.0	3.0	6.0	.0	5.2	806
18	6.5	5.8	5.1	8.3	4.0	4.5	1.1	3.0	2.0	6.0	11.5	6.2	6.3	19.4	3.0	5.0	.1	2.4	806
19	5.2	5.2	4.6	7.3	5.0	5.7	1.6	1.7	1.7	3.7	8.6	5.2	8.6	27.2	3.5	4.6	.1	.5	806
20	4.2	3.1	2.6	6.2	6.2	6.6	1.9	1.6	1.1	3.2	5.5	4.2	14.4	31.8	3.3	3.2	.6	.2	806
21	1.6	2.5	1.9	3.6	3.1	3.7	3.6	2.1	1.9	3.6	4.3	5.5	22.8	33.6	3.0	2.1	.5	.6	806
22	.5	1.4	1.4	1.2	.6	1.5	2.7	2.5	1.5	4.3	8.4	9.2	26.4	35.4	1.4	.9	.5	.2	806
23	.4	.5	1.1	.4	.0	.9	.7	.4	.9	2.4	12.7	12.3	37.2	26.3	3.0	.6	.2	.1	806
24	.4	.7	.4	.2	.2	.2	.5	.6	1.0	1.4	7.3	19.5	41.2	22.2	2.4	1.0	.5	.2	806
TOTAL	4.1	3.6	2.2	2.8	2.5	2.9	2.0	2.6	2.6	5.6	8.2	10.7	18.9	17.9	4.3	4.6	.4	4.0	19342
PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 50-FOOT LEVEL-1955-1980 FOR																	AUG		
HOURL	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	.2	.0	.0	.2	.6	.7	.6	.5	.5	4.0	7.7	26.4	38.6	16.4	1.9	1.1	.4	.1	806
2	.5	.4	.4	.4	.4	.4	.6	1.1	.6	4.1	10.2	25.4	38.8	11.9	3.0	.7	.7	.4	806
3	.7	.6	.1	1.0	.5	.7	1.4	3.2	3.0	5.6	9.3	24.2	32.5	12.2	2.1	.6	.7	1.5	806
4	.6	.2	.2	.4	.4	1.4	2.6	2.9	4.5	9.1	11.3	23.0	27.8	11.7	1.2	.7	1.2	.9	806
5	.4	.1	.4	.4	.5	1.7	2.0	2.7	5.2	8.1	14.2	21.5	28.6	8.1	2.2	1.0	2.0	1.0	805
6	.2	.4	.4	1.1	.5	2.0	2.0	3.6	5.1	8.2	12.7	21.7	22.0	13.3	2.7	1.5	2.2	.5	806
7	1.2	.9	.7	1.1	1.0	1.7	1.7	2.6	3.7	4.7	9.8	10.8	24.1	23.6	5.0	3.2	3.8	1.0	806
8	3.5	1.5	1.4	1.4	1.2	1.9	.6	2.5	2.4	2.9	4.2	6.6	14.0	32.3	14.0	6.2	1.7	1.9	806
9	6.9	4.0	2.7	2.0	1.4	2.5	2.0	1.1	1.6	3.1	2.9	2.9	8.1	22.0	16.7	15.9	.2	4.1	806
10	10.8	8.2	4.3	4.6	3.3	3.2	1.9	2.7	2.6	3.6	3.6	3.2	4.5	10.9	8.7	14.0	.5	9.3	806
11	8.7	6.8	4.1	6.0	4.5	4.7	3.2	4.6	3.0	6.5	3.7	4.2	5.1	7.3	5.3	10.3	.1	11.9	806
12	7.6	6.7	4.1	3.5	5.8	6.2	4.5	4.5	5.5	6.5	5.0	3.6	4.5	6.0	3.8	9.4	.0	13.0	806
13	7.2	5.7	3.3	3.8	5.6	5.8	4.1	5.2	5.0	9.4	5.7	4.6	2.5	5.2	5.0	8.3	.0	13.5	806
14	7.6	6.0	4.2	4.1	4.2	4.3	3.3	5.3	5.7	11.5	8.9	4.3	3.1	5.6	4.1	5.7	.0	11.9	806
15	6.2	5.7	3.8	5.0	4.2	4.2	3.5	4.5	5.6	11.8	10.0	4.7	3.8	8.6	2.7	7.1	.1	8.4	806
16	5.0	6.1	3.8	4.3	3.6	5.1	2.5	2.6	5.2	10.2	9.7	6.3	5.3	11.3	3.7	7.3	.0	7.9	806
17	7.6	4.2	5.0	5.2	4.6	4.6	2.4	2.2	3.6	7.9	10.9	5.7	5.6	16.0	3.8	5.3	.1	5.2	806
18	6.1	5.5	4.1	7.2	6.2	6.0	2.4	2.1	2.5	6.0	9.8	5.7	6.1	20.0	3.6	5.0	.2	1.7	806
19	4.0	4.1	4.3	6.5	7.4	7.6	3.3	3.3	2.7	3.1	6.6	5.1	10.7	23.6	2.6	3.5	1.1	.5	806
20	1.9	2.6	2.4	3.5	6.1	7.7	6.0	3.5	2.2	4.2	5.7	4.8	15.5	27.7	2.0	2.6	1.1	.6	806
21	1.5	1.5	1.9	1.4	1.9	3.6	5.0	3.0	2.9	6.5	9.3	7.3	22.2	28.9	1.5	.7	.9	.2	806
22	.4	.4	.2	.6	.7	.5	2.6	1.0	1.1	5.3	13.6	13.6	28.3	27.7	1.6	1.0	.4	.9	806
23	.5	.1	.6	.6	.7	.4	.5	.5	.7	2.0	13.0	19.9	36.1	20.8	2.1	1.4	.0	.0	806
24	.5	.5	.2	.1	.1	.6	.5	.7	.7	2.1	8.2	25.7	39.1	17.1	2.0	1.1	.2	.4	806
TOTAL	3.7	3.0	2.2	2.7	2.7	3.2	2.5	2.8	3.1	6.1	8.6	11.7	17.8	16.2	4.2	4.7	.7	4.0	19343

TABLE 44. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 50-FOOT LEVEL-1955-1980 FOR																	SEP		
FIGUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	.8	.5	.1	.6	.4	1.0	.5	.8	2.9	5.4	8.6	24.7	29.2	15.8	4.1	2.1	1.5	.9	780
2	.9	1.2	.6	.0	1.0	1.3	.6	2.3	3.7	5.5	10.3	23.6	26.7	14.2	3.6	1.5	1.7	1.3	780
3	1.5	1.0	.6	1.0	.9	1.7	1.5	2.8	4.0	7.2	12.3	20.0	23.1	14.1	3.2	1.7	2.4	.8	780
4	1.8	.5	.6	.6	1.7	2.1	2.7	4.0	4.9	6.2	13.2	16.3	21.2	13.8	4.1	1.8	2.9	1.7	780
5	1.3	.9	.9	2.3	1.0	2.2	4.2	4.2	5.3	5.5	9.9	16.0	20.0	13.8	4.4	2.7	3.6	1.8	780
6	1.9	1.3	1.9	1.8	.9	3.3	4.0	5.1	3.6	5.5	8.5	16.5	19.7	13.6	4.1	2.6	4.1	1.5	780
7	1.8	1.2	1.7	1.9	1.2	3.3	2.9	4.9	4.4	4.5	9.6	14.2	16.2	15.3	4.7	5.0	4.5	2.8	780
8	5.6	3.0	1.7	2.1	1.2	3.2	3.6	3.7	1.9	3.6	6.4	7.1	15.7	21.4	9.6	4.9	4.0	1.3	779
9	10.0	6.8	2.8	2.2	2.1	2.7	1.8	1.7	.9	3.9	4.2	4.6	8.3	19.3	16.4	10.0	1.0	1.3	779
10	12.2	7.3	3.5	5.5	3.5	2.7	1.0	1.2	1.5	3.2	4.6	3.9	4.6	13.1	13.5	15.1	.4	3.2	779
11	10.3	9.1	4.0	5.1	5.8	2.6	2.2	2.2	2.3	3.7	5.4	2.6	5.0	8.6	9.1	15.5	.4	6.3	780
12	11.7	8.7	4.0	5.9	4.9	4.2	1.8	3.8	2.6	4.7	6.3	4.0	3.7	7.2	4.6	13.8	.3	7.6	780
13	10.4	8.1	3.8	5.8	6.0	4.6	2.3	4.1	4.1	5.8	6.0	3.5	4.0	7.3	5.5	10.3	.1	8.3	780
14	9.1	8.8	3.1	4.0	4.7	6.0	3.1	2.7	4.4	8.5	6.5	3.7	4.1	7.4	5.0	9.7	.1	9.0	780
15	8.8	9.0	3.5	4.9	5.1	4.9	2.7	3.7	4.5	8.3	7.7	2.7	4.5	8.6	4.1	10.0	.0	7.1	780
16	11.5	8.6	4.0	6.2	5.0	5.5	2.7	2.3	3.1	7.7	8.3	5.4	2.9	11.3	3.5	7.8	.0	4.2	780
17	9.0	8.5	5.4	7.3	5.6	6.5	2.7	2.2	3.7	5.4	8.1	3.8	5.3	12.6	4.4	7.1	.6	1.9	780
18	6.0	6.8	3.6	7.6	6.3	7.6	4.9	2.7	3.1	4.1	5.4	5.8	8.1	16.8	3.2	5.4	2.2	.6	780
19	3.2	3.3	2.3	5.6	7.1	8.6	6.2	3.6	3.1	5.1	7.3	6.3	12.4	17.2	3.1	3.7	1.5	.4	780
20	1.2	1.7	2.2	3.6	2.2	6.3	6.5	5.0	5.0	7.4	11.3	9.1	15.3	18.1	2.4	2.6	.3	.0	780
21	.6	1.2	1.2	.8	.9	2.2	4.0	2.4	3.7	7.3	16.8	15.8	20.3	17.4	2.8	1.7	.6	.4	780
22	1.0	1.0	.5	.5	.6	1.3	1.7	1.2	2.4	6.0	17.1	21.4	20.8	20.0	2.6	1.3	.5	.1	780
23	.9	.9	1.3	.5	.3	.4	.5	1.4	1.0	5.4	11.8	26.7	27.3	15.1	3.3	1.8	.1	1.3	780
24	.8	1.0	.9	.8	.4	.8	.3	.6	2.2	3.5	9.6	28.5	29.7	14.0	3.7	1.9	.6	.8	780
TOTAL	5.1	4.2	2.3	3.2	2.9	3.5	2.7	2.9	3.3	5.6	9.0	11.9	14.5	14.0	5.2	5.8	1.4	2.7	18717
PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 50-FOOT LEVEL-1955-1980 FOR																	OCT		
FIGUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	.9	.6	1.0	1.0	1.6	3.1	1.7	3.8	4.6	5.0	10.0	20.1	21.8	12.3	5.6	2.2	3.8	.7	806
2	1.5	.5	.2	1.5	1.1	2.7	3.5	5.7	5.6	6.5	9.8	17.2	16.7	15.1	4.0	2.6	4.2	1.5	806
3	1.2	1.4	1.5	1.6	1.4	4.0	3.6	5.2	6.2	6.8	7.4	15.8	17.7	13.4	4.3	2.5	3.7	2.2	806
4	2.0	1.4	1.2	2.4	2.4	4.0	5.1	5.0	5.6	6.5	9.1	14.0	18.1	10.9	4.8	2.2	3.3	2.1	806
5	1.0	1.7	1.2	2.5	1.9	6.2	4.2	5.8	5.5	6.9	8.9	10.7	17.6	11.7	5.5	3.1	4.0	1.6	806
6	2.0	1.4	1.5	2.4	1.7	5.3	5.2	5.6	3.5	7.6	7.8	11.9	16.0	13.2	4.3	2.2	5.7	2.7	806
7	.7	1.9	1.1	1.6	2.9	5.2	6.1	5.2	5.2	6.3	8.9	10.5	14.9	14.4	4.6	2.5	6.6	1.4	806
8	1.7	1.2	1.7	2.2	1.4	4.3	5.1	7.6	4.8	5.1	6.3	8.4	13.4	15.9	5.7	5.2	7.2	2.6	806
9	4.8	5.6	2.2	3.1	1.5	3.6	4.2	4.0	2.9	4.7	5.6	4.6	9.9	20.0	10.5	7.1	4.8	.9	806
10	8.7	7.2	2.7	3.2	2.7	3.2	2.1	2.2	2.4	4.0	5.0	4.2	7.9	13.6	13.4	11.7	2.6	3.1	806
11	9.1	8.7	5.2	5.1	4.0	2.1	2.4	2.1	3.0	4.6	4.7	2.1	6.1	12.3	13.2	10.4	1.5	3.5	805
12	8.9	8.2	5.3	5.3	5.3	4.6	2.2	2.5	5.0	5.1	4.5	1.7	5.6	8.2	8.1	13.8	1.5	4.2	806
13	11.0	8.1	5.5	5.1	6.6	5.3	2.4	1.5	4.0	6.7	5.8	3.2	3.2	7.8	7.8	11.2	.9	4.0	806
14	9.1	7.7	4.6	5.7	6.2	7.3	1.9	2.5	4.3	7.9	6.3	2.6	4.7	6.8	6.3	10.5	.5	5.0	806
15	9.1	7.1	5.3	5.6	6.9	7.8	3.2	2.2	4.3	7.2	6.3	1.7	4.3	9.7	6.3	8.9	.9	3.0	806
16	7.8	6.3	5.1	6.3	7.4	8.2	2.2	3.1	3.5	6.8	6.7	3.1	5.2	10.3	6.2	8.4	.9	2.4	806
17	5.5	4.0	5.3	5.7	7.7	7.3	4.0	2.9	4.1	6.5	6.1	2.9	9.3	13.2	5.3	4.6	5.3	.5	806
18	3.6	1.4	2.1	4.7	7.2	9.3	4.7	3.8	3.6	7.3	5.6	6.0	13.5	12.3	3.8	4.3	6.0	.7	806
19	1.6	1.0	1.4	2.0	4.1	8.7	5.8	4.8	4.2	9.7	11.5	8.7	13.2	14.5	3.5	2.2	2.2	.9	806
20	1.1	.9	.7	1.0	1.1	6.7	4.1	5.3	4.2	8.2	15.6	18.1	13.4	12.3	2.9	2.0	1.9	.5	806
21	.7	.7	.5	1.2	.9	2.0	2.7	3.0	3.0	8.3	16.6	23.9	15.9	11.5	2.7	2.9	2.1	1.2	806
22	.9	1.0	.7	.9	1.7	1.6	1.2	1.1	3.5	6.3	11.4	28.4	19.2	12.4	5.0	2.5	1.2	.9	806
23	.9	1.2	1.0	1.2	.4	1.6	1.1	2.6	2.4	5.0	11.4	26.8	19.7	14.6	4.7	2.7	2.0	.6	806
24	1.0	1.1	.9	.5	.7	2.0	2.1	3.0	3.8	5.6	10.7	23.0	21.6	14.1	4.1	2.0	2.5	1.4	806
TOTAL	3.9	3.3	2.4	3.0	3.3	4.8	3.4	3.8	4.1	6.4	8.4	11.2	12.9	12.5	5.9	5.3	3.1	2.0	19343

TABLE 44. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 50-FOOT LEVEL-1955-1980 FOR NOV																	CALM	VAR	TOTAL
HOURLY	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N			
1	1.8	.9	.8	1.8	2.4	4.6	3.1	5.8	5.0	6.9	7.9	11.0	16.4	15.6	6.3	3.6	4.6	1.4	780
2	2.1	2.2	1.3	1.5	3.2	4.5	3.2	5.0	6.2	5.9	6.7	10.8	17.1	16.0	5.6	3.2	4.7	.9	780
3	1.5	1.5	1.5	2.4	3.1	4.1	3.1	5.0	7.2	6.4	6.0	9.7	15.9	14.5	7.1	3.1	6.2	1.7	780
4	1.7	.9	.9	3.1	2.1	4.7	3.5	4.5	5.8	7.3	6.2	10.1	15.0	15.4	6.0	4.2	6.7	2.1	780
5	1.9	1.3	.6	2.1	2.9	5.1	3.6	6.0	5.3	7.2	6.8	9.5	14.4	15.3	6.3	4.0	6.2	1.7	780
6	1.9	.6	1.2	3.5	2.1	4.5	3.3	7.1	5.0	6.2	6.4	9.1	14.9	13.7	7.3	4.2	6.9	2.2	780
7	2.3	2.8	.9	2.1	1.9	3.8	5.5	5.0	4.2	6.4	6.4	8.8	14.9	14.9	6.7	4.2	6.9	2.2	780
8	2.3	1.4	2.7	2.1	2.2	4.6	5.3	4.9	5.0	5.6	5.5	8.7	14.7	13.8	7.6	2.9	8.6	2.1	780
9	2.7	3.0	1.9	2.1	3.6	3.3	3.6	4.2	5.9	5.5	5.6	6.2	12.1	16.3	9.0	4.1	8.6	2.3	779
10	5.4	3.6	3.6	2.4	1.9	4.4	3.7	2.8	5.0	5.6	3.3	5.3	8.6	18.4	11.2	6.9	6.5	1.2	779
11	6.9	5.5	4.4	2.7	3.7	3.2	1.9	2.6	3.6	6.0	3.5	3.8	7.8	16.9	10.4	9.4	4.6	3.1	780
12	8.8	5.8	4.9	3.5	4.1	4.0	1.3	2.2	4.0	6.3	4.4	2.9	6.0	15.0	11.2	10.4	3.2	2.2	780
13	8.5	5.5	4.4	5.0	4.6	3.9	1.9	2.1	4.1	5.9	5.3	2.2	5.6	15.1	10.4	10.8	2.4	2.3	779
14	8.7	7.6	4.6	5.1	6.4	4.2	1.5	2.2	3.7	6.5	5.3	2.6	6.3	12.7	7.4	10.7	3.1	1.3	779
15	8.6	7.2	5.0	5.9	4.9	5.4	3.2	1.9	3.6	6.3	5.3	2.9	6.8	13.1	8.2	6.5	4.4	.9	780
16	5.0	4.2	5.6	5.8	4.9	6.0	3.2	2.6	3.7	6.0	4.7	3.6	10.1	14.2	7.1	4.7	6.9	1.5	780
17	3.8	1.9	3.3	5.4	5.8	6.3	3.8	3.8	4.6	5.9	4.0	5.4	13.1	15.1	6.0	3.5	6.9	1.3	780
18	2.6	1.9	1.2	2.8	5.0	7.2	4.4	4.9	3.7	7.4	7.1	7.9	14.6	14.6	4.9	3.3	5.0	1.5	780
19	1.9	1.3	1.8	1.3	3.1	5.6	4.6	5.3	5.3	8.7	8.6	10.8	15.5	14.4	4.9	2.6	3.8	.6	780
20	1.3	.9	1.3	1.2	1.5	4.5	4.2	3.5	5.4	8.1	11.0	15.5	15.4	14.5	4.0	2.1	4.6	1.2	780
21	1.2	.9	.9	1.4	1.9	3.1	3.6	4.7	3.6	6.8	11.8	14.2	15.8	16.7	3.7	3.3	5.3	1.2	780
22	1.0	1.4	1.4	.8	2.6	2.7	2.4	4.1	4.6	8.2	9.6	15.3	15.5	15.4	3.6	4.5	5.9	1.0	780
23	1.0	1.8	1.2	1.4	1.3	3.1	4.0	5.0	4.4	7.1	9.6	13.3	15.5	16.3	5.6	3.1	5.1	1.3	780
24	1.3	.6	1.3	.9	1.4	3.1	4.2	4.9	5.4	5.6	8.8	12.7	17.3	15.4	6.2	3.1	5.4	2.4	780
TOTAL	3.5	2.7	2.4	2.8	3.2	4.4	3.4	4.2	4.8	6.6	6.7	8.4	12.9	15.1	6.9	4.9	5.5	1.6	1871

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 50-FOOT LEVEL-1955-1980 FOR DEC																	CALM	VAR	TOTAL
HOUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N			
1	1.0	1.2	1.0	1.6	2.0	3.6	3.8	4.7	4.8	7.7	6.8	9.7	16.7	16.5	5.6	3.8	7.1	2.2	806
2	1.2	1.0	1.1	2.7	2.1	4.6	2.9	4.1	5.3	8.4	7.4	8.9	16.7	14.8	5.2	4.0	7.1	2.4	806
3	1.4	1.1	1.6	2.6	2.7	3.2	3.8	2.7	5.8	8.1	8.2	9.1	14.1	16.1	6.0	2.7	9.3	1.4	806
4	1.9	1.9	1.0	3.6	2.4	2.9	4.0	4.0	5.5	7.8	7.4	7.4	15.3	18.0	5.3	4.2	5.3	2.2	806
5	1.9	1.9	1.7	1.1	1.9	3.3	3.7	3.5	5.7	5.7	8.3	9.6	13.3	18.9	6.6	3.6	7.2	2.2	806
6	2.2	1.4	2.0	2.1	2.6	3.1	4.1	4.2	4.5	7.6	6.1	8.7	15.1	15.9	6.1	5.2	7.7	1.5	806
7	2.2	2.0	2.0	3.0	2.0	3.2	3.6	4.2	4.2	6.1	7.8	8.3	13.8	17.5	5.8	5.0	7.6	1.7	806
8	3.0	1.7	1.6	2.6	2.4	4.0	3.3	4.6	6.1	5.6	6.0	9.2	14.3	16.6	5.0	3.8	7.9	2.4	806
9	2.0	1.5	1.2	1.5	2.4	4.2	3.5	5.1	5.7	6.0	5.8	7.4	12.8	18.2	7.7	5.1	6.6	3.3	806
10	3.0	2.0	2.5	1.6	2.6	3.7	4.0	3.6	4.8	5.0	5.5	6.9	12.4	18.2	7.6	6.7	7.6	2.4	806
11	4.3	2.2	3.3	2.2	2.0	4.0	3.7	3.1	5.1	4.8	5.6	4.5	10.9	19.7	9.6	7.2	5.5	2.2	806
12	5.3	4.6	3.2	2.5	2.6	3.3	3.2	2.5	4.5	4.6	5.7	3.5	7.8	19.1	11.9	9.1	4.3	2.2	806
13	5.5	6.8	4.5	2.5	3.0	4.0	1.7	1.9	3.2	6.6	4.3	5.1	6.7	18.4	10.3	8.4	5.0	2.2	806
14	6.3	3.8	3.7	4.6	4.1	4.0	1.4	2.4	3.6	6.2	5.7	4.6	7.6	17.9	8.1	8.4	6.1	1.6	806
15	6.1	5.0	3.7	3.5	4.2	4.7	2.7	2.2	3.6	6.7	5.2	4.3	8.9	17.2	8.3	5.2	6.5	1.9	806
16	4.1	4.1	3.2	4.5	3.7	4.6	3.1	3.2	4.7	7.4	4.5	3.7	11.0	15.0	6.0	4.6	7.1	1.5	806
17	3.1	2.2	2.6	2.9	4.6	5.2	3.2	3.5	5.1	7.5	4.2	6.0	13.3	17.9	4.6	4.2	9.1	.9	805
18	1.9	1.9	1.5	3.1	4.3	4.6	2.9	3.1	5.0	7.7	8.6	8.1	13.9	16.5	4.5	3.5	7.7	1.5	806
19	1.6	1.0	1.7	1.5	2.1	4.2	4.3	4.6	5.1	6.7	8.3	10.7	16.4	15.4	4.8	2.6	6.7	2.2	806
20	1.7	1.4	1.0	1.2	1.7	4.7	4.2	3.8	4.2	7.6	8.2	10.9	17.5	15.5	4.6	3.5	6.7	1.5	806
21	1.6	1.1	1.0	1.4	2.9	3.3	2.9	3.1	2.9	7.7	10.0	8.3	18.2	16.1	6.4	3.3	7.7	2.1	807
22	1.4	2.1	1.0	2.4	2.0	4.1	2.9	3.8	4.6	6.6	10.3	10.2	16.3	15.4	5.6	3.5	6.6	1.5	806
23	1.9	1.1	2.5	1.7	1.5	4.0	2.4	4.8	4.8	8.4	8.8	10.0	17.1	14.8	5.0	3.0	6.1	2.1	806
24	2.0	.9	1.1	1.9	2.2	3.6	3.1	5.0	3.7	8.1	9.6	11.8	15.9	16.3	5.1	2.0	6.2	1.6	805
TOTAL	2.8	2.2	2.1	2.4	2.7	3.9	3.3	3.7	4.7	6.9	7.0	7.8	13.6	17.1	6.5	4.7	6.9	1.9	19343

TABLE 44. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 50-FOOT LEVEL-1955-1980 FOR ANNUAL

HOURLY	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	1.0	.8	.6	.9	1.2	2.0	1.8	2.5	3.1	5.6	9.1	19.1	27.0	15.9	4.0	2.2	2.4	1.0	9495
2	1.1	1.0	.6	1.0	1.3	2.2	1.9	2.9	3.4	5.8	9.8	19.0	25.8	14.7	3.7	2.0	2.7	1.1	9495
3	1.3	1.0	.8	1.3	1.4	2.5	2.3	3.0	3.9	6.8	10.0	17.7	23.6	14.0	3.9	2.1	3.1	1.3	9495
4	1.4	1.0	.7	1.4	1.6	2.6	2.8	3.4	4.6	6.7	10.7	16.4	21.5	14.2	3.8	2.4	3.0	1.6	9495
5	1.4	1.0	.9	1.2	1.4	3.0	2.7	4.0	4.8	7.1	10.6	15.3	20.7	14.1	4.3	2.4	3.4	1.6	9492
6	1.4	1.1	.9	1.7	1.5	3.0	3.0	4.4	4.4	7.0	10.0	14.2	19.8	14.7	4.5	2.6	4.1	1.8	9493
7	1.8	1.6	1.1	1.7	1.6	2.7	2.9	3.8	3.9	6.0	8.8	10.7	18.7	19.2	5.6	3.7	4.2	1.7	9495
8	3.5	2.3	1.6	1.6	1.5	2.8	2.7	3.7	3.9	4.7	6.5	7.8	15.8	21.5	9.0	5.3	3.7	2.0	9494
9	5.7	4.4	2.1	2.1	1.8	2.9	2.6	2.8	3.4	4.8	6.0	4.9	11.5	19.9	10.9	8.4	3.0	3.1	9493
10	7.4	5.8	3.1	2.9	2.7	3.2	2.6	2.9	3.5	5.5	5.3	4.6	8.7	15.1	9.7	10.0	2.4	4.8	9493
11	7.6	6.1	3.6	3.7	3.5	3.8	2.8	3.3	4.2	6.6	5.9	3.9	7.3	12.7	8.0	9.5	1.6	6.0	9494
12	7.9	7.0	3.6	3.8	3.7	4.2	2.8	3.6	4.9	7.8	6.0	3.9	6.1	11.1	6.9	9.2	1.2	6.3	9495
13	7.7	6.7	3.9	3.8	4.0	4.4	2.7	3.6	5.1	8.9	6.6	4.4	5.4	10.8	6.7	8.1	1.0	6.3	9494
14	7.5	6.3	3.7	3.9	4.1	4.6	2.4	3.6	5.3	9.8	7.7	4.2	5.8	10.2	5.9	7.9	1.2	5.8	9494
15	7.1	6.1	4.2	4.1	4.2	4.5	2.8	3.4	4.9	9.5	8.4	4.2	6.5	11.1	5.4	7.4	1.4	4.8	9495
16	6.6	6.1	3.9	4.6	4.1	5.3	2.6	3.3	4.7	8.7	7.9	4.9	7.6	13.0	4.7	6.6	1.8	3.7	9495
17	5.6	4.9	4.1	4.8	4.5	5.4	3.1	3.0	4.4	7.6	7.6	5.2	9.5	15.8	4.3	5.3	2.8	2.1	9495
18	4.1	4.0	3.3	5.2	4.6	6.0	3.6	3.4	3.7	6.9	8.1	5.9	11.3	17.7	3.8	4.5	2.9	1.2	9496
19	2.7	2.8	3.0	4.1	4.3	6.0	4.4	3.7	3.8	6.8	8.0	7.0	14.0	19.5	3.7	3.4	2.3	.7	9496
20	1.9	1.9	1.8	3.0	3.4	5.5	4.4	3.7	3.5	7.0	8.9	9.4	16.9	20.5	3.0	2.6	2.1	.6	9496
21	1.4	1.3	1.2	1.8	2.1	3.3	3.9	2.9	3.3	7.3	10.4	12.0	20.6	19.9	3.1	2.2	2.3	.8	9497
22	1.2	1.1	.9	1.2	1.4	2.2	2.3	2.5	3.1	6.6	11.4	15.7	22.4	20.0	3.0	2.0	2.2	.8	9496
23	1.2	1.0	1.0	.9	1.0	1.8	1.6	2.3	2.6	5.4	11.2	18.0	25.7	17.7	3.5	2.1	2.0	.8	9496
24	1.1	.9	.7	.9	.9	1.7	1.8	2.3	2.9	5.0	9.7	20.0	26.7	16.6	3.7	1.9	2.3	1.0	9495
TOTAL	3.7	3.2	2.1	2.6	2.6	3.6	2.8	3.2	4.0	6.8	8.5	10.3	15.8	15.8	5.2	4.7	2.5	2.5	227874

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TABLE 45. Monthly and Annual Percent Frequency of Hourly Wind Direction at 200-Foot Level, 1955 Through 1980

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 200FOOT LEVEL-1955-1980 FOR																			JAN
HOURL	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	4.7	1.5	.9	1.5	2.6	3.4	3.2	3.1	3.2	7.6	5.8	7.6	14.6	21.4	8.2	5.1	4.5	1.1	804
2	3.6	1.9	1.6	1.9	1.9	4.1	2.7	3.1	4.9	6.0	5.7	7.3	15.3	21.5	7.2	5.3	4.9	1.1	804
3	3.6	1.7	1.1	1.9	2.6	4.2	4.0	2.5	4.2	6.5	5.5	6.0	14.4	22.4	8.8	4.9	4.5	1.2	804
4	2.6	3.4	1.4	2.5	2.2	4.4	3.2	2.6	3.6	5.2	6.0	7.3	15.5	20.4	9.5	4.4	4.5	1.4	804
5	3.4	2.1	.9	2.0	2.7	4.2	2.6	2.7	3.2	5.3	6.7	7.3	13.3	23.6	9.6	4.6	4.5	1.1	804
6	3.5	2.1	1.7	2.9	2.7	4.7	1.5	2.9	3.0	4.7	6.1	7.5	13.1	22.6	9.3	6.3	3.9	1.5	804
7	3.4	1.2	1.5	1.1	2.1	4.9	2.0	3.1	3.4	4.9	5.8	6.8	15.8	20.9	9.0	6.7	4.7	2.7	804
8	2.9	2.6	1.4	1.2	1.6	3.0	3.9	3.1	3.5	6.6	5.3	7.6	13.2	21.4	9.7	7.3	3.7	2.0	804
9	3.7	2.2	1.6	2.2	1.9	3.5	2.9	4.1	4.4	4.4	5.5	7.2	13.3	23.0	10.0	4.6	4.4	1.2	804
10	3.2	3.1	1.7	1.9	1.7	4.0	3.4	3.4	3.9	6.5	4.4	5.8	11.1	23.8	9.5	5.7	5.0	2.1	804
11	3.9	4.8	2.7	2.1	1.7	4.3	3.1	3.2	6.1	4.8	5.3	3.7	8.4	23.7	9.8	6.8	3.5	1.7	805
12	6.3	5.3	3.9	2.7	3.1	3.2	2.2	2.2	4.8	5.7	5.6	3.0	8.3	20.6	12.3	6.7	2.6	1.2	805
13	6.8	6.0	4.0	3.2	4.6	3.2	2.1	1.5	4.1	5.8	5.3	2.5	8.1	19.9	10.1	9.3	1.7	1.6	804
14	7.3	6.2	4.1	4.1	5.5	4.1	2.5	1.9	5.1	6.0	5.6	2.7	6.8	17.2	9.2	8.2	2.4	1.1	804
15	5.5	5.0	4.0	6.3	5.0	5.3	3.4	2.7	3.9	5.5	5.3	3.6	7.8	15.4	8.9	9.4	1.7	1.2	805
16	5.2	5.5	3.4	6.8	4.3	6.1	3.2	3.1	4.7	6.1	5.0	3.0	7.6	16.5	7.7	7.1	3.9	.9	805
17	4.1	3.9	4.2	3.4	4.0	5.8	5.0	3.2	2.9	7.2	5.2	3.5	9.1	21.1	5.7	5.3	5.6	.9	805
18	2.1	2.6	3.2	1.9	3.9	5.1	5.3	3.5	4.0	7.7	5.0	6.0	12.7	20.1	5.2	5.6	5.3	.9	805
19	2.0	2.1	1.9	1.9	3.4	4.7	5.1	2.6	3.9	8.7	5.5	6.7	14.0	21.2	7.2	4.6	4.1	.5	805
20	2.0	2.0	.9	1.5	2.4	3.9	4.1	4.5	2.6	7.0	7.1	8.6	15.3	21.7	6.8	5.1	3.6	1.1	805
21	2.5	1.9	1.1	1.4	2.1	2.7	3.6	4.1	3.7	7.3	6.3	8.4	16.8	21.2	6.6	5.5	3.7	1.0	805
22	2.2	1.4	1.6	1.5	2.2	3.5	3.5	3.2	3.1	5.7	6.5	9.4	16.8	22.0	7.6	5.5	3.1	1.2	805
23	2.6	3.0	1.2	2.0	2.7	2.7	3.0	2.2	3.1	6.6	5.6	9.6	16.5	21.4	8.2	5.0	3.7	.9	805
24	3.2	2.5	1.5	1.6	1.0	4.3	2.9	2.9	2.9	6.1	7.1	7.7	16.8	21.5	7.8	4.3	5.0	1.0	805
TOTAL	3.8	3.1	2.1	2.5	2.8	4.1	3.3	3.0	3.8	6.2	5.7	6.2	12.7	21.0	8.5	6.0	3.9	1.3	19308
PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 200FOOT LEVEL-1955-1980 FOR																			FEB
HOURL	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	2.7	1.9	.1	1.0	1.8	3.0	2.4	2.4	2.7	6.8	8.2	12.0	19.6	20.5	6.7	4.9	2.7	.5	735
2	2.4	3.0	.7	.5	1.8	3.4	3.0	2.4	3.8	4.5	8.3	12.1	20.1	19.6	6.3	4.1	2.9	1.1	735
3	2.2	1.6	1.4	.8	1.8	2.7	2.6	3.8	2.6	5.3	6.4	12.0	20.0	21.1	7.3	3.9	3.4	1.1	735
4	2.7	3.0	1.1	1.8	1.8	2.3	2.4	3.1	3.3	4.4	6.4	11.6	19.0	21.4	7.8	3.3	3.8	1.0	735
5	2.2	1.8	.8	2.7	1.4	3.0	2.9	2.5	3.3	5.6	5.4	10.9	19.6	21.5	8.7	3.8	3.3	.7	735
6	2.3	1.8	1.2	1.9	2.0	3.5	3.4	2.6	3.1	6.4	6.0	12.0	16.9	20.1	7.6	4.9	3.3	1.0	735
7	2.3	2.6	1.5	2.0	1.9	3.4	2.3	2.7	3.9	5.9	6.8	10.6	16.7	21.5	7.3	4.2	2.6	1.6	735
8	3.7	1.6	1.6	1.9	1.9	2.9	1.9	3.3	5.0	5.2	6.7	10.7	14.4	23.0	7.2	4.6	3.7	.7	735
9	4.2	2.6	2.4	1.5	1.6	2.6	3.4	3.3	3.9	5.2	6.0	8.4	14.3	23.0	8.8	3.4	3.4	1.8	735
10	4.1	3.0	3.4	1.9	1.0	3.5	2.9	2.9	3.8	6.3	5.2	6.3	12.4	23.7	10.2	5.9	2.9	1.0	735
11	5.9	4.2	4.4	2.2	2.7	3.0	1.9	1.8	3.5	7.2	5.6	3.7	8.4	22.6	11.0	8.4	1.8	1.8	735
12	8.6	6.9	3.4	3.4	2.3	3.8	1.8	2.6	2.9	8.3	4.8	3.8	7.5	18.6	10.3	9.3	.8	1.0	735
13	7.9	7.6	3.3	3.5	2.9	3.9	1.9	2.4	5.0	7.5	5.2	3.8	7.3	16.1	9.0	10.9	.7	1.1	735
14	9.3	6.0	3.1	3.9	3.7	3.8	1.4	2.6	4.9	8.0	6.0	4.4	6.4	14.6	8.7	11.7	.7	1.0	735
15	10.3	5.4	3.7	5.3	4.2	3.4	1.5	2.4	4.5	8.6	6.5	2.6	7.8	13.6	7.8	9.4	1.8	1.2	735
16	8.4	7.2	3.8	3.9	3.4	5.6	1.8	2.7	5.0	8.2	6.7	3.9	6.4	15.1	7.1	8.6	1.0	1.2	735
17	6.5	4.8	4.2	3.5	3.9	4.9	2.9	2.4	5.4	8.2	5.9	5.2	9.0	15.0	7.6	7.1	2.9	.7	735
18	5.2	4.1	2.2	3.3	3.9	6.4	3.0	2.9	3.8	7.5	6.8	4.5	12.0	17.4	6.8	6.1	3.1	1.1	735
19	2.9	2.7	2.2	2.0	2.9	6.1	4.2	3.0	4.2	8.8	6.3	7.1	14.7	18.0	7.2	4.8	2.4	.5	735
20	2.7	2.0	1.6	1.0	2.3	4.5	5.2	3.3	3.5	7.1	7.6	10.9	17.6	19.2	4.6	4.2	2.0	.7	735
21	2.0	1.4	.8	.8	2.2	3.9	2.3	4.1	3.1	8.2	7.9	13.5	18.0	18.8	6.7	2.9	3.0	.5	735
22	1.8	1.5	.4	.7	2.0	2.6	2.7	3.3	3.1	7.1	8.3	12.9	20.1	18.5	6.8	4.2	3.1	.8	735
23	1.9	.8	.5	1.1	2.2	3.1	2.0	2.2	3.1	6.4	7.5	13.1	19.5	21.6	6.7	5.0	2.9	.4	735
24	2.3	1.6	1.1	1.0	1.2	2.6	3.1	2.4	3.1	7.1	8.4	11.3	19.9	21.6	7.1	3.3	2.2	.7	735
TOTAL	4.4	3.3	2.0	2.2	2.4	3.7	2.6	2.8	3.8	6.8	6.6	8.6	14.5	19.4	7.7	5.8	2.5	1.0	17640

TABLE 45. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 200FOOT LEVEL-1955-1980 FOR																	MAR		
HOUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	NNW	NW	NNW	N	CALM	VAR	TOTAL
1	2.6	.5	.4	1.0	1.4	2.5	2.4	2.4	3.2	6.5	9.8	17.2	21.1	20.3	5.1	3.3	.5	.5	806
2	1.2	.7	.6	.5	1.1	3.2	2.7	2.5	3.3	7.2	8.9	15.4	21.8	20.1	6.0	3.2	.7	.6	806
3	.7	1.7	.5	1.2	2.2	2.9	2.4	2.7	3.1	7.1	8.4	16.1	19.4	20.7	6.1	3.5	.6	.6	806
4	2.4	.9	1.0	1.5	1.6	2.5	2.4	3.0	3.7	6.1	8.6	14.8	20.8	18.1	7.1	3.3	1.1	1.2	806
5	1.9	1.6	1.1	1.6	1.9	2.5	2.5	2.9	4.3	5.8	8.6	15.3	18.7	18.7	6.8	3.7	1.2	.9	806
6	2.6	1.7	1.2	1.5	1.9	2.2	1.5	3.2	4.6	5.7	7.8	15.9	17.7	18.6	7.2	3.3	1.7	1.5	806
7	3.2	1.5	.6	1.0	2.6	2.4	3.5	3.0	4.7	5.8	8.9	12.0	19.2	18.0	7.1	4.0	1.1	1.4	806
8	3.6	2.7	1.6	1.0	2.6	3.2	1.2	2.2	6.7	5.2	8.8	10.0	19.0	18.6	6.9	5.0	.7	1.4	806
9	4.5	3.8	1.5	.9	2.0	2.7	2.2	3.2	4.1	6.3	8.3	5.7	11.9	23.7	9.8	6.9	1.0	1.4	806
10	6.7	6.3	2.6	2.7	1.7	3.2	1.6	2.7	3.6	7.2	8.1	3.8	7.8	16.4	13.5	10.0	.5	1.4	806
11	8.4	7.4	4.2	3.6	2.6	3.2	2.5	2.5	5.1	8.6	7.9	2.7	6.6	13.0	9.7	9.6	.4	2.0	806
12	10.4	6.8	4.6	3.5	3.2	2.9	2.5	4.1	7.2	9.7	7.6	3.3	5.1	9.9	7.7	9.9	.2	1.4	806
13	9.1	6.2	1.9	4.1	3.1	4.2	3.7	3.7	8.3	11.5	7.3	2.7	6.3	10.2	6.3	9.3	.1	1.9	806
14	9.3	6.3	3.2	3.3	3.1	4.8	3.2	4.5	7.1	12.8	9.3	4.1	6.2	8.9	6.0	7.1	.2	.5	806
15	7.7	6.6	3.1	2.9	3.5	5.6	1.9	4.1	7.8	12.7	8.6	4.7	5.8	10.0	5.7	7.6	.0	1.9	806
16	8.6	5.6	3.3	2.9	3.6	6.2	3.5	4.8	5.6	12.3	10.8	3.0	6.5	10.4	3.8	7.9	.1	1.1	806
17	6.6	5.7	3.6	3.3	3.7	7.4	3.8	4.0	6.6	11.0	8.2	4.2	9.4	11.4	4.6	6.0	.4	.6	806
18	4.5	4.2	3.8	4.2	3.3	7.1	5.5	4.7	6.3	8.7	8.2	5.1	10.2	14.1	4.1	4.7	1.0	.2	806
19	3.3	3.2	2.2	3.7	3.5	6.1	6.0	4.8	5.7	9.3	10.4	4.3	12.5	14.5	4.5	4.3	1.2	.2	806
20	2.5	1.9	1.0	2.2	2.9	6.0	5.3	4.3	5.5	10.8	10.0	7.8	17.5	14.4	3.5	3.3	.7	.4	806
21	2.4	1.9	1.0	2.1	1.5	4.5	5.2	4.1	3.7	8.7	11.9	12.2	19.5	15.3	3.0	2.2	.6	.4	806
22	.9	1.6	1.0	1.0	2.4	3.0	3.7	2.4	3.1	8.2	12.0	15.5	21.8	14.6	4.1	3.5	.6	.6	806
23	2.1	1.1	.9	1.0	1.0	3.3	1.6	2.2	3.7	7.1	10.8	17.0	22.3	16.7	5.3	3.0	.4	.4	806
24	1.4	1.2	.4	1.2	1.0	2.6	2.1	2.2	2.6	7.8	9.4	16.9	25.3	16.9	5.0	2.9	.5	.6	806
TOTAL	4.4	3.4	1.9	2.2	2.4	3.9	3.0	3.3	5.0	8.4	9.1	9.6	14.7	15.6	6.2	5.3	.7	1.0	19344
PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 200FOOT LEVEL-1955-1980 FOR																	APR		
HOUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	NNW	NW	NNW	N	CALM	VAR	TOTAL
1	1.0	.8	.9	.0	1.4	1.3	1.3	.8	2.6	5.9	9.1	19.4	28.1	20.1	4.4	2.8	.1	.1	780
2	1.2	.3	.6	.4	1.2	1.8	.8	1.7	1.7	5.0	10.6	20.1	29.4	17.8	4.5	2.6	.1	.4	780
3	.9	.5	.8	.8	1.5	1.7	.5	1.2	1.9	5.5	11.5	18.7	27.1	18.1	5.6	2.3	.5	.9	780
4	1.0	.9	.4	1.4	.6	2.1	1.2	1.5	1.9	6.9	10.5	20.1	23.2	18.5	5.5	2.6	.3	1.4	780
5	.8	1.4	1.7	.9	1.8	.9	1.5	1.7	3.2	7.2	10.9	16.9	23.0	19.3	5.0	2.2	1.2	.5	779
6	1.0	.8	1.2	1.9	2.1	2.1	2.3	1.9	2.6	5.4	10.3	18.8	22.6	18.2	5.4	1.7	1.4	.5	780
7	1.2	1.2	.6	1.8	1.9	1.4	2.3	2.2	2.9	5.5	10.1	16.4	19.1	19.9	6.3	4.6	1.8	.8	780
8	3.1	2.9	2.8	2.4	.8	2.2	1.8	1.9	2.3	5.5	8.7	10.6	17.4	21.0	7.8	6.7	1.0	.9	780
9	5.6	5.9	2.9	2.2	1.5	2.2	1.2	1.4	2.9	5.5	9.4	4.6	12.7	21.0	11.9	7.8	.6	.5	780
10	8.1	7.6	3.5	3.3	2.3	2.2	1.5	2.2	3.8	7.2	7.6	4.5	9.2	13.1	10.1	11.3	.1	2.4	780
11	9.0	6.7	3.1	4.9	3.7	3.1	2.8	2.4	5.8	8.8	9.5	4.9	6.8	11.0	6.2	9.1	.0	2.3	780
12	8.3	6.7	4.6	3.3	3.1	4.5	3.3	3.7	6.4	10.8	8.5	4.7	8.6	9.1	4.6	7.6	.0	2.2	780
13	6.7	6.9	3.3	3.5	3.6	3.3	3.5	5.1	6.7	11.9	10.1	5.4	6.9	9.5	4.0	7.6	.0	2.1	780
14	6.9	7.1	2.6	3.3	3.5	4.4	2.7	4.5	6.4	13.1	11.4	5.0	8.1	8.2	4.2	6.2	.1	2.4	780
15	6.4	5.6	4.5	3.6	1.9	3.6	3.7	5.1	6.4	12.7	10.4	6.7	7.6	9.0	4.4	6.0	.0	2.4	780
16	5.6	6.4	4.7	3.6	2.8	4.5	3.5	3.5	6.3	11.9	9.7	5.3	9.7	12.2	3.1	6.2	.0	1.0	780
17	5.5	4.5	4.5	4.5	3.1	5.0	3.6	3.6	4.4	10.4	10.3	6.5	10.1	15.4	3.2	4.6	.0	.9	780
18	4.4	3.6	5.1	5.9	3.6	5.1	4.2	3.2	4.0	8.7	10.1	4.9	12.8	16.5	3.6	3.2	.3	.8	780
19	2.9	2.4	4.6	4.9	3.6	5.1	5.9	3.7	3.8	7.4	9.2	5.0	13.1	20.9	2.4	4.1	.6	.1	780
20	2.4	1.4	2.8	4.1	3.1	5.3	4.6	3.7	3.5	9.0	6.9	8.2	18.6	20.5	2.1	2.9	.8	.1	780
21	1.4	2.4	2.2	2.2	1.5	3.7	4.1	2.8	4.1	7.7	9.1	10.6	24.5	19.6	1.7	1.8	.4	.1	780
22	1.0	2.2	1.0	.8	.9	2.8	2.9	2.6	2.9	6.7	12.1	12.8	28.8	17.6	1.9	2.1	.4	.5	780
23	.9	1.0	.6	.5	.6	1.9	1.8	1.7	2.8	4.9	9.7	17.6	30.5	18.3	3.2	3.1	.1	.5	780
24	1.0	.5	.9	.6	.6	1.2	.6	1.8	2.3	4.6	10.4	18.6	28.5	19.5	5.1	2.6	.6	.5	780
TOTAL	3.6	3.3	2.5	2.5	2.1	3.0	2.6	2.7	3.8	7.8	9.8	11.1	17.8	16.4	4.8	4.6	.4	1.0	18719

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TABLE 45. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 200FOOT LEVEL-1955-1980 FOR																	MAY		
HOUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	.6	.4	.4	.4	.6	1.9	.6	.9	.7	2.6	7.1	20.5	38.2	18.7	4.6	1.9	.0	.0	806
2	.6	.5	.5	.4	.5	1.2	.9	.6	.7	2.7	10.3	18.0	37.1	18.6	4.6	2.0	.6	.1	806
3	.5	.7	1.1	.5	.7	1.4	1.2	.9	1.9	2.5	9.4	18.6	35.2	18.6	3.3	2.7	.5	.1	806
4	.5	.9	.6	.2	.9	2.1	1.6	.9	1.9	4.0	8.6	20.3	31.9	17.9	3.6	3.2	.7	.2	806
5	.7	.7	.4	1.4	.5	1.6	2.1	1.1	1.6	2.1	10.5	18.6	31.0	18.9	4.2	2.4	1.2	.9	806
6	.9	.7	.5	1.4	.9	2.0	1.7	1.4	1.6	2.6	9.7	22.2	26.2	19.5	4.7	2.0	1.5	.6	806
7	1.0	1.5	1.4	1.2	1.5	2.1	1.9	1.9	1.0	3.5	9.3	12.7	23.9	23.3	7.6	3.7	1.9	.7	806
8	4.2	2.9	1.9	1.4	1.0	1.1	1.2	1.4	1.9	4.6	6.8	7.2	16.1	28.3	10.4	7.6	1.2	.9	806
9	6.3	5.3	3.0	3.2	1.7	2.2	.9	1.7	1.4	4.1	8.4	4.8	11.7	19.5	12.7	10.3	.2	2.5	806
10	7.6	5.8	3.3	3.0	3.3	2.6	2.4	2.4	3.7	8.6	7.2	3.8	8.7	12.5	8.4	11.3	.2	5.1	806
11	6.6	6.6	2.2	3.1	3.0	5.7	3.3	4.7	5.6	9.1	8.1	6.5	6.6	8.4	5.7	10.0	.1	4.7	806
12	6.9	6.5	2.7	3.5	4.1	4.3	3.6	5.8	5.8	10.8	9.4	6.5	5.7	8.2	4.3	6.1	.0	5.7	806
13	6.7	6.3	4.3	3.7	2.9	4.2	3.8	5.6	5.5	12.0	8.4	6.6	6.6	7.8	4.3	5.1	.2	5.8	806
14	6.0	6.7	5.0	3.6	2.2	5.0	3.3	4.2	6.6	11.5	9.7	6.7	6.6	9.4	3.6	5.0	.4	4.6	806
15	6.5	5.5	4.1	3.2	2.5	4.1	3.3	4.2	5.6	10.8	11.8	6.6	6.5	11.0	4.1	6.5	.2	3.6	806
16	5.8	8.6	3.8	3.5	2.7	5.5	2.1	3.8	4.6	10.7	10.9	5.1	6.5	15.0	3.2	5.7	.0	2.5	806
17	5.2	7.9	4.6	4.2	3.5	4.7	2.2	2.6	4.7	6.7	9.8	5.6	8.8	19.0	3.5	5.1	.1	1.5	806
18	4.3	7.2	4.8	5.2	3.7	4.1	3.6	2.6	4.2	6.1	7.9	4.8	9.4	23.2	3.1	4.2	.4	1.0	806
19	4.2	3.1	4.7	6.1	3.7	5.3	4.5	3.1	2.7	4.2	6.8	5.1	13.2	26.4	2.9	3.0	.7	.2	806
20	2.5	4.5	2.4	4.6	5.5	4.3	4.3	3.2	2.5	2.9	5.8	5.5	18.2	28.5	3.0	1.9	.2	.2	806
21	2.0	3.0	2.9	2.7	2.7	5.0	4.6	2.7	2.2	4.3	5.3	6.9	24.8	26.2	3.2	1.1	.0	.2	806
22	1.4	2.4	2.0	.7	1.4	2.7	3.5	3.2	2.0	4.5	6.3	11.9	30.0	24.8	2.0	1.0	.2	.0	806
23	1.6	1.2	.9	.5	1.5	1.4	1.7	2.1	1.5	2.4	7.2	17.5	33.7	23.3	2.0	1.1	.4	.0	806
24	1.1	.5	.6	.9	.2	1.0	1.6	1.0	.6	1.7	7.0	18.6	37.6	20.9	3.5	2.9	.1	.1	805
TOTAL	3.5	3.7	2.4	2.4	2.1	3.1	2.5	2.6	2.9	5.6	8.4	10.9	19.8	16.7	4.7	4.4	.5	1.7	19343

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 200FOOT LEVEL-1955-1980 FOR JUN																			
HOUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	1.2	.8	.5	.4	.1	.5	.0	.5	.6	1.2	6.0	16.9	40.3	24.4	4.2	1.8	.1	.5	780
2	1.0	.6	.4	.6	.4	.6	.1	.5	.4	1.2	7.3	17.6	40.5	22.8	4.1	1.7	.0	.1	780
3	1.0	.8	.1	.3	.5	.9	.8	.9	.9	3.1	7.4	19.0	38.8	19.6	4.4	1.5	.0	.0	780
4	1.0	.4	.6	.4	.5	.5	.9	1.7	1.3	2.8	9.2	21.3	33.6	19.4	3.7	2.2	.4	.1	780
5	1.2	.6	.1	.6	.3	.9	.9	1.4	1.4	4.4	11.2	21.4	29.9	18.3	3.8	2.3	.9	.4	780
6	1.5	.4	.0	.6	1.2	1.5	.9	1.8	2.1	3.7	9.6	19.1	28.5	21.5	4.0	1.0	1.4	1.2	780
7	1.9	1.0	1.3	1.5	.6	1.3	1.8	2.2	1.0	4.5	8.3	9.6	23.2	28.8	7.1	3.8	1.2	.8	780
8	4.2	2.9	1.5	1.5	1.7	1.3	1.4	2.4	2.1	3.1	7.3	5.8	14.9	27.7	13.1	7.6	.4	1.2	780
9	8.7	5.1	2.4	1.3	2.6	2.6	1.9	1.5	2.9	5.9	6.4	4.6	9.9	19.7	10.4	10.8	.6	2.6	780
10	7.3	5.9	2.9	4.0	3.5	3.8	1.8	4.6	4.4	6.5	8.7	5.0	6.9	12.1	9.2	8.1	.1	5.1	780
11	5.5	7.8	2.1	4.0	3.7	5.6	4.7	3.1	6.7	9.6	6.8	6.4	6.3	9.6	5.8	6.9	.0	5.4	780
12	6.0	7.3	3.1	3.3	2.3	5.9	4.7	5.4	8.2	10.6	8.3	5.6	6.8	7.2	3.7	6.0	.1	5.3	780
13	5.8	6.2	3.7	3.1	2.6	4.7	3.3	5.4	7.6	12.8	10.0	6.3	4.7	7.3	4.6	5.3	.1	6.5	780
14	5.4	4.4	3.2	4.2	3.1	4.4	3.3	5.0	6.8	14.7	10.3	6.4	5.4	5.4	4.7	4.7	.0	4.6	780
15	5.1	5.9	3.2	3.1	2.8	3.8	2.9	4.4	7.1	11.9	11.0	6.4	6.4	11.5	3.8	4.7	.1	5.6	780
16	5.5	5.8	4.4	3.7	2.4	3.3	2.2	4.0	6.5	8.6	11.7	6.5	7.6	14.6	4.2	4.9	.0	4.1	780
17	5.9	5.0	4.6	4.4	3.8	3.3	3.2	3.8	2.7	7.4	9.5	6.8	7.6	20.6	4.9	5.1	.0	1.3	780
18	4.2	5.1	3.7	6.4	5.1	3.7	2.3	2.4	2.1	5.3	8.6	5.8	7.7	28.2	3.6	4.6	.1	1.0	780
19	3.5	4.9	5.0	4.4	6.3	3.7	2.9	2.6	2.1	3.8	7.2	3.8	10.3	32.9	3.5	3.2	.0	.0	780
20	3.1	3.8	3.5	3.3	6.7	5.3	2.9	1.3	1.9	2.9	5.8	3.7	16.2	34.5	2.2	2.2	.5	.3	780
21	2.2	2.8	2.1	3.5	3.7	3.5	3.8	1.8	1.2	2.7	4.5	6.3	23.8	34.4	1.5	1.9	.3	.1	780
22	1.9	2.1	1.7	2.3	1.3	2.4	3.1	1.9	1.7	3.5	4.2	8.2	28.8	33.7	1.4	1.8	.0	.0	780
23	1.0	1.3	.6	.9	.4	1.2	1.8	1.4	1.0	2.4	5.5	12.2	37.4	29.5	2.1	1.2	.1	.0	780
24	.9	.8	.8	.4	.4	.6	.8	.9	.5	1.7	4.9	14.0	39.5	28.7	2.8	1.8	.4	.3	780
TOTAL	3.5	3.4	2.1	2.4	2.3	2.7	2.2	2.5	3.0	5.6	7.9	9.9	19.8	21.5	4.7	4.0	.3	1.9	18720

TABLE 45. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 200FOOT LEVEL-1955-1980 FOR																			JUL
HOOR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	.5	.2	.5	.2	.4	.2	.2	.6	.2	.9	3.8	13.8	44.4	28.0	3.6	2.1	.1	.0	806
2	.2	.7	.0	.6	.1	.5	.0	.9	.7	1.6	3.1	15.3	46.3	24.7	3.3	1.9	.0	.0	806
3	.2	.4	.2	.5	.4	.5	.9	.5	.5	2.4	6.3	16.3	45.4	18.9	4.0	2.4	.1	.2	806
4	.6	1.0	.0	.9	.2	.4	.5	1.0	.6	2.9	6.3	22.0	38.7	18.7	4.0	1.9	.4	.0	806
5	.4	.5	.1	.1	.7	1.0	.6	1.1	1.1	3.2	8.9	17.9	39.9	18.3	3.4	2.0	.7	.0	805
6	.6	.0	.5	.7	.7	1.2	.7	2.1	1.2	3.5	8.3	18.1	34.0	21.7	4.6	1.4	.1	.2	805
7	1.6	.7	.6	1.4	1.0	.7	1.1	1.9	2.0	3.1	6.8	9.9	24.6	33.6	6.6	3.2	.6	.5	806
8	4.2	2.5	.7	1.0	1.4	1.1	1.1	2.1	1.5	2.9	4.1	4.6	12.8	32.8	16.5	9.4	.4	1.0	806
9	10.2	7.2	3.0	2.1	2.1	1.9	2.1	1.7	1.9	2.2	5.1	3.4	5.5	20.1	16.9	11.7	.0	2.9	804
10	12.4	9.2	4.1	3.9	3.6	4.0	3.5	3.6	2.0	5.5	4.0	3.4	4.6	9.9	6.8	13.4	.4	5.6	805
11	8.9	8.0	4.6	4.2	6.0	6.1	4.8	4.8	5.5	6.8	5.8	4.0	3.5	6.0	5.1	9.9	.2	5.7	805
12	8.2	8.2	2.4	4.1	5.8	6.7	5.7	5.8	5.1	8.7	6.0	4.8	4.2	5.7	4.0	7.9	.1	6.6	806
13	8.4	6.7	5.1	3.6	3.6	6.2	4.0	5.0	5.0	11.8	8.4	4.5	3.7	5.0	4.1	5.5	.0	9.6	806
14	7.4	7.1	2.5	4.8	4.1	5.3	3.6	3.8	6.5	11.4	10.9	5.7	3.6	5.7	4.7	6.7	.0	6.1	806
15	8.1	6.9	4.0	4.6	3.1	4.5	2.7	4.7	4.0	11.7	12.5	6.0	4.1	8.2	3.6	6.0	.0	5.5	806
16	6.9	8.2	3.1	5.1	3.5	4.6	2.5	4.2	3.6	10.0	11.4	7.7	5.1	9.3	3.7	6.1	.0	5.0	806
17	7.6	5.1	5.1	7.1	4.0	3.6	2.0	2.5	3.5	7.9	11.5	7.6	5.7	14.9	3.5	5.7	.0	2.9	806
18	6.5	6.0	5.0	8.1	4.2	4.5	1.6	2.7	2.4	5.1	11.9	6.8	4.7	21.2	3.0	5.1	.1	1.2	806
19	5.1	5.5	5.0	6.2	6.0	5.3	1.6	2.0	1.6	3.6	7.9	6.5	7.1	28.3	3.3	4.8	.1	.1	806
20	4.6	3.7	3.8	5.6	6.0	5.6	2.2	1.5	.9	3.0	5.0	4.0	13.2	33.9	2.9	3.8	.4	.1	806
21	2.4	3.8	1.9	3.5	3.2	4.0	3.3	1.5	1.7	2.9	4.2	4.3	19.9	37.1	2.6	3.2	.5	.0	806
22	1.1	1.5	2.0	1.7	1.1	2.2	2.7	2.2	2.0	2.6	5.2	7.7	24.6	39.5	2.7	1.0	.1	.0	806
23	.9	1.1	1.0	.5	.4	.9	1.0	1.4	.7	2.0	5.0	11.8	37.6	32.8	1.7	1.2	.1	.0	806
24	1.0	.9	.5	.2	.4	.5	.4	1.0	.9	.9	3.5	12.4	43.2	29.0	3.6	1.2	.2	.2	806
TOTAL	4.5	4.0	2.3	2.9	2.6	3.0	2.0	2.4	2.3	4.9	6.9	9.1	19.8	21.0	4.9	4.9	.2	2.2	19338

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 200FOOT LEVEL-1955-1980 FOR																			AUG
HOOR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	.9	.1	.0	.0	.6	.5	.4	.5	.5	1.9	6.1	14.8	45.3	22.8	4.1	1.4	.0	.2	806
2	.7	.4	.1	.4	.2	.2	.2	.9	.4	2.2	6.8	15.4	44.5	21.2	3.1	2.6	.5	.0	806
3	.6	.1	.2	.6	.5	.4	.1	1.5	1.6	2.9	7.2	19.0	36.1	20.5	3.6	2.5	.4	.2	806
4	1.0	.2	.2	.6	.4	.5	1.0	1.0	1.1	4.1	8.6	20.0	35.3	20.2	3.1	1.1	.7	.7	805
5	.4	.4	.5	.1	.5	.6	1.2	.9	1.5	3.5	9.7	20.6	35.7	16.6	4.0	2.5	.6	.7	805
6	.6	.7	.2	.4	.7	1.2	1.2	1.1	1.5	3.2	8.2	19.2	32.5	19.9	5.5	1.7	1.5	.5	806
7	1.7	.5	.2	.9	.9	1.6	.6	1.2	2.0	2.9	6.5	14.1	25.4	31.1	5.7	2.1	1.9	.6	806
8	2.9	1.9	1.4	1.4	.9	1.7	.9	2.2	1.9	2.9	4.3	6.7	14.9	32.4	15.5	6.6	1.0	.6	805
9	8.3	4.5	1.0	2.5	1.4	1.9	2.4	1.1	1.9	3.1	3.5	3.1	7.4	22.8	17.9	15.1	.2	2.0	806
10	11.8	6.9	5.3	3.7	3.7	4.1	1.9	2.1	3.1	4.7	3.7	3.6	4.7	11.4	7.9	14.5	.4	4.3	806
11	9.1	9.8	4.6	6.0	4.7	5.0	4.2	5.2	3.3	6.6	4.0	3.2	6.1	7.4	6.1	9.2	.0	5.6	806
12	7.4	8.4	4.1	3.8	5.6	5.7	4.7	6.2	5.5	6.7	6.1	3.2	4.8	6.1	4.8	8.9	.0	7.8	806
13	8.8	7.6	3.3	3.8	6.1	6.5	3.7	5.3	5.2	10.0	7.8	4.5	3.8	5.7	4.8	6.3	.0	6.6	806
14	8.7	6.3	5.3	4.1	3.8	5.6	3.7	6.0	5.8	12.4	9.6	4.0	3.5	5.5	4.1	5.3	.0	6.3	806
15	6.3	6.5	4.2	5.6	3.7	4.5	3.2	4.6	5.5	13.6	9.3	5.1	4.0	8.3	3.6	6.8	.1	5.1	806
16	6.1	7.3	5.1	4.1	3.0	6.2	2.2	3.1	4.6	11.5	10.9	5.3	5.6	11.2	4.2	6.1	.0	3.5	806
17	7.6	4.7	4.8	5.0	5.6	4.7	2.2	2.2	4.0	7.6	11.3	6.0	6.0	15.6	4.6	5.7	.0	2.5	806
18	6.1	6.1	4.0	7.4	6.5	5.6	2.4	1.9	2.6	5.8	10.3	5.7	5.2	20.7	3.7	4.8	.2	1.0	806
19	4.1	4.8	4.6	5.6	7.6	7.1	3.1	3.0	2.9	3.5	6.3	5.2	9.4	25.6	2.6	3.6	.6	.5	806
20	2.6	2.7	3.6	2.4	6.2	7.4	6.2	2.7	2.4	3.2	5.8	3.5	15.8	28.7	2.7	2.9	1.0	.2	806
21	2.0	2.4	2.4	1.5	2.4	3.6	5.6	2.7	2.2	4.1	7.1	6.3	21.6	30.8	3.1	1.5	.6	.2	806
22	1.0	.5	.6	.6	.7	1.1	2.7	2.2	1.6	3.8	7.9	11.4	30.4	30.5	2.5	1.4	.2	.6	806
23	1.0	.5	.6	.6	.5	.2	1.1	.4	1.2	2.1	6.8	13.3	41.6	25.9	2.9	1.1	.1	.0	806
24	.7	.2	.2	.5	.1	.6	.5	.7	.9	1.1	5.2	14.5	43.7	24.8	3.8	2.2	.0	.0	806
TOTAL	4.2	3.6	2.4	2.6	2.8	3.2	2.3	2.5	2.6	5.1	7.2	9.5	20.2	19.4	5.2	4.8	.4	2.1	19341

TABLE 45. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 200FOOT LEVEL-1955-1980 FOR																	SEP			
HOOR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL	
1	1.6	.6	.6	.6	.5	.8	.6	.5	1.4	2.7	7.1	12.9	34.4	24.1	7.6	2.6	.4	.8	780	
2	1.4	1.2	.4	.6	.8	1.2	.5	.9	1.8	3.7	6.5	13.7	36.8	19.2	7.2	2.7	1.0	.4	780	
3	1.7	.9	.5	.8	1.0	.9	.8	1.5	2.2	2.9	6.8	17.2	30.8	20.9	6.4	3.1	1.2	.5	780	
4	1.8	.5	.5	1.2	1.2	1.0	1.9	1.5	1.7	4.4	6.3	16.0	24.6	25.0	6.0	3.5	2.3	.6	780	
5	2.6	1.4	.5	.9	1.0	1.2	2.7	1.8	1.9	3.7	6.7	14.7	24.4	21.4	7.7	3.2	3.2	1.0	780	
6	2.2	1.5	1.7	.8	1.3	1.4	3.6	1.7	1.5	4.4	6.2	13.6	21.8	23.7	7.3	3.1	2.7	1.7	780	
7	2.2	1.8	1.3	1.2	1.5	3.6	2.8	2.2	1.8	3.5	5.6	13.5	18.6	22.3	7.6	6.0	2.9	1.7	780	
8	4.7	2.6	1.7	1.8	1.8	3.6	2.8	2.7	1.7	3.1	6.2	8.5	15.5	24.1	10.4	5.1	2.7	1.2	780	
9	9.5	5.5	2.9	3.1	1.9	2.1	2.1	1.7	1.2	3.2	5.3	3.8	8.1	20.6	16.2	11.2	.5	1.3	780	
10	11.6	8.5	3.1	5.1	3.3	2.4	2.2	1.2	1.4	3.3	5.0	3.2	5.9	12.1	14.2	15.4	.1	1.8	780	
11	12.1	9.9	4.9	5.9	4.9	3.6	2.2	2.6	1.4	4.9	5.3	2.6	3.7	8.6	9.7	14.2	.4	3.3	780	
12	12.3	9.9	5.1	6.5	4.6	4.2	2.9	3.1	2.7	6.0	5.9	2.9	3.7	7.7	5.4	12.3	.1	4.5	780	
13	10.3	8.6	4.1	4.6	6.3	6.7	3.2	2.9	5.4	5.8	6.5	2.9	4.0	7.1	6.0	11.9	.1	3.6	780	
14	11.2	8.6	3.8	4.6	5.0	7.3	3.3	2.3	3.7	10.3	6.7	3.1	4.2	7.2	5.8	8.3	.0	4.6	780	
15	10.4	7.9	5.4	4.2	5.3	5.4	3.3	3.6	4.5	9.4	7.2	3.8	4.2	8.5	5.3	9.1	.0	2.6	780	
16	10.6	9.5	4.7	5.3	5.6	6.2	2.1	2.1	3.6	9.1	8.5	4.1	3.3	10.8	4.1	7.7	.0	2.6	780	
17	9.0	9.1	5.3	7.4	5.3	6.2	2.8	2.9	3.8	6.4	7.4	3.7	3.7	14.6	4.1	6.4	.5	1.3	780	
18	5.8	6.5	4.9	6.3	7.2	7.1	5.3	2.4	3.5	4.5	5.8	4.9	6.9	18.5	2.9	5.6	1.7	.4	780	
19	4.1	3.7	3.3	5.0	6.8	8.1	6.8	2.8	3.5	4.6	7.3	4.9	10.9	20.3	2.7	3.7	1.3	.3	780	
20	3.3	2.8	1.9	3.3	2.4	5.9	7.3	4.1	4.1	6.4	9.0	5.9	15.9	21.2	2.4	3.1	.6	.3	780	
21	2.2	2.1	2.1	.6	1.8	2.1	4.5	3.3	3.5	5.0	11.0	13.3	19.4	23.5	2.9	2.2	.3	.4	780	
22	1.9	1.4	1.0	.4	.9	.9	2.1	2.3	1.7	5.5	8.8	15.6	26.2	24.6	4.2	2.1	.3	.1	780	
23	1.7	1.2	1.3	.5	.1	1.0	1.0	1.0	1.4	4.2	6.7	14.9	32.8	22.3	6.8	2.8	.3	.0	780	
24	1.7	.9	1.0	.6	.6	.3	.6	1.0	1.5	3.3	6.3	14.6	33.1	24.7	6.7	2.4	.4	.1	780	
TOTAL	5.7	4.4	2.6	3.0	3.0	3.5	2.8	2.2	2.5	5.0	6.8	8.9	16.4	18.0	6.7	6.2	1.0	1.5	18720	

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 200FOOT LEVEL-1955-1980 FOR																			OCT
HOOR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	1.4	.9	.7	1.5	.7	3.1	1.7	2.7	2.6	4.0	6.6	10.8	24.1	22.8	9.7	3.7	2.1	.9	806
2	1.6	1.5	.4	1.6	2.4	2.2	2.1	2.5	4.1	4.5	6.7	13.3	19.4	23.6	8.2	2.5	2.7	.9	806
3	1.2	2.1	1.0	1.0	1.6	3.3	2.5	4.2	2.7	5.2	7.4	10.5	20.7	22.6	7.1	3.0	3.0	.7	806
4	2.0	1.9	1.4	1.2	1.6	4.2	2.7	3.8	3.0	3.8	6.2	11.8	18.7	22.5	6.6	4.0	3.2	1.4	806
5	2.6	1.7	1.7	1.9	3.5	3.8	4.3	3.5	3.0	3.6	5.6	11.3	17.2	20.6	6.8	4.5	2.7	1.6	806
6	2.9	1.7	1.6	1.4	2.4	3.7	4.3	3.7	2.4	5.3	5.2	10.8	15.0	22.0	8.7	3.8	4.0	1.1	806
7	2.2	1.7	1.4	2.1	2.5	4.3	3.8	4.1	1.7	5.7	7.7	9.9	15.4	21.8	6.2	4.2	3.2	1.9	806
8	1.5	2.1	2.0	3.1	2.5	4.5	3.8	3.6	3.7	5.2	6.1	9.3	14.0	20.0	8.4	5.8	2.6	1.7	806
9	5.0	3.8	2.9	2.4	2.1	3.7	3.6	3.3	2.5	5.2	5.3	4.8	10.4	22.2	11.0	7.9	2.7	1.6	806
10	7.7	7.7	3.2	3.1	2.1	3.8	2.1	2.7	2.5	4.1	4.1	4.0	7.7	15.3	15.1	10.9	1.6	2.2	806
11	8.9	9.3	4.3	5.0	3.8	3.5	1.9	2.9	2.6	5.0	4.3	2.0	5.7	12.7	14.5	11.0	.9	1.7	806
12	8.9	9.2	5.0	5.0	7.1	4.7	1.9	2.1	4.7	5.0	5.6	1.6	4.5	8.4	9.6	13.6	.9	2.4	806
13	12.2	8.8	4.7	6.1	6.3	6.1	2.6	2.2	3.8	6.2	6.6	3.1	3.2	7.7	7.3	10.7	.4	2.0	806
14	9.3	8.1	6.0	5.0	7.8	6.9	3.2	1.9	4.2	7.4	7.3	2.4	3.5	6.6	8.2	10.0	.4	1.9	806
15	9.6	8.1	4.5	6.8	6.7	8.6	3.1	2.2	4.8	6.9	6.3	1.9	4.2	8.6	8.1	7.8	.5	1.4	806
16	7.7	6.5	5.7	6.2	7.6	8.8	2.5	2.2	4.0	6.9	7.2	3.0	4.6	11.0	6.5	8.6	.5	.6	806
17	6.1	4.8	4.1	7.4	7.2	7.8	4.8	2.5	3.8	7.3	6.0	3.2	7.8	13.2	6.0	4.6	3.0	.4	806
18	3.8	2.9	2.1	4.8	6.9	8.7	6.2	3.6	3.1	7.4	5.8	5.3	10.2	16.1	3.8	4.8	3.8	.4	806
19	2.6	1.0	1.7	2.5	4.2	8.6	7.1	5.0	4.3	6.9	8.2	6.9	12.9	16.9	4.8	4.0	2.1	.2	806
20	1.5	1.2	1.5	2.0	1.7	6.5	7.1	5.0	3.8	7.8	8.1	12.2	16.4	17.5	3.5	3.2	.9	.2	806
21	2.0	.4	.9	1.1	.9	3.5	4.0	3.1	4.0	5.2	9.9	16.3	20.7	19.2	4.5	2.4	1.4	.7	806
22	2.2	.9	.4	.9	1.6	2.0	1.9	1.5	2.4	5.7	7.6	14.0	24.4	23.1	6.3	3.0	1.9	.4	806
23	2.2	1.2	1.5	.6	1.1	1.9	1.2	2.1	2.1	3.1	7.6	12.5	27.4	23.0	6.9	3.7	1.4	.4	806
24	2.0	1.4	1.5	1.4	1.0	2.0	2.1	1.7	2.7	4.0	6.0	11.5	23.9	24.9	8.2	3.3	1.7	.6	806
TOTAL	4.5	3.7	2.5	3.1	3.6	4.8	3.3	3.0	3.3	5.5	6.6	8.0	13.8	17.6	7.7	5.9	2.0	1.1	19344

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TABLE 45. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 200FOOT LEVEL-1955-1980 FOR																			NOV
FOUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	2.3	1.8	1.2	1.7	2.2	4.2	3.1	3.8	4.1	5.8	6.0	8.3	16.3	21.5	7.9	4.6	4.1	1.0	780
2	2.9	1.8	1.2	1.7	2.9	4.4	3.3	3.6	4.6	3.8	6.2	7.9	16.2	21.3	8.1	5.1	3.6	1.4	780
3	2.9	2.6	.9	1.9	3.2	4.4	4.5	3.3	5.1	5.4	5.4	8.2	14.6	19.6	9.0	4.7	3.5	.8	780
4	2.8	1.3	.9	2.2	3.1	4.5	4.1	3.7	5.0	5.1	4.5	7.8	14.9	19.1	9.2	5.9	4.4	1.5	780
5	2.7	1.8	2.4	1.9	3.2	3.3	4.0	5.3	4.1	5.0	6.9	7.9	13.5	19.5	7.7	5.1	4.7	.9	780
6	2.9	1.7	1.9	2.2	2.9	4.6	3.7	3.6	4.7	4.6	6.9	7.4	12.6	20.0	9.1	5.8	4.2	1.0	780
7	2.6	2.3	1.3	1.8	2.2	5.3	3.5	4.2	4.4	4.5	4.6	7.9	12.8	20.9	10.0	6.4	3.8	1.5	780
8	4.6	1.9	2.7	2.6	2.7	4.2	4.2	2.6	3.7	4.5	6.5	6.7	12.4	19.4	9.5	6.5	3.3	1.9	780
9	3.9	2.3	1.2	3.3	3.5	5.1	3.1	3.3	4.0	5.0	5.5	7.3	10.8	14.5	9.4	6.7	4.9	1.3	779
10	5.1	3.0	2.7	3.1	3.1	4.4	2.7	3.0	3.6	6.7	5.3	4.5	7.3	20.9	9.9	9.1	5.0	.8	779
11	7.4	4.6	4.5	3.3	4.2	2.6	1.7	2.8	3.3	6.0	4.9	3.7	6.4	17.7	12.2	9.5	3.5	1.7	780
12	8.7	6.9	3.7	2.9	4.2	4.9	1.2	2.7	4.5	5.1	5.1	3.3	5.1	15.1	12.6	10.3	2.4	1.2	780
13	8.3	6.2	4.6	4.7	5.3	3.5	2.1	2.2	4.5	5.5	6.4	2.2	4.2	14.5	12.2	10.5	1.8	1.3	779
14	8.6	7.2	4.0	6.4	5.5	5.3	1.8	2.4	3.1	7.1	5.1	2.6	4.4	14.4	7.6	11.4	2.6	.6	779
15	8.8	7.1	6.2	5.6	4.7	6.0	2.9	2.3	2.9	7.1	5.6	2.7	5.1	13.1	9.1	7.2	2.8	.6	780
16	5.3	5.3	4.7	6.8	4.1	5.6	4.7	2.8	3.3	5.8	5.4	4.0	7.1	15.3	8.5	5.5	5.4	.5	780
17	3.3	4.1	2.3	4.4	5.4	6.2	5.4	3.5	3.8	6.0	4.9	4.2	10.8	15.9	7.9	5.6	6.0	.3	780
18	2.4	3.2	1.4	2.9	3.5	7.7	5.1	4.5	3.5	6.8	6.5	6.0	12.4	18.1	6.7	4.7	3.3	1.2	780
19	3.3	1.8	1.3	2.1	3.2	4.6	5.6	4.7	4.0	6.7	7.4	7.7	15.0	16.9	6.2	5.0	3.7	.8	780
20	2.1	1.0	1.7	1.8	2.2	4.0	4.4	5.3	3.8	6.8	6.8	11.4	15.3	20.1	6.5	3.2	3.2	.5	780
21	2.8	1.0	1.2	1.4	2.1	4.0	3.8	3.8	3.7	5.4	7.9	11.3	17.6	19.1	7.7	3.6	2.9	.6	780
22	2.9	2.1	1.2	1.8	1.8	3.7	2.3	2.6	4.9	6.0	6.2	10.9	17.1	15.2	8.6	3.8	4.4	.6	780
23	2.7	2.1	1.0	1.7	1.4	3.3	2.9	3.8	3.7	6.3	6.7	9.4	17.7	19.7	9.2	3.5	3.7	1.2	780
24	2.7	1.0	1.0	1.4	2.6	3.6	3.8	3.6	4.6	4.9	7.1	9.6	15.0	21.8	9.4	4.1	3.3	.5	780
TOTAL	4.3	3.1	2.3	2.9	3.3	4.6	3.5	3.5	4.0	5.7	6.0	6.8	11.9	18.4	8.9	6.2	3.6	1.0	18716
PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 200FOOT LEVEL-1955-1980 FOR																			DEC
FOUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	3.2	1.5	1.2	1.0	2.0	4.3	3.8	2.5	4.7	7.3	7.4	8.1	14.5	21.3	8.8	3.5	4.3	.4	806
2	3.2	1.6	1.4	1.9	2.9	3.5	3.1	4.3	4.7	6.8	6.9	8.9	14.0	19.2	7.4	4.6	4.8	.6	806
3	1.5	2.2	1.5	1.4	3.2	4.6	2.9	3.1	3.7	7.4	7.1	8.7	11.2	21.3	8.3	4.6	6.0	1.4	806
4	2.1	1.5	1.5	2.1	2.4	3.5	5.0	3.2	4.3	6.1	6.5	7.2	13.4	20.7	9.1	5.0	5.1	1.5	806
5	1.6	2.0	2.1	1.6	2.2	3.3	4.3	3.8	3.3	6.8	6.1	8.9	12.3	22.3	8.6	5.2	3.8	1.5	806
6	2.5	2.0	1.5	2.4	2.5	3.0	4.3	4.0	3.5	5.6	6.3	8.6	12.3	20.2	9.9	5.6	4.6	1.4	806
7	3.8	2.6	1.0	2.2	3.1	3.2	3.7	3.1	4.0	5.1	5.2	8.2	13.9	19.4	8.2	5.8	5.7	1.7	806
8	2.6	1.9	2.4	2.5	3.0	4.6	3.2	3.7	5.0	5.0	4.8	8.6	11.9	20.6	8.2	6.0	4.8	1.4	806
9	2.9	1.9	1.7	2.0	2.7	5.5	3.1	3.3	5.1	5.0	5.0	8.2	10.8	20.6	10.4	5.6	4.8	1.5	806
10	3.0	3.2	1.5	1.7	2.6	4.6	3.3	3.2	4.6	5.1	5.7	7.1	12.2	20.6	10.5	4.8	4.6	1.6	806
11	3.6	2.6	3.0	2.5	2.1	4.3	4.0	2.2	4.2	4.6	7.7	6.0	9.1	21.2	10.5	6.9	3.6	1.9	806
12	5.5	3.6	3.7	2.4	2.7	3.5	3.7	2.5	4.8	5.0	5.8	4.1	6.5	21.3	11.7	8.6	3.5	1.2	806
13	5.8	5.6	4.0	3.1	3.2	4.5	1.9	2.5	3.6	6.5	4.8	4.0	6.0	18.9	11.8	8.6	3.6	1.9	806
14	6.2	3.3	5.8	4.1	4.6	3.8	2.5	2.1	3.6	6.7	5.7	4.6	5.8	17.6	9.4	8.1	4.6	1.4	806
15	6.0	4.6	3.5	4.6	4.2	5.8	2.1	2.5	4.3	6.9	5.2	4.0	7.2	18.0	8.9	6.3	4.3	1.5	806
16	5.3	4.2	2.7	4.8	4.3	6.0	2.9	3.8	4.2	7.3	5.1	4.1	8.1	19.4	8.1	4.6	4.2	.9	806
17	3.9	3.2	2.7	2.2	4.7	5.1	3.6	3.9	4.3	7.6	5.0	4.6	9.6	19.4	7.3	6.3	5.6	1.0	805
18	3.1	2.2	2.0	3.6	3.8	5.2	3.7	2.7	4.0	7.7	6.1	6.2	11.5	19.6	6.8	4.3	6.1	1.2	806
19	2.9	.7	1.9	1.6	3.1	4.5	4.1	4.5	4.1	6.8	6.7	9.6	13.8	18.7	7.4	4.0	4.8	.9	806
20	2.4	1.5	1.5	2.2	2.4	3.8	3.3	4.1	3.5	7.4	5.7	8.7	15.5	20.3	9.1	3.6	4.6	.4	806
21	1.9	1.4	1.4	1.4	2.2	3.5	3.7	3.0	3.2	5.6	7.4	8.9	14.7	23.3	7.6	4.1	5.6	1.2	807
22	2.1	1.6	1.5	1.7	2.4	3.5	3.2	3.0	4.0	5.0	7.3	8.9	16.1	19.7	8.7	5.1	5.1	1.1	806
23	2.1	2.0	1.4	2.5	1.6	3.7	3.1	3.1	5.2	5.8	7.8	9.2	15.3	20.2	6.6	4.3	4.2	1.9	806
24	2.6	1.5	1.0	1.5	1.4	3.5	3.7	2.6	4.3	7.2	7.7	8.8	15.8	20.4	7.2	4.5	4.5	1.9	805
TOTAL	3.3	2.4	2.2	2.4	2.9	4.2	3.4	3.2	4.2	6.3	6.2	7.2	11.7	20.2	8.8	5.4	4.7	1.3	19343

TABLE 45. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 200FOOT LEVEL-1955-1980 FOR ANNUAL

HOUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	1.9	.9	.6	.8	1.2	2.1	1.7	1.7	2.2	4.4	6.9	13.5	28.4	22.2	6.2	3.1	1.6	.5	9495
2	1.7	1.2	.7	.9	1.3	2.2	1.6	2.0	2.6	4.1	7.3	13.8	28.5	20.8	5.8	3.2	1.8	.6	9495
3	1.4	1.3	.8	1.0	1.6	2.3	1.9	2.2	2.5	4.7	7.4	14.2	26.3	20.4	6.2	3.3	2.0	.7	9495
4	1.7	1.3	.8	1.3	1.4	2.3	2.2	2.3	2.6	4.6	7.3	15.0	24.2	20.1	6.2	3.3	2.2	.9	9494
5	1.7	1.3	1.0	1.3	1.6	2.2	2.5	2.4	2.7	4.7	8.1	14.3	23.2	19.9	6.3	3.5	2.3	.9	9492
6	2.0	1.3	1.1	1.5	1.8	2.6	2.4	2.5	2.6	4.6	7.6	14.5	21.1	20.7	6.9	3.4	2.5	1.0	9494
7	2.3	1.5	1.1	1.5	1.8	2.8	2.4	2.6	2.7	4.5	7.2	11.0	19.1	23.5	7.4	4.6	2.6	1.3	9495
8	3.5	2.4	1.8	1.8	1.8	2.8	2.3	2.6	3.2	4.5	6.3	8.0	14.7	24.1	10.3	6.5	2.1	1.2	9494
9	6.1	4.2	2.2	2.2	2.1	3.0	2.3	2.5	3.0	4.6	6.1	5.5	10.5	21.3	12.1	8.5	1.9	1.7	9492
10	7.4	6.0	3.1	3.1	2.7	3.6	2.4	2.8	3.4	6.0	5.7	4.6	8.2	15.9	10.5	10.1	1.7	2.8	9493
11	7.4	6.8	3.7	3.9	3.6	4.2	3.1	3.2	4.4	6.8	6.3	4.1	6.5	13.4	8.8	9.3	1.2	3.2	9495
12	8.1	7.1	3.9	3.7	4.0	4.5	3.2	3.9	5.2	7.7	6.6	3.9	5.9	11.5	7.6	8.9	.9	3.4	9496
13	8.1	6.9	3.9	3.9	4.2	4.8	3.0	3.7	5.4	9.0	7.3	4.0	5.4	10.8	7.0	8.4	.7	3.7	9494
14	8.0	6.4	4.1	4.3	4.3	5.1	2.9	3.4	5.3	10.1	8.1	4.3	5.4	10.4	6.3	7.7	.9	2.9	9494
15	7.5	6.3	4.2	4.7	4.0	5.1	2.9	3.6	5.1	9.8	8.3	4.5	5.9	11.3	6.1	7.2	1.0	2.7	9496
16	6.8	6.7	4.1	4.7	4.0	5.7	2.8	3.4	4.7	9.0	8.6	4.6	6.5	13.4	5.3	6.6	1.3	2.0	9496
17	5.9	5.2	4.1	4.7	4.5	5.4	3.5	3.1	4.2	7.8	7.9	5.1	8.1	16.3	5.2	5.6	2.0	1.2	9495
18	4.4	4.5	3.5	5.0	4.6	5.8	4.0	3.1	3.6	6.8	7.8	5.5	9.6	19.5	4.4	4.8	2.1	.9	9496
19	3.4	3.0	3.2	3.8	4.5	5.8	4.7	3.5	3.6	6.2	7.4	6.1	12.2	21.7	4.5	4.1	1.8	.4	9496
20	2.6	2.4	2.2	2.8	3.6	5.2	4.7	3.6	3.2	6.2	7.0	7.5	16.3	23.4	4.1	3.3	1.5	.4	9496
21	2.1	2.0	1.6	1.9	2.2	3.7	4.1	3.1	3.0	5.6	7.7	9.8	20.1	24.1	4.2	2.7	1.6	.5	9497
22	1.7	1.6	1.2	1.2	1.6	2.5	2.9	2.5	2.7	5.3	7.7	11.6	23.8	24.0	4.7	2.9	1.6	.5	9496
23	1.7	1.4	1.0	1.0	1.1	2.1	1.9	2.0	2.5	4.4	7.2	13.2	27.7	22.9	5.1	2.9	1.4	.5	9496
24	1.7	1.1	.9	.9	.9	1.9	1.9	1.8	2.2	4.2	6.9	13.2	28.6	22.9	5.8	3.0	1.6	.5	9494
TOTAL	4.1	3.4	2.3	2.6	2.7	3.7	2.8	2.8	3.4	6.1	7.3	8.8	16.1	18.9	6.6	5.3	1.7	1.4	227876

TABLE 46. Monthly and Annual Percent Frequency of Hourly Wind Direction at 400-Foot Level, 1955 Through 1980

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 400FOOT LEVEL-1955-1980 FOR																			JAN
HOUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	4.1	1.9	1.1	2.2	1.9	2.6	3.0	2.1	3.1	7.2	6.0	6.7	11.9	24.9	8.2	5.5	7.1	.5	804
2	3.7	1.2	1.0	2.0	2.2	3.0	2.0	2.6	4.0	6.3	6.7	6.5	11.2	24.8	9.7	6.0	6.1	1.0	804
3	2.6	2.5	1.9	1.6	1.7	3.4	2.4	2.6	3.2	7.3	4.7	6.5	12.1	24.6	9.7	5.3	7.1	.7	804
4	2.7	1.6	1.5	1.6	1.5	3.2	3.6	2.5	3.0	6.0	5.2	7.3	11.7	23.9	10.1	7.1	6.3	1.1	804
5	4.0	1.9	1.2	1.0	2.0	2.9	3.1	3.0	3.2	5.8	6.6	6.8	11.7	23.3	10.0	6.6	6.8	.1	804
6	3.5	1.2	2.4	1.6	2.4	3.0	1.6	2.4	2.9	4.2	7.6	8.0	10.4	24.4	9.6	7.0	7.0	1.0	804
7	2.7	1.9	1.9	2.4	1.5	3.1	2.9	2.5	2.7	5.8	6.1	5.7	13.4	21.3	11.1	7.8	5.3	1.9	804
8	4.1	2.0	1.0	1.9	1.0	2.9	3.1	3.5	3.0	6.1	6.1	8.0	11.4	23.5	9.5	7.7	4.9	.5	804
9	3.6	2.0	1.5	2.1	1.6	3.2	2.6	3.2	4.4	4.7	5.7	6.5	11.4	22.3	11.3	6.7	5.6	1.5	804
10	3.4	2.4	1.2	2.4	1.0	3.6	2.6	3.4	3.4	7.3	5.5	7.0	9.8	23.4	9.8	6.0	6.7	1.2	804
11	3.5	3.4	2.1	2.0	2.0	4.2	2.4	3.0	4.7	6.5	5.7	5.2	8.6	22.9	11.6	5.3	5.7	1.4	805
12	5.5	3.2	1.9	3.0	2.5	3.9	2.7	2.9	4.2	6.1	5.8	4.0	6.7	22.5	12.5	6.6	3.7	2.4	805
13	6.0	4.3	2.5	4.0	3.7	4.1	2.1	1.7	4.8	5.8	6.5	2.7	7.2	19.5	12.2	7.6	3.9	1.4	805
14	6.5	4.0	3.5	4.1	4.6	3.6	2.9	2.5	5.2	6.1	5.6	3.7	5.0	16.8	11.8	8.8	4.6	.9	805
15	4.6	5.5	4.0	5.6	3.5	6.8	2.5	2.1	4.3	5.6	5.7	3.5	4.8	16.9	10.8	8.0	4.3	1.5	805
16	6.2	3.9	3.0	4.5	5.3	5.6	3.6	2.6	5.0	6.5	4.7	2.7	7.1	15.5	8.7	7.0	6.8	1.4	805
17	4.6	2.7	3.6	3.0	4.5	5.5	3.4	3.0	3.2	7.8	5.3	3.9	7.5	18.5	8.2	6.3	8.0	1.1	805
18	2.7	2.6	2.2	2.9	3.0	5.5	4.2	2.6	3.4	8.7	5.8	4.8	10.8	19.6	7.0	5.5	8.4	.2	805
19	1.9	1.7	2.0	2.6	2.0	5.6	3.4	2.6	5.0	8.1	6.2	5.7	11.1	21.1	8.2	6.5	6.2	.2	805
20	2.2	1.4	1.9	2.2	2.5	3.7	3.1	2.6	3.6	7.3	7.2	6.6	13.0	22.2	8.3	6.0	5.6	.5	805
21	3.6	2.1	1.7	2.2	1.2	3.4	3.0	2.0	3.5	7.0	7.2	6.6	13.2	23.7	9.4	3.7	5.8	.6	805
22	2.9	1.6	.9	2.5	2.2	3.0	2.0	1.7	3.4	6.2	7.1	8.1	11.6	24.5	10.4	4.6	5.8	1.4	805
23	3.5	1.7	1.2	2.6	2.2	3.0	1.5	1.6	3.5	6.7	5.5	8.6	11.8	24.5	9.6	5.0	6.3	1.2	805
24	2.4	1.9	1.5	2.5	1.2	2.6	2.7	3.7	2.2	6.7	6.3	7.0	14.2	24.0	8.2	5.6	6.7	.6	805
TOTAL	3.8	2.4	1.9	2.6	2.4	3.8	2.8	2.6	3.7	6.5	6.0	5.9	10.3	22.0	9.8	6.3	6.0	1.0	19310
PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 400FOOT LEVEL-1955-1980 FOR																			FEB
HOUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	3.0	1.5	1.2	.7	2.2	2.0	2.3	2.0	2.4	6.3	8.7	10.2	15.0	24.2	9.0	3.5	4.9	.8	735
2	2.2	2.2	.7	1.6	1.8	2.0	3.1	1.9	4.5	4.9	6.3	11.2	14.1	25.4	9.3	3.4	4.6	.8	735
3	2.2	2.0	.3	1.9	1.5	1.9	2.9	3.4	2.4	5.6	6.7	12.1	13.3	25.2	8.7	3.8	4.9	1.2	735
4	2.9	2.2	1.4	1.1	1.5	2.2	1.8	3.1	3.4	5.9	4.8	12.4	15.2	23.1	9.5	4.1	5.2	.4	735
5	2.6	1.9	1.1	2.4	1.6	1.6	2.2	1.5	3.9	5.3	5.0	12.2	14.3	25.0	8.8	4.8	4.6	1.0	735
6	2.3	1.0	1.5	2.0	1.4	2.2	2.6	1.8	3.0	5.7	6.8	11.4	14.3	22.7	10.1	5.3	4.9	1.1	735
7	2.3	1.2	1.0	1.8	1.1	2.3	2.4	2.4	3.8	5.0	7.3	11.4	14.7	21.9	10.2	5.4	5.2	.4	735
8	3.5	1.1	1.0	1.6	1.1	2.3	1.4	3.3	3.9	5.2	7.9	10.3	12.4	22.6	10.5	5.4	5.3	1.2	735
9	3.0	2.3	1.0	1.2	1.1	2.7	2.9	2.3	3.1	7.1	5.9	9.4	12.5	24.5	10.1	4.5	6.3	.3	735
10	2.7	2.2	2.3	1.6	1.4	2.4	2.4	3.1	3.5	6.9	6.4	7.6	9.1	25.7	10.2	5.2	5.0	2.0	735
11	5.3	3.5	2.0	3.4	2.4	3.5	2.7	2.7	2.6	7.9	6.5	5.2	7.8	20.7	12.0	7.5	3.0	1.2	735
12	6.1	6.0	3.3	2.6	2.9	3.5	2.6	2.4	3.9	7.6	5.3	4.5	7.2	17.7	10.5	9.5	2.7	1.6	735
13	7.9	3.8	4.6	3.3	3.5	3.5	1.1	3.3	4.9	7.6	5.6	4.1	6.3	15.6	11.0	10.3	1.9	1.6	735
14	7.6	5.3	3.0	3.4	3.5	3.1	1.9	3.0	4.8	8.3	6.3	4.9	5.7	12.9	10.7	12.5	1.5	1.5	735
15	9.3	6.0	3.0	3.9	4.4	3.8	2.3	2.4	4.2	9.3	6.7	3.9	6.3	12.7	7.8	10.6	2.6	1.0	735
16	7.2	5.3	3.5	4.1	3.3	6.0	2.2	1.8	5.7	8.3	6.4	4.8	4.6	14.8	8.3	9.9	2.6	1.2	735
17	6.4	5.2	3.3	3.5	3.0	5.4	2.7	2.6	4.9	9.0	6.4	5.2	6.8	14.6	8.2	8.4	4.2	.3	735
18	5.9	3.0	2.4	3.3	3.7	6.3	2.7	2.6	3.8	9.8	6.7	4.4	8.7	17.0	7.1	7.8	4.4	.7	735
19	4.1	3.4	2.7	1.2	3.1	6.1	2.9	3.3	4.1	9.0	6.7	5.7	10.6	17.8	8.2	7.1	3.5	.5	735
20	2.6	2.9	1.6	1.9	2.2	4.9	3.9	2.7	3.8	6.4	7.6	8.6	15.1	17.7	7.8	6.5	3.4	.4	735
21	1.9	1.2	1.2	1.4	1.9	3.7	3.8	2.3	2.9	7.2	7.3	11.4	15.6	20.0	8.3	3.8	5.0	1.0	735
22	1.9	1.6	.7	1.5	2.0	3.1	3.1	2.2	2.9	6.8	7.8	11.2	15.9	22.2	7.1	4.6	4.8	.7	735
23	2.7	1.2	.5	1.5	1.5	3.4	3.1	1.9	2.7	5.9	9.0	10.1	16.5	21.5	9.1	4.6	3.8	1.0	735
24	2.0	1.8	.7	.5	2.0	2.7	2.2	3.0	2.0	6.1	8.3	9.9	13.5	25.4	10.1	3.9	5.2	.5	735
TOTAL	4.1	2.8	1.8	2.1	2.3	3.4	2.6	2.5	3.6	7.0	6.8	8.4	11.5	20.5	9.3	6.4	4.1	.9	17640

TABLE 46. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 400FOOT LEVEL-1955-1960 FOR																			MAR
HOOR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	1.6	1.1	.7	.5	1.0	2.2	2.4	2.0	2.7	6.3	9.1	15.5	19.6	21.2	9.1	3.0	1.6	.4	806
2	1.5	.9	.6	.5	.5	2.4	3.0	1.9	4.2	7.1	8.6	12.9	18.4	23.1	9.3	3.6	1.5	.2	806
3	1.4	1.1	.7	.7	1.4	3.1	1.7	2.5	3.6	6.1	6.8	13.5	20.1	20.7	10.9	3.8	1.0	.7	806
4	1.9	1.4	.6	1.2	1.1	1.9	2.4	3.0	3.7	4.6	7.7	13.8	21.1	21.0	9.1	4.1	1.2	.4	806
5	1.4	1.6	.9	.9	1.4	3.0	2.4	2.2	3.7	5.1	8.2	12.3	20.5	20.0	9.7	3.6	2.7	.6	806
6	1.7	1.2	.7	1.1	1.4	2.5	1.9	2.6	3.8	6.5	7.3	13.4	16.0	22.6	8.7	4.7	3.1	.7	806
7	2.9	1.0	.7	.7	1.4	1.6	2.4	3.0	5.3	5.5	7.4	12.4	17.7	20.2	9.7	5.0	2.2	.9	806
8	2.6	1.4	.6	.9	.7	2.7	2.0	2.1	4.2	7.1	7.6	10.5	17.1	21.8	10.7	4.7	2.1	1.1	806
9	4.0	2.2	1.2	1.1	.7	2.5	2.7	2.2	4.3	6.9	7.9	7.8	13.2	22.6	11.3	6.0	1.7	1.5	806
10	5.6	4.1	2.9	2.2	3.2	2.4	1.2	2.5	4.5	7.3	8.3	5.1	7.6	16.4	14.0	9.7	1.6	1.5	806
11	7.8	5.6	4.6	3.6	2.7	3.2	2.7	3.0	4.8	9.3	7.4	3.3	6.9	12.2	10.5	9.9	.9	1.1	806
12	9.8	6.5	4.1	4.1	3.2	2.9	2.5	4.6	6.9	10.3	7.4	3.7	5.6	9.7	7.9	8.8	.4	1.6	806
13	7.9	5.6	2.1	3.5	3.7	4.5	3.0	4.1	8.3	11.4	7.9	2.6	6.3	10.5	6.2	10.2	.1	1.7	806
14	8.3	5.6	3.2	3.3	2.5	4.6	3.3	4.6	7.6	12.8	8.8	4.2	6.6	6.9	5.2	8.7	.5	1.2	806
15	7.7	5.3	3.1	3.1	3.7	5.6	1.9	6.1	7.1	12.3	8.2	5.5	6.3	9.2	5.8	7.6	.1	1.5	806
16	7.4	6.1	2.9	3.5	2.2	6.5	3.6	4.8	5.6	12.2	10.2	4.1	5.6	11.5	3.5	8.2	.4	1.6	806
17	6.5	4.3	3.3	4.5	2.7	6.5	5.5	4.3	5.7	11.0	8.6	4.2	7.7	12.7	4.1	6.6	.7	.9	806
18	4.3	4.3	2.9	5.2	2.4	6.1	6.3	4.5	6.1	5.8	8.6	5.0	8.3	14.8	4.1	6.1	1.2	.1	806
19	3.7	3.8	1.7	3.0	3.6	5.8	6.3	4.2	5.8	9.2	10.4	4.8	10.7	14.8	4.8	4.8	2.0	.4	806
20	2.6	2.2	2.0	2.5	2.5	5.5	6.8	4.0	5.0	9.9	9.6	7.1	17.0	13.9	4.6	3.7	1.1	.1	806
21	2.7	2.0	1.4	3.5	1.9	5.1	4.7	3.6	4.0	8.4	12.0	8.2	20.0	14.5	4.6	2.0	1.2	.2	806
22	1.7	1.2	1.4	2.2	2.7	3.2	3.1	4.0	2.4	8.7	10.7	12.5	19.0	17.2	4.7	5.8	1.2	.1	806
23	1.5	1.5	1.2	1.0	.9	3.0	2.1	2.7	3.8	7.8	10.3	13.2	19.9	19.6	6.6	3.3	1.1	.5	806
24	1.5	1.5	.4	1.0	1.0	2.0	1.9	2.2	2.6	8.3	9.1	13.8	21.0	21.5	6.1	3.6	1.6	.7	806
TOTAL	4.1	3.0	1.8	2.2	2.0	3.7	3.2	3.4	4.8	8.5	8.7	8.7	13.8	16.7	7.5	5.7	1.3	.8	19344

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 400FOOT LEVEL-1955-1960 FOR																			APR
HOOR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	2.3	1.0	.6	.4	1.2	1.4	1.2	1.3	2.2	6.3	7.6	15.9	28.6	21.3	6.2	2.2	.4	.0	780
2	1.9	.8	.5	.6	.5	1.3	1.2	1.0	2.1	4.2	8.5	18.2	28.5	19.0	7.7	2.8	1.0	.3	780
3	1.7	.4	.8	1.2	.6	1.0	.6	.6	1.9	5.8	8.2	19.0	26.3	20.0	7.8	2.9	1.0	.1	780
4	1.2	1.0	.4	.5	1.4	.9	1.0	1.3	1.9	5.4	9.0	18.5	24.4	20.9	7.8	3.2	.4	.9	780
5	1.2	.6	.6	1.0	1.0	1.2	1.4	2.1	1.7	6.4	8.5	17.5	24.0	21.1	7.7	1.9	1.5	.6	779
6	1.5	1.3	1.0	.8	.8	1.8	1.4	1.8	1.8	4.7	9.0	19.4	22.1	20.9	5.9	2.6	2.7	.6	780
7	1.9	1.7	1.0	1.0	.4	1.4	1.7	2.6	1.7	5.0	9.4	14.9	22.6	21.8	7.1	2.7	2.6	.8	780
8	1.9	2.3	1.3	2.2	.9	1.9	1.0	1.8	2.9	5.5	8.7	8.3	21.9	20.5	8.1	7.3	2.4	.9	780
9	5.4	2.8	3.6	2.4	1.2	2.2	1.4	1.3	1.9	6.8	9.2	5.6	13.8	20.1	13.5	6.9	.6	1.2	780
10	5.9	6.4	3.7	4.6	1.8	2.4	1.5	1.5	3.5	7.1	8.5	5.3	9.8	13.1	10.6	11.4	.4	2.3	779
11	7.4	6.7	3.1	4.2	3.2	3.5	2.3	3.1	5.1	8.5	9.1	6.3	7.6	11.2	6.4	9.6	.3	2.4	779
12	8.5	5.5	4.5	3.5	2.7	4.2	4.2	3.9	5.5	11.3	7.8	5.4	9.5	9.0	4.2	8.3	.1	1.8	779
13	5.9	6.4	4.4	3.2	2.4	4.7	2.8	5.5	6.8	11.9	9.5	5.8	7.3	9.0	5.4	6.9	.0	2.1	780
14	6.8	5.1	3.3	3.8	2.4	4.4	2.9	5.0	7.1	12.1	11.4	4.6	9.4	7.2	4.6	7.2	.0	2.7	780
15	7.1	3.7	4.6	4.2	1.5	3.5	4.5	4.1	7.2	13.1	9.2	7.7	7.9	9.2	3.2	6.8	.1	2.3	780
16	6.0	6.0	4.0	4.1	2.4	4.6	3.5	3.5	7.1	11.2	8.8	6.3	10.6	11.3	3.3	6.0	.1	1.3	780
17	5.1	4.7	5.1	3.6	2.8	5.4	3.8	2.7	5.6	9.7	9.9	6.8	11.0	14.7	3.7	4.2	.3	.6	780
18	4.1	3.5	5.0	6.0	3.2	5.0	4.1	3.5	4.4	8.2	9.9	5.6	13.6	15.9	3.3	3.7	.6	.4	780
19	2.9	2.8	4.5	5.1	3.5	4.6	5.5	3.7	4.1	7.3	8.5	6.2	14.7	16.8	2.1	4.6	.9	.1	780
20	2.8	1.9	3.7	3.8	2.9	5.3	4.2	3.5	3.1	8.6	7.4	6.4	20.0	19.9	2.8	2.6	1.0	.0	780
21	2.7	2.2	2.8	2.4	2.4	4.0	3.8	2.8	3.1	6.8	8.7	7.7	28.7	16.8	2.7	1.8	.5	.0	780
22	2.1	1.5	1.9	1.8	1.8	3.1	2.6	2.2	2.7	7.9	8.2	11.5	29.0	18.1	2.9	1.8	.8	.1	780
23	1.4	1.8	.8	1.5	1.2	2.6	1.5	1.4	2.6	6.2	9.5	13.1	30.3	19.5	3.7	2.4	.5	.1	780
24	1.7	1.5	.8	.6	1.7	1.3	1.4	1.3	2.2	4.5	8.5	17.2	29.1	20.1	4.5	2.8	.8	.1	780
TOTAL	3.7	3.0	2.6	2.6	1.8	3.0	2.5	2.6	3.7	7.7	8.9	10.5	18.8	16.6	5.6	4.7	.8	.9	18716

TABLE 46. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 400FOOT LEVEL-1955-1980 FOR																	MAY		
HOURL	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	.4	.5	.7	.7	.1	.9	1.7	.9	.9	2.0	5.5	18.5	38.0	21.6	4.5	2.6	.5	.1	806
2	1.2	.7	.5	.4	.4	2.0	.9	.7	.5	2.6	6.7	17.0	37.1	21.3	5.5	1.9	.5	.1	806
3	1.2	1.2	.2	.6	.5	1.2	.7	1.4	1.4	2.5	7.9	17.6	33.7	21.8	5.7	1.7	.4	.0	806
4	.6	1.6	.5	.4	.4	1.0	1.2	.7	1.2	2.9	7.4	17.2	34.5	20.8	6.0	2.1	1.0	.4	806
5	.9	.6	.5	1.0	.9	.6	.9	.6	1.9	2.2	8.2	15.4	33.9	21.5	7.3	2.1	1.0	.6	806
6	.6	.4	1.0	.9	.5	1.1	1.5	1.5	.7	2.1	8.2	17.2	32.5	20.0	7.4	2.9	1.2	.2	806
7	1.2	1.2	.6	1.2	.6	1.9	1.2	1.1	.9	2.7	8.3	12.3	28.3	23.9	8.2	3.3	2.2	.6	806
8	3.5	2.4	1.1	1.6	.5	1.2	.9	1.1	1.7	3.7	7.4	8.3	17.6	27.2	11.3	8.2	1.5	.7	806
9	5.2	4.8	2.6	3.1	1.7	1.9	1.2	1.5	1.6	4.1	8.1	5.3	12.3	18.9	14.0	10.7	.2	2.7	806
10	7.3	5.2	3.8	2.7	3.1	3.2	2.4	3.0	2.9	8.9	6.2	5.6	9.2	11.9	7.8	11.7	.2	4.8	806
11	6.7	6.1	2.2	4.0	3.1	5.5	3.0	4.8	5.3	9.2	8.7	6.0	7.4	7.9	6.6	8.8	.1	4.6	806
12	8.0	5.7	2.7	2.9	4.2	5.3	3.5	5.6	5.6	12.3	8.8	6.1	6.6	8.0	4.2	5.8	.0	4.7	805
13	6.7	7.3	3.5	3.2	2.7	5.1	3.7	5.2	6.6	11.5	9.2	6.2	7.2	8.2	4.1	5.1	.1	4.3	806
14	6.8	6.5	4.6	3.0	2.4	5.8	2.5	3.4	7.1	12.0	10.8	5.7	7.5	8.6	4.1	4.8	.2	4.2	805
15	6.9	5.5	4.1	3.1	2.7	4.0	3.2	4.7	5.5	10.2	13.2	5.7	7.3	10.0	4.3	6.2	.2	3.1	806
16	6.7	6.4	4.2	3.2	2.5	5.6	1.9	4.3	4.2	10.5	10.9	6.2	6.3	15.3	3.0	5.8	.2	2.1	806
17	6.0	6.6	5.1	4.0	3.2	4.1	2.5	2.5	4.6	7.6	9.6	6.1	9.6	17.9	3.2	5.1	.5	1.6	806
18	4.7	5.6	6.3	4.2	3.5	4.2	3.6	3.1	3.6	6.0	8.7	4.2	10.3	23.4	2.6	4.3	.6	.7	806
19	3.8	4.0	4.6	5.3	3.8	5.0	4.3	2.5	3.5	4.6	6.3	5.5	13.8	25.8	2.9	3.1	1.0	.2	806
20	2.7	5.0	2.6	3.8	5.1	4.1	4.3	3.7	2.0	3.2	5.5	4.6	19.6	26.3	2.2	2.7	.2	.2	806
21	2.2	3.0	3.3	2.6	2.9	6.0	3.8	3.1	2.1	3.5	5.7	6.2	26.3	24.2	2.0	2.4	.4	.4	806
22	1.6	2.4	3.0	1.1	2.5	2.9	3.7	3.2	1.9	3.8	5.2	9.3	33.9	20.7	2.4	2.2	.1	.1	806
23	1.5	2.1	.9	1.0	1.6	2.0	2.6	1.5	1.4	2.0	6.1	13.6	37.8	20.6	3.0	1.5	.6	.2	806
24	1.1	.9	.7	.9	.7	1.2	2.1	1.2	1.1	2.1	6.2	15.9	39.5	19.6	3.5	2.7	.2	.1	805
TOTAL	3.7	3.6	2.5	2.3	2.1	3.2	2.4	2.6	2.8	5.5	7.9	9.8	21.3	18.6	5.2	4.5	.6	1.6	19341
PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 400FOOT LEVEL-1955-1980 FOR																	JUN		
HOURL	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	1.2	1.4	.3	.4	.3	.9	.6	.3	.4	1.4	5.5	14.2	40.8	26.4	2.6	2.3	.6	.5	780
2	1.4	.8	.1	.8	.1	.9	.0	.9	.4	.9	6.3	16.4	40.8	22.8	4.9	2.3	.3	.0	780
3	1.3	.9	.0	.3	.4	.3	.9	.5	.8	2.3	4.9	18.3	39.1	21.3	6.5	1.9	.3	.1	780
4	1.2	.5	.6	.0	.3	.5	.6	.5	.8	2.3	6.5	19.5	36.5	22.6	4.4	2.6	.3	.4	780
5	1.4	.4	.3	.1	.3	.8	.6	.4	1.2	2.2	9.1	20.3	32.2	21.4	4.9	3.7	.6	.3	780
6	1.2	.1	.4	.6	.6	1.2	.3	.5	1.8	2.8	7.4	16.9	34.6	21.0	5.4	3.1	1.4	.6	780
7	1.9	.9	.9	1.0	.5	1.2	.8	1.7	1.5	2.7	8.1	10.8	26.9	28.3	7.9	2.9	.9	1.0	780
8	3.7	2.1	.5	1.5	1.3	1.2	1.3	2.7	1.8	3.2	6.8	7.4	16.2	26.3	12.3	7.6	.6	1.5	780
9	8.7	3.7	2.6	1.3	2.2	2.2	2.1	1.5	3.0	5.5	6.2	5.5	10.8	19.9	10.8	10.4	.9	2.8	779
10	7.1	5.0	3.0	3.7	3.3	3.7	2.2	4.0	4.7	6.2	8.3	5.8	7.2	12.8	8.9	9.4	.1	4.6	779
11	5.5	6.9	2.2	4.0	3.6	6.3	5.0	3.6	6.2	10.0	7.8	5.1	7.6	9.2	5.6	7.1	.0	4.2	779
12	5.3	6.9	3.7	3.3	3.5	5.5	4.9	5.5	8.0	10.4	9.4	5.6	7.1	6.9	3.9	5.8	.0	4.4	779
13	5.4	5.1	4.1	2.9	4.1	4.5	2.8	6.0	7.2	14.0	9.5	6.4	5.3	6.8	5.5	5.3	.1	5.0	780
14	4.5	4.7	3.6	4.1	2.8	4.1	3.1	4.5	8.3	14.7	11.0	7.1	5.1	8.8	4.1	5.5	.0	3.6	780
15	5.4	5.9	3.7	3.2	2.2	4.0	3.1	4.1	7.2	12.3	10.9	6.7	7.4	11.5	3.1	4.2	.1	5.0	780
16	5.4	6.3	4.0	3.2	3.1	2.7	2.8	3.3	6.0	9.2	12.2	7.1	8.5	14.1	4.7	4.2	.0	3.2	780
17	4.7	6.3	4.1	4.5	3.1	3.5	2.7	4.0	2.8	7.6	9.7	7.6	6.7	21.8	4.4	4.7	.1	1.8	780
18	4.4	4.9	4.2	5.9	4.5	4.2	2.4	2.7	2.2	5.1	9.2	5.3	9.0	27.6	3.3	4.2	.1	.8	780
19	3.6	5.1	4.4	5.4	4.5	4.4	2.8	1.9	2.6	3.6	7.4	4.0	12.4	30.5	3.3	3.8	.0	.3	780
20	3.3	4.5	3.2	3.8	6.0	4.2	3.3	1.5	1.8	2.6	6.0	3.8	18.8	31.9	2.1	2.2	.5	.3	780
21	2.4	3.1	2.3	3.8	3.5	3.3	3.8	1.2	1.7	2.3	4.5	5.8	26.4	32.2	1.9	1.5	.3	.0	780
22	2.8	2.6	1.9	2.9	1.5	2.6	2.8	.9	1.7	2.6	4.2	7.2	34.4	29.2	1.3	1.2	.3	.0	780
23	1.4	1.8	1.3	1.4	1.2	1.5	1.7	.9	.8	1.7	5.1	9.1	38.3	29.4	2.2	1.3	.8	.3	780
24	1.9	.6	.9	.6	.5	1.0	1.0	.5	.6	2.2	3.8	11.5	39.6	29.6	2.7	1.8	.5	.4	780
TOTAL	3.5	3.4	2.2	2.5	2.2	2.7	2.2	2.2	3.1	5.3	7.5	9.5	21.3	21.4	4.9	4.1	.4	1.7	18716

TABLE 46. Continued

PERCENT FREQUENCY OF FOURLY WIND DIRECTION AT 400FOOT LEVEL-1955-1980 FOR																	JUL		
HOUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	.7	.4	.7	.4	.4	.4	.2	.6	.1	1.2	3.1	10.9	44.0	29.1	5.2	2.1	.2	.1	805
2	.6	.6	.5	.4	.1	.5	.0	.2	.6	1.5	3.4	12.2	44.1	27.3	5.2	2.5	.2	.0	805
3	.7	.7	.2	.5	.5	.0	.7	.6	.2	1.9	4.1	16.6	42.6	22.1	5.8	2.4	.1	.0	805
4	.9	.9	.4	.7	.2	.1	.5	.5	.6	1.5	4.8	17.8	42.4	19.8	6.0	2.4	.6	.0	805
5	.5	.6	.2	.4	.2	.5	.4	.6	.6	1.6	5.7	18.0	40.3	22.0	5.5	2.0	.7	.0	804
6	.2	.4	.1	.2	.7	.9	.5	.2	1.1	2.2	6.3	15.5	38.9	22.6	6.6	2.0	.6	.6	804
7	1.2	.7	.1	1.2	.5	1.0	.5	.6	1.1	3.4	4.7	9.4	33.0	31.1	6.2	3.2	1.5	.4	805
8	3.5	1.9	.5	.6	1.5	.6	1.4	2.5	.9	2.4	4.3	4.7	16.1	33.6	15.3	8.6	.4	1.4	806
9	9.4	5.7	3.2	1.4	1.9	1.9	1.6	2.6	1.4	2.9	4.7	2.5	8.2	19.5	16.6	12.9	.2	3.5	806
10	11.3	9.3	3.7	2.7	3.3	4.8	3.3	4.0	2.1	5.1	4.3	3.3	5.6	11.0	7.9	13.3	.1	4.6	806
11	9.3	7.7	3.5	5.1	6.1	6.2	4.0	5.3	4.6	7.2	6.7	3.8	3.8	7.4	4.1	9.1	.1	6.0	806
12	8.9	7.3	2.7	3.5	6.3	7.1	6.0	6.1	4.8	9.1	5.7	5.3	3.5	5.3	4.6	7.6	.0	6.2	806
13	6.8	7.7	5.5	5.7	3.5	7.3	4.2	6.1	5.6	10.9	9.2	5.0	3.7	5.6	3.3	5.8	.0	6.1	806
14	7.3	7.1	2.7	4.7	3.7	6.0	4.5	4.0	5.8	13.2	10.9	4.6	3.0	5.3	4.6	7.3	.0	4.2	806
15	7.1	6.3	4.7	3.8	3.5	4.0	4.1	4.2	3.2	12.2	13.2	6.2	4.7	7.3	4.5	6.7	.0	4.5	806
16	6.1	7.1	3.7	5.2	3.5	3.8	2.5	3.3	4.1	10.8	10.2	8.1	6.2	8.8	4.0	5.7	.1	4.6	806
17	7.7	6.0	4.5	7.1	3.3	3.7	2.9	1.9	2.7	8.6	11.5	7.7	6.3	14.6	3.0	6.0	.0	2.6	806
18	6.2	6.5	5.3	7.3	4.1	4.5	1.5	2.9	2.0	6.0	11.5	6.7	6.3	19.4	3.1	5.5	.0	1.4	806
19	4.8	5.8	5.6	6.6	5.6	5.3	1.4	1.6	1.9	4.0	8.3	6.0	9.8	25.9	3.0	4.3	.1	.0	806
20	4.1	4.7	3.6	5.8	5.8	5.2	2.2	1.2	.6	2.7	6.0	4.1	15.4	30.9	3.0	4.3	.2	.0	806
21	3.3	3.7	2.6	3.2	3.2	4.3	2.9	1.0	2.2	2.0	4.3	4.0	23.8	33.3	2.1	3.1	.9	.0	806
22	1.2	2.2	2.5	2.4	2.0	2.1	2.2	2.0	1.4	1.6	4.2	6.2	29.9	33.9	3.0	2.4	.7	.1	806
23	1.0	1.9	1.4	.7	.9	1.1	1.7	1.2	.7	2.0	3.2	7.7	39.4	31.8	2.2	2.0	.9	.1	805
24	1.2	1.4	.4	.4	.5	.6	.5	.7	1.1	.9	2.6	10.3	44.6	28.2	4.0	2.0	.5	.1	805
TOTAL	4.4	4.0	2.4	2.8	2.6	3.0	2.1	2.3	2.1	4.8	6.4	8.2	21.5	20.7	5.4	5.1	.4	1.9	19333

PERCENT FREQUENCY OF FOURLY WIND DIRECTION AT 400FOGT LEVEL-1955-1980 FOR																	AUG		
HOUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	.6	.4	.6	.1	.5	.5	.4	.5	.2	1.4	5.6	12.5	44.4	24.9	5.1	1.7	.1	.4	806
2	1.2	.4	.2	.1	.2	.1	.1	.5	.2	2.2	6.1	12.5	43.9	24.6	4.8	2.0	.4	.2	806
3	1.4	.1	.4	.1	.5	.2	.2	.2	.9	2.5	5.7	14.5	41.6	23.9	4.5	2.4	.5	.4	806
4	.9	.2	.4	.4	.2	.2	.4	.7	.9	2.6	5.8	15.9	41.1	22.5	5.0	1.7	.6	.5	806
5	.9	.1	.4	.2	.1	.4	.4	.6	1.1	2.0	6.6	17.0	39.3	23.4	4.5	2.0	.9	.1	806
6	.9	.4	.0	.4	.1	.5	.7	.5	.7	2.1	5.7	16.9	37.1	24.4	6.1	1.7	1.5	.2	806
7	.6	.1	.0	.2	.6	1.0	.6	.5	1.4	2.2	4.5	12.7	35.2	28.9	7.9	1.7	1.6	.1	806
8	2.2	1.2	.9	.7	.6	1.2	.7	1.2	2.2	2.6	4.3	7.3	19.2	34.4	13.3	5.1	1.6	1.0	806
9	5.6	3.8	1.9	2.2	.9	2.1	1.7	1.9	1.7	3.7	2.6	4.2	9.2	23.6	16.4	16.3	.2	1.7	806
10	10.2	7.8	4.2	3.8	3.8	4.2	1.7	2.7	2.6	5.3	3.6	4.3	5.1	11.4	10.9	14.1	.6	3.3	806
11	8.8	8.3	5.3	5.5	4.6	5.2	4.2	5.0	3.3	6.3	4.0	4.5	6.0	7.8	6.3	9.2	.0	5.7	806
12	7.3	7.4	3.6	4.0	5.7	7.2	4.2	5.5	5.8	7.3	5.5	3.1	5.1	6.0	4.8	9.7	.1	7.4	806
13	7.8	6.7	4.5	3.8	4.5	7.4	4.6	5.2	5.2	10.9	7.6	4.0	4.0	6.1	5.1	7.2	.0	5.5	806
14	7.9	6.7	4.1	5.0	3.3	5.2	4.0	5.2	7.3	12.4	8.3	5.1	4.0	5.2	3.6	6.8	.0	5.8	806
15	5.5	6.7	4.3	5.7	3.3	4.2	3.3	5.0	6.5	13.0	10.7	3.6	4.7	7.8	4.5	7.1	.0	4.1	806
16	7.4	6.8	3.6	4.7	2.6	5.5	2.2	3.1	5.3	11.8	10.9	5.2	5.3	12.7	3.0	6.0	.0	3.6	806
17	6.9	5.3	4.2	6.2	3.8	4.8	2.5	2.6	3.7	6.6	12.3	6.1	7.3	14.9	4.2	6.0	.1	2.4	806
18	5.6	6.5	4.3	5.8	5.7	5.8	2.6	1.9	3.0	6.2	10.4	5.7	7.1	19.4	4.1	4.8	.2	.6	806
19	4.3	4.6	4.7	6.0	6.2	6.6	3.8	2.9	2.7	3.6	6.1	4.7	12.4	23.6	2.7	4.1	.6	.4	806
20	2.2	3.2	3.3	4.1	4.5	6.8	6.5	2.2	2.4	3.1	6.3	4.0	17.0	27.0	1.9	4.2	1.1	.1	806
21	2.0	2.7	2.0	3.1	2.0	4.3	5.8	2.4	1.7	3.1	6.2	6.3	26.1	25.8	2.7	2.5	1.0	.2	806
22	2.0	1.2	1.2	1.1	1.4	1.7	3.1	2.4	1.0	3.3	5.0	9.4	33.1	28.9	2.5	1.7	.9	.0	806
23	1.0	.9	.5	.7	.5	.4	1.1	1.6	.9	1.5	6.3	11.0	42.3	26.4	2.6	1.5	.5	.2	806
24	.6	.6	.6	.2	.4	.5	.7	.4	.7	1.1	5.6	11.8	44.2	27.7	2.6	2.2	.0	.0	806
TOTAL	3.9	3.4	2.3	2.7	2.3	3.2	2.3	2.3	2.6	4.9	6.5	8.4	22.3	20.1	5.4	5.1	.5	1.6	19344

TABLE 46. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 400FOOT LEVEL-1955-1980 FOR																			SEP
FLOOR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	2.3	.3	.8	.4	.6	.5	.6	.9	1.4	2.4	5.5	11.7	31.7	27.6	9.0	3.1	.4	.6	780
2	1.9	.6	.3	.5	.1	1.0	.8	.5	1.5	2.3	5.9	12.1	32.8	26.0	8.1	3.8	1.5	.1	780
3	1.8	.5	.1	.5	.1	.6	.8	1.0	1.3	2.1	6.5	13.1	30.4	27.6	8.1	3.3	1.3	.4	780
4	1.9	.5	.3	1.0	.0	1.2	.6	1.0	1.2	2.6	7.3	12.9	27.9	26.3	9.4	3.6	1.8	.5	780
5	2.7	.5	.3	.4	.5	1.0	1.2	.6	1.5	3.3	5.0	14.4	26.2	25.9	10.0	3.3	2.4	.8	780
6	2.6	.6	.1	.3	.6	1.2	1.0	1.3	2.1	2.2	5.0	14.5	25.8	25.4	9.5	4.4	2.4	1.0	780
7	2.9	.9	.5	.6	1.2	2.1	1.2	1.0	1.0	3.3	5.1	14.4	21.9	25.0	11.9	3.7	2.7	.4	780
8	2.9	1.5	1.3	1.7	1.0	2.1	1.3	1.7	1.3	3.2	5.9	8.5	21.2	24.4	12.6	5.5	3.3	.8	780
9	5.6	4.4	2.3	2.1	2.1	2.3	1.7	1.4	1.0	3.5	5.8	4.4	9.1	24.7	16.4	10.9	1.4	1.0	780
10	10.5	7.8	2.3	4.6	3.7	2.6	1.9	1.2	1.4	3.7	4.9	3.5	6.5	12.6	15.0	14.5	.9	2.2	780
11	10.0	8.5	4.7	6.4	4.1	3.7	1.9	2.6	2.1	4.2	6.2	3.2	9.6	10.3	15.4	.5	3.5	.5	780
12	10.3	8.6	4.4	6.2	5.0	4.9	2.2	3.5	3.1	5.6	6.7	2.4	4.0	8.3	7.3	13.7	.6	3.3	780
13	9.7	8.5	4.2	4.6	6.5	6.8	3.5	2.8	5.0	6.9	6.5	2.9	4.0	7.1	6.5	11.4	.1	2.8	780
14	10.1	7.6	4.7	4.2	5.1	7.7	2.6	3.1	4.4	10.3	6.5	2.9	4.7	7.2	4.7	10.0	.1	4.0	780
15	10.4	7.9	4.5	4.2	4.7	5.9	3.5	3.2	5.4	9.2	7.4	3.1	4.7	7.7	4.7	10.6	.0	2.7	780
16	9.7	9.4	5.0	5.6	5.5	5.4	2.9	2.7	3.3	8.5	8.8	4.4	3.8	10.5	4.7	7.7	.0	1.9	780
17	10.9	7.8	4.5	7.8	5.4	5.8	2.8	4.0	2.9	6.7	7.2	4.2	4.7	13.8	4.4	5.6	.6	.8	780
18	5.9	6.4	4.9	6.8	5.9	7.1	4.6	3.2	3.2	4.9	5.9	5.3	6.3	16.4	2.8	6.5	1.5	.4	780
19	4.6	4.6	3.2	5.3	5.6	7.4	6.8	3.2	3.2	4.6	7.4	5.0	12.2	18.2	3.3	4.0	1.0	.3	780
20	4.9	2.4	2.7	3.3	2.6	6.7	6.0	4.4	3.6	5.8	7.3	5.8	16.5	19.4	3.3	3.2	2.2	.0	780
21	3.2	2.4	2.4	1.7	1.0	4.1	6.2	2.6	2.2	3.6	9.0	11.2	20.1	22.9	3.8	1.8	1.5	.3	780
22	1.4	2.2	1.8	1.0	.9	2.2	2.9	2.1	1.9	4.4	8.6	11.9	25.6	23.6	5.1	2.6	1.4	.4	780
23	1.9	1.4	1.4	.6	.3	.9	1.8	1.7	1.7	5.4	5.5	10.9	33.5	23.5	6.0	2.9	.5	.1	780
24	1.9	.9	.6	.5	.5	.5	1.2	.6	1.5	3.7	6.2	12.4	31.0	25.3	9.0	3.2	.6	.3	780
TOTAL	5.4	4.0	2.4	2.9	2.6	3.5	2.5	2.1	2.4	4.7	6.5	8.1	17.1	19.1	7.8	6.5	1.2	1.2	18720

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 400FOOT LEVEL-1955-1980 FOR																			OCT
FLOOR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	1.1	1.2	.5	1.2	1.2	1.2	2.4	1.2	2.4	4.2	6.6	11.2	20.0	27.3	10.5	3.0	3.8	.9	806
2	1.7	.7	.5	.6	1.5	2.0	1.9	2.2	2.4	4.8	6.8	10.3	19.6	28.5	8.6	3.3	4.0	.2	806
3	1.2	.6	.9	.9	.9	3.1	1.5	1.6	2.6	6.0	5.3	9.7	21.6	26.9	8.8	3.6	4.3	.5	806
4	1.5	1.2	.9	1.5	1.0	3.0	2.2	2.6	2.2	4.0	7.1	9.3	20.1	27.2	8.9	3.8	3.0	.5	806
5	2.0	.9	1.6	1.7	1.0	2.4	2.6	1.6	2.2	4.1	6.1	9.2	20.6	25.4	8.7	4.7	4.6	.6	806
6	1.9	1.4	.4	2.0	1.5	2.4	2.2	2.5	1.5	4.6	5.5	9.6	20.5	23.4	10.3	5.7	4.5	.4	806
7	1.7	1.0	1.1	1.6	1.6	2.6	1.1	3.7	1.7	4.3	6.8	9.4	19.2	22.7	12.0	4.6	3.8	.7	806
8	2.4	1.7	2.0	1.6	1.9	2.4	1.7	2.1	3.0	4.6	7.1	9.8	17.0	24.2	9.6	4.2	4.0	.9	806
9	4.0	2.4	1.5	2.2	.9	3.1	2.0	2.1	3.0	5.2	5.5	6.6	12.9	23.7	12.5	6.3	4.7	1.5	806
10	6.0	4.3	2.7	3.5	2.9	2.5	2.2	2.4	2.9	4.1	4.6	4.5	7.9	19.1	13.6	10.9	3.2	2.7	806
11	8.7	6.8	4.1	4.7	3.7	3.5	2.1	2.4	3.5	4.3	5.6	2.2	6.3	12.8	14.0	10.9	2.0	2.4	806
12	8.6	7.8	4.2	5.3	6.8	5.1	2.0	2.2	4.0	5.2	6.2	2.2	4.6	9.7	9.4	12.5	1.9	2.2	806
13	10.0	7.9	5.0	6.3	5.6	6.9	2.4	2.9	3.5	6.9	6.7	2.7	4.2	7.3	7.4	12.0	.7	1.4	806
14	9.3	7.3	4.7	6.2	6.7	7.7	3.2	2.2	4.3	7.7	7.1	2.5	3.2	6.6	7.6	10.7	.6	2.4	806
15	7.7	7.9	4.5	5.6	6.8	8.7	3.1	2.5	4.6	7.4	5.8	2.6	4.0	8.1	8.4	10.2	1.0	1.1	806
16	7.9	5.8	5.1	6.5	8.4	8.2	2.4	3.2	3.3	7.7	7.2	2.5	5.1	10.3	6.7	8.3	1.0	.4	806
17	6.1	4.1	4.2	7.7	5.6	9.8	4.1	2.2	3.8	6.8	7.8	2.9	6.8	12.9	5.6	5.1	3.7	.5	806
18	3.7	3.5	1.7	5.2	6.0	9.3	6.1	3.6	3.3	7.4	5.7	5.6	9.7	15.3	3.8	4.5	5.1	.5	806
19	2.4	2.0	2.1	2.6	4.0	9.6	6.8	3.1	4.5	6.2	7.1	6.5	14.1	16.1	4.5	4.1	4.1	.4	806
20	1.6	1.7	1.6	2.4	2.0	7.9	6.5	3.6	3.8	6.6	7.3	9.7	17.2	17.6	3.2	3.3	3.6	.2	806
21	1.6	.9	1.4	1.4	1.4	4.5	6.0	2.1	4.1	5.1	8.2	11.3	22.5	20.0	4.1	2.6	2.5	.6	806
22	1.5	.9	1.5	.9	1.7	1.5	4.0	2.2	3.0	4.8	6.9	12.8	21.6	24.7	5.5	2.6	3.5	.5	806
23	2.1	.5	.9	.7	1.0	2.2	1.5	1.9	3.0	3.5	7.8	10.9	22.1	25.4	8.6	4.0	3.7	.2	806
24	1.5	1.6	.4	.9	1.2	1.4	2.2	1.6	2.6	4.0	7.3	10.0	21.7	26.1	9.3	4.6	3.2	.4	806
TOTAL	4.0	3.1	2.2	3.1	3.1	4.6	3.0	2.4	3.1	5.4	6.6	7.2	14.3	19.2	8.4	6.1	3.2	.9	19344

TABLE 46. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 400FOOT LEVEL-1955-1980 FOR																	NOV			
FOUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL	
1	2.8	1.5	1.5	1.5	1.8	3.1	3.3	2.7	4.1	4.7	7.2	8.7	11.2	23.6	10.4	5.5	5.5	.8	780	
2	3.5	1.2	1.2	2.3	1.9	4.6	2.7	2.3	4.7	3.8	6.0	9.1	11.5	22.8	10.1	5.6	5.5	1.0	780	
3	2.9	1.7	1.2	2.3	2.7	2.7	3.6	3.1	4.6	5.4	5.9	7.8	10.8	23.6	10.5	5.3	5.5	.5	780	
4	3.1	.9	1.4	2.7	2.7	4.2	2.9	2.8	4.0	5.0	4.9	9.2	10.6	22.7	9.1	6.3	5.5	1.9	780	
5	2.8	1.5	1.9	2.3	1.7	4.1	3.2	4.1	4.0	4.4	6.8	8.2	9.5	22.8	10.4	5.8	5.8	.8	780	
6	2.8	1.0	1.9	2.3	2.2	4.6	2.4	2.9	4.2	4.4	6.4	8.6	11.0	21.7	10.4	6.5	5.5	1.0	780	
7	2.7	1.8	.8	1.5	2.3	4.1	2.7	2.7	4.7	4.1	5.3	7.6	11.5	23.6	10.8	6.8	6.0	1.0	780	
8	3.1	1.9	1.4	2.3	1.8	3.5	4.1	2.6	3.3	5.3	4.2	7.2	13.7	21.5	10.8	7.1	5.1	1.2	780	
9	3.6	3.3	1.7	2.7	2.2	4.5	1.9	2.3	4.1	4.2	4.9	9.9	10.3	21.1	11.6	6.5	4.5	1.4	779	
10	4.6	2.6	2.3	2.7	1.7	4.0	2.3	3.0	3.2	5.4	4.4	6.3	8.1	23.7	9.2	7.7	7.4	1.4	779	
11	6.7	3.5	2.6	3.5	3.1	3.1	2.2	2.2	4.0	6.8	4.7	4.5	6.0	18.1	12.7	8.6	6.2	1.8	779	
12	6.8	4.9	3.5	2.7	4.2	4.4	2.2	2.3	4.1	5.9	5.9	3.0	6.5	14.8	13.0	9.2	4.6	2.1	779	
13	7.1	5.9	4.1	4.6	5.1	3.7	2.2	3.1	4.0	5.9	5.5	3.2	4.9	14.1	13.0	9.1	2.7	1.8	779	
14	7.3	6.5	4.0	5.1	5.6	5.4	1.7	3.0	3.3	7.1	5.0	3.0	5.4	13.0	9.9	9.8	3.2	1.8	779	
15	8.5	6.9	3.7	5.6	4.7	6.0	2.7	2.9	3.1	6.9	6.0	2.4	5.0	12.4	9.7	7.4	4.7	1.0	780	
16	5.0	5.6	3.5	6.4	4.0	5.9	3.6	3.1	3.7	7.1	5.1	4.4	5.8	14.2	8.7	6.0	7.1	.8	780	
17	3.8	3.2	2.6	4.1	4.7	6.2	3.8	4.2	3.8	5.8	5.9	4.0	8.7	16.3	6.8	7.6	7.7	.8	780	
18	3.7	2.7	1.4	3.7	3.2	6.5	4.5	4.4	3.1	6.4	6.9	6.0	10.9	17.2	7.4	4.9	6.3	.8	780	
19	3.7	2.4	1.5	2.7	3.1	4.9	4.0	4.4	3.7	5.8	8.2	6.5	11.7	18.3	6.4	5.5	6.7	.5	780	
20	2.6	1.5	1.8	2.3	2.4	4.2	4.0	4.7	3.3	6.3	5.3	10.8	14.4	19.1	7.2	4.6	5.0	.5	780	
21	2.4	1.3	1.7	2.1	2.8	3.7	3.3	3.3	4.1	6.0	5.9	10.0	13.2	20.9	8.6	5.5	4.4	.8	780	
22	2.6	1.5	1.7	2.1	1.2	3.6	2.8	2.3	4.2	5.5	5.4	10.1	13.7	21.8	9.4	5.0	6.3	.9	780	
23	2.4	1.7	.6	2.3	1.7	2.7	2.4	3.1	3.7	5.4	5.5	8.6	12.3	25.1	8.3	6.4	6.9	.8	780	
24	1.9	1.7	1.0	1.7	2.1	3.1	2.6	4.1	4.1	5.0	6.5	6.8	11.7	24.1	11.5	5.8	5.6	.8	780	
TOTAL	4.0	2.8	2.0	3.0	2.9	4.3	3.0	3.1	3.9	5.5	5.7	6.9	9.9	19.9	9.8	6.6	5.6	1.1	18714	
PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 400FOOT LEVEL-1955-1980 FOR																	DEC			
FOUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL	
1	1.4	1.5	1.0	1.7	1.4	3.8	2.6	3.0	3.5	7.6	7.1	7.7	14.1	20.7	9.9	5.1	6.5	1.0	806	
2	2.2	2.5	1.4	2.5	1.6	3.0	2.1	3.3	3.8	6.2	7.1	9.2	11.3	22.0	8.7	5.7	6.7	.7	806	
3	1.2	1.4	1.6	2.1	2.1	4.5	2.9	2.5	3.5	7.6	6.0	9.8	12.3	20.7	8.4	5.3	6.8	1.4	806	
4	2.2	2.0	1.7	1.6	1.7	3.6	3.1	3.7	4.0	6.2	5.6	9.1	11.4	20.6	10.3	4.3	7.4	1.4	806	
5	2.0	1.9	1.6	1.7	1.9	3.5	3.2	3.1	3.6	5.3	7.3	9.4	10.4	22.8	10.7	5.1	5.6	.9	806	
6	2.6	1.5	1.7	2.0	1.1	3.6	2.9	2.5	4.2	5.2	6.8	8.4	10.3	22.7	9.7	6.5	7.2	1.1	806	
7	3.4	1.1	2.2	2.0	2.2	3.4	2.1	4.1	3.0	5.7	6.1	7.8	13.0	19.6	10.4	6.1	6.6	1.1	805	
8	3.1	1.9	2.0	2.2	2.5	3.6	2.4	3.6	3.6	5.3	4.5	9.1	11.3	21.8	10.0	4.7	6.9	1.5	806	
9	2.9	1.2	1.1	2.2	2.5	3.1	2.9	2.6	5.0	5.2	5.5	6.9	12.8	20.5	9.6	7.4	7.3	1.4	806	
10	3.2	1.0	1.1	2.2	2.2	5.3	1.9	2.6	3.1	6.2	6.3	7.7	10.9	22.0	11.2	4.6	7.4	1.0	806	
11	2.6	2.6	2.0	2.4	2.0	4.3	2.4	2.2	4.6	5.5	6.5	6.7	10.7	20.4	10.8	6.0	5.7	2.7	805	
12	4.1	3.6	1.9	2.2	2.9	3.6	3.5	2.4	4.8	5.3	5.6	5.7	6.3	22.6	10.2	7.7	6.2	1.4	805	
13	5.7	4.1	2.6	3.1	3.5	4.1	2.7	1.4	4.3	5.8	5.6	4.7	6.1	18.8	12.4	7.2	6.0	1.9	805	
14	5.5	2.4	4.5	4.5	3.6	4.3	1.7	3.1	4.3	6.2	5.6	5.2	6.5	16.6	9.7	7.5	7.7	1.1	805	
15	5.6	4.3	3.5	4.2	4.3	5.3	2.5	2.1	4.3	7.2	5.2	4.6	6.1	15.7	10.1	5.6	7.7	1.6	805	
16	4.2	4.0	3.0	5.0	4.2	5.7	2.2	3.8	2.7	8.9	4.5	4.7	6.0	18.7	8.9	5.3	7.1	1.0	806	
17	3.7	3.4	2.4	4.0	4.8	5.2	3.0	3.7	3.7	7.8	6.0	4.0	9.4	17.4	8.8	4.2	7.5	1.0	805	
18	3.2	2.0	2.5	3.6	3.3	5.0	3.6	3.0	3.6	7.1	6.3	5.8	11.9	18.1	7.6	5.3	7.6	.5	806	
19	2.0	1.7	2.2	2.0	2.6	4.6	3.2	3.1	4.5	7.1	5.8	6.7	13.3	19.4	8.2	5.1	6.9	1.6	806	
20	2.4	2.0	1.6	2.4	2.4	3.7	3.1	2.9	4.2	6.9	6.1	6.7	14.8	20.5	8.1	5.1	6.6	.7	806	
21	2.2	1.9	1.0	2.0	2.0	3.0	3.1	2.7	3.2	6.8	5.8	7.7	13.0	25.0	7.3	5.2	6.9	1.1	807	
22	2.2	2.0	.9	1.7	2.2	3.8	2.5	1.9	4.1	5.6	8.7	6.9	14.4	21.7	8.4	5.2	7.2	.5	806	
23	2.4	1.7	1.4	1.6	1.6	3.0	2.2	3.7	4.8	5.2	8.9	7.6	12.9	20.6	9.8	5.0	6.2	1.4	806	
24	2.1	1.6	.6	1.0	1.4	3.1	3.1	2.6	4.0	6.6	7.7	7.7	11.9	23.4	9.7	5.0	7.5	1.1	805	
TOTAL	3.0	2.2	1.9	2.5	2.5	4.0	2.7	2.9	3.9	6.4	6.3	7.1	10.9	20.5	9.5	5.6	6.9	1.2	19337	

TABLE 46. Continued

PERCENT FREQUENCY OF HOURLY WIND DIRECTION AT 400 FOOT LEVEL-1955-1980 FOR ANNUAL

FCUR	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
1	1.8	1.1	.8	.9	1.0	1.6	1.7	1.5	1.9	4.2	6.4	12.0	26.7	24.4	7.5	3.3	2.6	.5	9494
2	1.9	1.0	.6	1.0	.9	1.9	1.5	1.5	2.4	3.9	6.5	12.3	26.2	24.0	7.7	3.6	2.7	.4	9494
3	1.6	1.1	.7	1.1	1.1	1.8	1.6	1.7	2.2	4.6	6.1	13.2	25.4	23.2	8.0	3.5	2.8	.5	9494
4	1.7	1.2	.8	1.1	1.0	1.8	1.7	1.9	2.2	4.1	6.4	13.6	24.8	22.6	7.9	3.8	2.8	.7	9494
5	1.6	1.0	.9	1.1	1.0	1.8	1.8	1.7	2.4	4.0	6.9	13.4	23.6	22.9	8.2	3.8	3.1	.5	9492
6	1.6	.9	.4	1.2	1.1	2.1	1.6	1.7	2.3	3.9	6.8	13.3	22.8	22.7	8.3	4.4	3.5	.7	9493
7	2.1	1.1	.9	1.3	1.2	2.1	1.6	2.2	2.4	4.2	6.6	10.7	21.5	24.0	9.4	4.4	3.4	.6	9493
8	3.0	1.8	1.1	1.6	1.2	2.1	1.8	2.3	2.7	4.5	6.2	8.3	16.3	25.4	11.2	6.3	3.2	1.1	9495
9	5.0	3.2	2.0	2.0	1.6	2.6	2.1	2.1	2.9	5.0	6.0	6.2	11.4	21.8	12.9	8.8	2.8	1.7	9493
10	6.5	4.9	2.8	3.1	2.6	3.4	2.1	2.8	3.1	6.1	5.9	5.5	8.1	16.9	10.8	9.9	2.8	2.7	9492
11	6.9	5.8	3.2	4.1	3.4	4.4	2.9	3.3	4.2	7.1	6.6	4.7	6.6	13.3	9.2	8.9	2.0	3.1	9492
12	7.4	6.1	3.4	3.6	4.2	4.8	3.4	3.9	5.1	8.0	6.7	4.3	6.0	11.7	7.7	6.8	1.7	3.3	9491
13	7.2	6.2	3.4	3.9	4.1	5.2	2.9	3.9	5.5	9.2	7.4	4.2	5.5	10.7	7.7	8.2	1.3	3.0	9494
14	7.3	5.7	3.8	4.3	3.9	5.2	2.9	3.6	5.8	10.2	8.1	4.5	5.6	9.7	6.7	8.3	1.5	2.8	9493
15	7.1	6.0	4.0	4.4	3.8	5.2	3.1	3.6	5.2	9.9	8.5	4.6	5.8	10.7	6.4	7.6	1.7	2.5	9495
16	6.8	6.1	3.8	4.7	3.9	5.5	2.8	3.3	4.7	9.4	8.3	5.0	6.2	13.1	5.6	6.7	2.1	1.9	9496
17	6.0	5.0	3.9	5.0	3.9	5.5	3.3	3.1	4.0	7.9	8.4	5.2	7.7	15.8	5.4	5.8	2.8	1.2	9495
18	4.5	4.3	3.6	5.0	4.0	5.8	3.9	3.1	3.5	7.1	8.0	5.4	9.6	18.7	4.7	5.2	3.0	.6	9496
19	3.5	3.5	3.3	4.0	4.0	5.8	4.3	3.0	3.8	6.1	7.4	5.6	12.2	20.9	4.8	4.7	2.8	.4	9496
20	2.8	2.8	2.5	3.2	3.4	5.2	4.5	3.1	3.1	5.8	6.8	6.5	16.6	22.4	4.5	4.0	2.5	.3	9496
21	2.5	2.2	2.0	2.5	2.2	4.1	4.2	2.4	2.9	5.1	7.1	8.0	20.8	23.3	4.8	3.0	2.5	.4	9497
22	2.0	1.7	1.6	1.8	1.9	2.7	2.9	2.3	2.5	5.1	6.8	9.6	23.6	23.9	5.2	3.1	2.7	.4	9496
23	1.9	1.5	1.0	1.3	1.2	2.1	1.9	1.9	2.5	4.4	6.9	10.4	26.5	24.0	6.0	3.3	2.7	.5	9495
24	1.7	1.3	.7	.9	1.1	1.7	1.8	1.8	2.1	4.3	6.5	11.2	26.9	24.6	6.7	3.6	2.7	.4	9493
TOTAL	4.0	3.1	2.2	2.6	2.4	3.5	2.6	2.6	3.3	6.0	7.0	8.2	16.1	19.6	7.4	5.5	2.6	1.3	227659

TABLE 47. Monthly and Annual Percent Frequency of Hourly Wind Speed Class and Average Speed, 50-Foot Level, 1955 Through 1980

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
50-FOOT LEVEL-- JAN

	SPEED CLASS										TOTAL SPEED	AVG SPEED
FOUR	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	4.59	32.88	30.65	21.22	7.44	2.23	.62	.37	.00	.00	5046	6.3
2	5.46	29.78	34.86	19.60	7.32	1.49	.87	.37	.25	.00	4958	6.2
3	6.20	31.27	33.50	19.73	6.33	1.36	.99	.62	.00	.00	4857	6.0
4	6.20	32.26	32.88	19.73	5.58	1.86	1.12	.37	.00	.00	4783	5.9
5	5.46	31.76	34.74	19.11	5.71	1.74	1.36	.12	.00	.00	4768	5.9
6	6.58	30.89	34.49	17.99	6.33	2.36	.99	.37	.00	.00	4831	6.0
7	6.33	34.99	29.28	19.85	5.96	2.61	.50	.50	.00	.00	4740	5.9
8	5.96	32.51	34.62	17.37	6.33	2.61	.37	.12	.00	.12	4689	5.8
9	6.33	33.50	33.62	16.87	6.45	2.11	.74	.25	.00	.12	4657	5.8
10	6.70	35.73	29.16	17.87	6.20	2.98	.99	.25	.00	.12	4737	5.9
11	4.71	35.11	28.54	18.24	8.56	3.23	1.24	.25	.00	.12	5123	6.4
12	3.47	35.61	28.78	17.49	8.44	3.47	2.11	.50	.12	.00	5443	6.8
13	2.48	36.85	28.29	16.75	8.06	4.22	2.36	.74	.25	.00	5641	7.0
14	3.10	35.61	27.92	17.74	8.93	4.09	1.99	.25	.37	.00	5568	6.9
15	2.73	36.35	27.92	17.87	7.69	5.09	1.86	.25	.25	.00	5497	6.8
16	4.71	35.24	29.03	16.75	8.56	3.85	1.49	.37	.00	.00	5157	6.4
17	6.95	30.02	31.27	19.98	7.20	3.10	1.24	.25	.00	.00	5064	6.3
18	7.07	25.81	33.50	21.84	8.31	2.11	.99	.37	.00	.00	5205	6.5
19	5.83	24.94	31.89	24.57	8.06	3.47	.99	.25	.00	.00	5465	6.8
20	5.33	25.31	33.62	22.46	8.56	2.61	1.74	.12	.25	.00	5572	6.9
21	5.58	26.92	32.26	22.33	8.44	2.98	1.24	.12	.12	.00	5417	6.7
22	5.46	29.90	30.77	22.46	7.07	3.23	.74	.37	.00	.00	5238	6.5
23	6.08	30.40	30.27	22.83	7.07	2.36	.50	.50	.00	.00	5052	6.3
24	5.63	30.89	32.38	20.22	7.57	1.99	.74	.37	.00	.00	4989	6.2
TOTAL	5.38	31.85	31.43	19.62	7.34	2.80	1.16	.34	.07	.02	122497	6.3

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
50-FOOT LEVEL-- FEB

	SPEED CLASS										TOTAL SPEED	AVG SPEED
FOUR	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	3.81	24.49	32.24	28.30	7.48	2.59	1.09	.60	.00	.00	5123	7.0
2	4.76	23.81	32.11	28.64	6.39	3.27	.82	.00	.00	.00	5013	6.8
3	4.63	25.31	32.65	25.85	7.76	2.72	.82	.27	.00	.00	4976	6.8
4	3.95	27.62	31.97	24.90	7.89	2.86	.54	.14	.14	.00	4897	6.7
5	4.63	27.48	32.38	25.58	6.53	2.59	.54	.27	.00	.00	4845	6.6
6	3.95	28.16	34.83	23.13	6.80	2.45	.27	.41	.00	.00	4700	6.4
7	4.49	29.12	33.61	23.67	6.53	1.77	.68	.14	.00	.00	4590	6.2
8	4.22	30.75	33.61	23.54	4.90	2.18	.54	.27	.00	.00	4511	6.1
9	4.63	33.33	28.71	21.22	7.76	2.72	1.63	.00	.00	.00	4689	6.4
10	2.45	33.88	27.35	20.68	10.61	2.86	1.36	.82	.00	.00	5082	6.9
11	1.90	33.74	28.84	18.91	10.07	3.40	2.59	.41	.14	.00	5292	7.2
12	.95	32.38	31.97	16.87	10.61	4.35	1.77	.95	.14	.00	5446	7.4
13	.68	32.65	29.25	16.60	12.79	4.35	2.59	.82	.27	.00	5764	7.8
14	.82	31.16	28.84	17.28	12.65	5.03	3.13	.95	.14	.00	5986	8.1
15	1.90	28.16	30.48	17.14	12.93	4.49	3.95	.68	.27	.00	6032	8.2
16	1.22	30.48	25.44	20.95	12.93	4.63	3.27	.82	.27	.00	6048	8.2
17	4.08	25.58	30.34	20.54	11.29	5.44	1.77	.82	.14	.00	5772	7.9
18	3.81	21.36	36.60	22.18	10.07	3.67	1.63	.54	.14	.00	5552	7.6
19	2.31	19.59	35.24	26.39	11.02	3.40	1.77	.27	.00	.00	5720	7.8
20	2.31	19.86	32.38	28.84	11.56	3.27	1.77	.00	.00	.00	5727	7.8
21	3.27	17.96	32.79	30.88	10.48	3.27	1.36	.00	.00	.00	5686	7.7
22	4.35	20.14	31.70	29.39	10.61	2.72	1.09	.00	.00	.00	5478	7.5
23	3.27	23.13	29.80	30.88	9.12	2.59	1.09	.14	.00	.00	5355	7.3
24	3.27	22.31	31.56	31.84	7.35	2.72	.82	.00	.14	.00	5324	7.2
TOTAL	3.15	26.77	31.45	23.93	9.42	3.30	1.54	.36	.07	.00	127608	7.2

TABLE 47. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
50-FOOT LEVEL-- MAR

FREQ	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.62	14.52	33.13	37.34	10.79	2.61	.50	.37	.00	.12	6564	8.1
2	1.49	16.38	34.00	33.13	11.54	2.48	.50	.50	.00	.00	6424	8.0
3	.87	17.87	34.24	33.25	9.93	2.48	1.24	.12	.00	.00	6308	7.8
4	1.24	20.72	33.13	32.63	9.31	2.11	.74	.12	.00	.00	5968	7.4
5	1.86	21.96	32.26	31.14	9.68	2.61	.25	.25	.00	.00	5861	7.3
6	2.48	21.46	34.86	29.53	8.31	2.73	.50	.12	.00	.00	5751	7.1
7	2.23	24.44	34.86	27.05	8.68	2.23	.37	.12	.00	.00	5555	6.9
8	1.74	29.53	33.37	20.35	11.66	2.85	.50	.00	.00	.00	5491	6.8
9	1.49	26.43	31.27	21.22	13.65	4.71	1.12	.12	.00	.00	6163	7.6
10	.87	29.16	28.16	18.36	15.14	6.08	1.99	.25	.00	.00	6564	8.1
11	.62	28.41	29.65	17.25	14.39	5.21	3.60	.74	.12	.00	6839	8.5
12	.25	24.57	33.37	16.75	13.52	6.70	3.85	.99	.00	.00	7148	8.9
13	.00	19.60	36.10	17.62	13.65	8.31	3.35	1.12	.25	.00	7492	9.3
14	.12	17.12	36.48	17.37	14.89	8.56	4.34	.87	.12	.12	7860	9.8
15	.00	15.01	34.00	20.97	14.14	10.05	4.84	.87	.12	.00	8177	10.1
16	.25	16.75	30.89	20.72	13.90	11.66	5.21	.62	.00	.00	8254	10.2
17	.50	17.00	30.15	18.61	17.87	11.29	4.22	.37	.00	.00	8241	10.2
18	1.74	15.01	32.75	21.09	16.75	9.55	2.73	.12	.25	.00	7763	9.6
19	1.74	11.91	30.40	28.16	19.11	6.82	1.74	.00	.12	.00	7631	9.5
20	.62	8.56	31.39	32.51	19.60	6.08	.99	.25	.00	.00	7741	9.6
21	.12	9.68	28.91	38.34	16.38	5.83	.50	.25	.00	.00	7624	9.5
22	.87	10.05	33.13	32.51	17.99	4.47	.99	.00	.00	.00	7320	9.1
23	.74	13.28	31.51	35.11	14.89	3.72	.62	.12	.00	.00	6927	8.6
24	.74	11.41	35.61	36.10	12.03	3.23	.62	.12	.12	.00	6744	8.4
TOTAL	.97	18.37	32.65	26.55	13.66	5.52	1.89	.35	.05	.01	166410	8.6

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
50-FOOT LEVEL-- APR

FREQ	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.51	9.23	30.13	40.90	15.77	2.95	.51	.00	.00	.00	6946	8.9
2	.77	9.23	33.08	40.51	13.59	2.31	.38	.13	.00	.00	6707	8.6
3	1.15	11.03	35.51	37.18	13.08	1.67	.26	.13	.00	.00	6405	8.2
4	1.79	15.13	34.23	37.69	8.85	1.92	.38	.00	.00	.00	5968	7.7
5	1.28	21.18	32.48	33.12	9.50	2.31	.13	.00	.00	.00	5685	7.3
6	2.56	20.13	37.82	28.85	7.95	2.05	.64	.00	.00	.00	5479	7.0
7	2.56	26.59	33.72	22.82	8.97	2.82	.51	.00	.00	.00	5212	6.7
8	1.03	27.44	27.31	24.87	13.85	3.97	1.54	.00	.00	.00	6034	7.7
9	.64	24.87	28.85	21.54	16.15	5.90	2.05	.00	.00	.00	6532	8.4
10	.13	26.54	31.15	18.46	16.15	6.03	1.54	.00	.00	.00	6401	8.2
11	.00	21.92	37.56	16.67	16.15	5.26	2.18	.26	.00	.00	6561	8.4
12	.13	17.31	41.41	17.56	14.49	6.54	2.18	.38	.00	.00	6800	8.7
13	.00	15.00	38.97	19.74	14.87	8.59	2.31	.51	.00	.00	7140	9.2
14	.13	12.62	38.21	21.54	15.51	8.59	2.82	.38	.00	.00	7462	9.6
15	.00	11.79	37.44	21.03	14.74	11.15	2.95	.77	.13	.00	7876	10.1
16	.13	11.41	37.56	18.72	15.51	11.28	5.00	.38	.00	.00	8077	10.4
17	.00	12.95	30.90	20.00	17.05	12.69	5.90	.38	.13	.00	8609	11.0
18	.38	12.44	26.92	21.79	19.87	13.08	5.38	.13	.00	.00	8755	11.2
19	.77	10.77	24.87	27.69	20.77	11.67	3.21	.26	.00	.00	8471	10.9
20	.90	8.46	24.23	29.87	22.95	11.03	2.31	.26	.00	.00	8564	11.0
21	.26	6.15	23.59	33.97	23.33	10.51	1.92	.26	.00	.00	8675	11.1
22	.38	5.90	25.13	35.90	22.44	8.97	1.28	.00	.00	.00	8298	10.6
23	.26	6.79	25.77	38.33	22.44	5.38	1.03	.00	.00	.00	7846	10.1
24	.90	8.33	29.74	37.56	18.59	3.97	.90	.00	.00	.00	7309	9.4
TOTAL	.69	14.81	31.94	27.76	15.94	6.69	1.97	.18	.01	.00	171812	9.2

TABLE 47. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
50-FOOT LEVEL-- MAY

BOOK	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.87	6.95	29.65	41.56	18.24	2.61	.12	.00	.00	.00	7334	9.1
2	.62	8.66	30.65	45.16	12.41	2.48	.00	.00	.00	.00	6937	8.6
3	.62	11.04	31.14	45.29	10.42	1.24	.25	.00	.00	.00	6528	8.1
4	.99	12.78	36.23	40.07	8.44	1.24	.25	.00	.00	.00	6185	7.7
5	1.49	15.51	37.47	34.37	9.80	.99	.37	.00	.00	.00	5937	7.4
6	2.73	20.97	38.21	28.78	8.06	.87	.37	.00	.00	.00	5450	6.8
7	2.23	28.78	24.32	30.27	11.79	2.61	.00	.00	.00	.00	5789	7.2
8	.99	25.56	29.40	26.18	14.52	3.23	.12	.00	.00	.00	6074	7.5
9	.37	29.40	32.51	22.08	12.16	3.10	.37	.00	.00	.00	5726	7.1
10	.12	28.04	39.68	17.25	12.41	2.85	.25	.00	.00	.00	5522	6.9
11	.12	21.34	45.04	18.61	11.66	2.61	.62	.00	.00	.00	5733	7.1
12	.00	16.63	47.35	19.98	11.54	3.85	.50	.12	.00	.00	6106	7.6
13	.25	12.16	47.27	22.46	12.16	5.09	.62	.00	.00	.00	6438	8.0
14	.25	10.17	45.91	22.46	15.26	4.84	.99	.12	.00	.00	6848	8.5
15	.12	9.93	43.67	22.46	15.63	6.70	1.12	.37	.00	.00	7276	9.0
16	.00	12.28	36.97	22.46	17.25	8.44	2.48	.12	.00	.00	7757	9.6
17	.25	11.91	31.39	24.07	18.11	10.55	3.47	.25	.00	.00	8314	10.3
18	.37	14.89	24.32	22.70	20.35	12.53	4.59	.25	.00	.00	8809	10.9
19	1.12	11.17	25.15	21.84	22.70	14.64	3.10	.25	.00	.00	9064	11.2
20	.62	7.84	23.08	28.66	24.44	13.52	1.74	.12	.00	.00	9190	11.4
21	.62	6.95	22.33	29.03	24.81	14.64	1.49	.12	.00	.00	9372	11.6
22	.50	5.09	23.33	29.65	27.17	12.78	1.49	.00	.00	.00	9322	11.6
23	.25	6.45	21.59	36.35	27.42	7.32	.62	.00	.00	.00	8681	10.8
24	.62	5.33	24.57	43.55	20.47	5.09	.37	.00	.00	.00	8035	10.0
TOTAL	.67	14.16	32.95	28.97	16.13	5.99	1.05	.07	.00	.00	172427	8.9

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
50-FOOT LEVEL-- JUNE

BOOK	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.64	5.38	24.87	40.77	25.00	3.08	.26	.00	.00	.00	7780	10.0
2	.38	6.28	29.36	43.97	18.33	1.67	.00	.00	.00	.00	7134	9.1
3	.64	7.18	33.72	45.26	12.56	.64	.00	.00	.00	.00	6565	8.4
4	1.28	11.28	35.51	43.08	7.95	.77	.13	.00	.00	.00	6007	7.7
5	1.67	12.18	38.85	38.72	7.31	1.28	.00	.00	.00	.00	5758	7.4
6	2.56	21.28	35.38	30.77	8.72	1.28	.00	.00	.00	.00	5323	6.8
7	1.92	20.77	27.95	31.92	15.77	1.54	.13	.00	.00	.00	6038	7.7
8	1.03	24.10	31.28	25.51	15.77	2.18	.13	.00	.00	.00	5917	7.6
9	.77	26.54	36.79	22.05	12.44	1.28	.13	.00	.00	.00	5371	6.9
10	.13	25.00	45.13	18.46	10.13	1.15	.00	.00	.00	.00	5152	6.6
11	.00	14.62	52.95	21.54	8.72	1.79	.38	.00	.00	.00	5420	6.9
12	.13	10.77	52.18	25.00	9.62	1.92	.38	.00	.00	.00	5761	7.4
13	.00	8.46	53.46	23.55	11.28	2.95	.26	.00	.00	.00	6034	7.7
14	.00	7.31	50.00	26.15	10.38	5.13	1.03	.00	.00	.00	6514	8.4
15	.00	6.92	47.95	24.62	12.31	6.54	1.67	.00	.00	.00	6854	8.8
16	.13	8.46	40.51	24.62	15.64	8.33	1.79	.51	.00	.00	7466	9.6
17	.00	7.82	36.67	23.08	16.67	11.15	4.23	.38	.00	.00	8266	10.6
18	.00	7.56	27.18	23.72	20.51	14.49	6.41	.13	.00	.00	9350	12.0
19	.26	6.41	21.92	23.08	22.31	20.90	5.00	.13	.00	.00	10032	12.9
20	.51	6.28	22.05	21.15	25.90	20.26	3.85	.00	.00	.00	9969	12.6
21	.51	4.87	20.64	22.56	30.26	18.46	2.69	.00	.00	.00	10000	12.6
22	.26	4.10	18.21	25.77	33.59	15.90	2.18	.00	.00	.00	9936	12.7
23	.13	3.97	19.49	26.67	37.44	11.41	.90	.00	.00	.00	9495	12.2
24	.38	5.77	19.10	36.67	30.38	7.44	.26	.00	.00	.00	8566	11.0
TOTAL	.56	10.97	34.21	28.70	17.46	6.73	1.32	.05	.00	.00	174708	9.2

TABLE 47. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
50-FOOT LEVEL-- JUL

FLOOR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.00	3.85	27.05	44.67	21.59	2.73	.12	.00	.00	.00	7917	9.8
2	.12	3.97	30.27	49.88	14.64	.87	.25	.00	.00	.00	7300	9.1
3	.50	7.94	32.43	48.51	10.05	.25	.12	.00	.00	.00	6627	8.2
4	1.24	9.80	37.34	44.42	6.82	.37	.00	.00	.00	.00	6170	7.7
5	1.61	11.30	41.99	40.50	4.35	.25	.00	.00	.00	.00	5731	7.1
6	1.12	19.75	42.11	31.55	3.98	.12	.37	.00	.00	.00	5223	6.5
7	1.24	21.09	34.74	33.00	6.93	.99	.00	.00	.00	.00	5701	7.1
8	.50	21.71	39.21	26.67	10.42	1.12	.37	.00	.00	.00	5680	7.0
9	.25	34.49	41.56	14.64	7.57	1.49	.00	.00	.00	.00	4704	5.8
10	.25	35.36	44.79	13.63	5.46	.99	.12	.00	.00	.00	4425	5.5
11	.12	24.57	54.59	14.02	4.96	1.49	.25	.00	.00	.00	4701	5.8
12	.00	18.11	58.31	16.13	6.33	.87	.25	.00	.00	.00	5002	6.2
13	.00	14.64	57.32	18.98	7.44	1.36	.25	.00	.00	.00	5435	6.7
14	.00	10.42	55.96	22.08	9.18	1.86	.37	.12	.00	.00	5847	7.3
15	.00	9.68	53.23	22.95	9.68	3.47	.99	.00	.00	.00	6301	7.8
16	.12	9.68	48.14	23.20	12.41	5.21	1.24	.00	.00	.00	6727	8.3
17	.00	11.54	41.32	22.21	15.51	6.82	2.48	.12	.00	.00	7358	9.1
18	.12	12.41	31.76	25.06	16.13	11.17	3.35	.00	.00	.00	8260	10.2
19	.12	10.17	28.55	24.07	20.47	15.14	3.47	.00	.00	.00	9167	11.4
20	.62	7.32	28.41	18.86	24.81	17.25	2.61	.12	.00	.00	9548	11.8
21	.50	6.45	19.48	22.33	30.52	18.36	2.36	.00	.00	.00	10148	12.6
22	.50	4.84	18.24	23.95	31.02	19.11	2.11	.12	.12	.00	10421	12.9
23	.25	3.85	18.98	30.15	33.00	12.41	1.36	.00	.00	.00	9804	12.2
24	.50	4.47	21.46	38.83	28.78	5.83	.12	.00	.00	.00	8705	10.8
TOTAL	.40	13.23	57.77	27.90	14.34	5.40	.94	.02	.01	.00	166503	8.0

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
50-FOOT LEVEL-- AUG

FLOOR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.37	5.33	30.15	44.79	17.87	1.49	.00	.00	.00	.00	7432	9.2
2	.74	8.31	34.74	44.79	11.17	.25	.00	.00	.00	.00	6674	8.2
3	.74	12.16	38.83	40.20	7.44	.62	.00	.00	.00	.00	6056	7.1
4	1.24	15.86	40.94	36.10	5.33	.50	.00	.00	.00	.00	5568	6.9
5	2.11	16.38	42.80	34.49	3.35	.37	.00	.00	.00	.00	5331	6.6
6	2.23	19.48	48.76	25.56	3.72	.25	.00	.00	.00	.00	4874	6.0
7	3.85	31.64	33.87	25.68	4.59	.37	.00	.00	.00	.00	4560	5.7
8	1.74	28.76	35.24	26.67	7.20	.37	.00	.00	.00	.00	4985	6.2
9	.25	33.37	40.69	17.62	7.44	.62	.00	.00	.00	.00	4668	5.8
10	.50	40.69	39.21	13.15	5.33	.99	.12	.00	.00	.00	4290	5.3
11	.12	34.74	47.15	12.66	4.47	.62	.25	.00	.00	.00	4306	5.3
12	.00	24.07	55.58	13.65	5.83	.74	.12	.00	.00	.00	4634	5.7
13	.00	18.86	57.94	14.89	7.07	.99	.25	.00	.00	.00	5047	6.2
14	.00	14.76	55.96	19.23	7.82	1.86	.25	.12	.00	.00	5494	6.8
15	.12	11.74	54.59	19.73	10.79	1.86	1.12	.00	.00	.00	5887	7.3
16	.00	13.40	47.39	21.96	12.53	3.10	1.61	.00	.00	.00	6378	7.9
17	.12	16.38	38.09	23.08	13.40	7.07	1.86	.00	.00	.00	7005	8.7
18	.25	16.50	31.89	21.84	16.13	10.30	3.10	.00	.00	.00	7813	9.7
19	1.24	13.15	28.78	21.46	19.35	12.90	3.10	.00	.00	.00	8388	10.4
20	1.12	8.95	27.05	24.57	22.21	14.02	2.11	.00	.00	.00	8843	11.0
21	.67	5.46	24.44	25.19	26.80	16.13	1.12	.00	.00	.00	9452	11.7
22	.37	4.34	22.95	24.28	27.30	14.89	.87	.00	.00	.00	9532	11.8
23	.00	5.09	22.83	34.49	29.40	7.82	.37	.00	.00	.00	8840	11.0
24	.25	4.96	27.42	40.09	23.33	3.23	.12	.00	.00	.00	7947	9.9
TOTAL	.76	16.85	38.64	26.32	12.52	4.22	.68	.01	.00	.00	154004	8.0

TABLE 47. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
50-FOOT LEVEL-- SEP

FLUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	1.54	9.36	38.97	37.56	11.15	1.03	.26	.13	.00	.00	6182	7.9
2	1.67	16.41	37.05	33.97	9.87	.90	.13	.00	.00	.00	5711	7.3
3	2.44	17.44	38.33	33.97	6.28	1.28	.26	.00	.00	.00	5478	7.0
4	2.95	20.64	36.54	31.41	7.18	1.15	.13	.00	.00	.00	5294	6.8
5	3.59	23.21	37.44	28.72	5.90	.90	.26	.00	.00	.00	4988	6.4
6	4.10	24.49	37.95	26.92	4.87	1.67	.00	.00	.00	.00	4829	6.2
7	4.49	30.51	38.21	20.77	4.62	1.28	.13	.00	.00	.00	4388	5.8
8	3.97	35.26	29.74	20.90	8.33	1.15	.64	.00	.00	.00	4661	6.0
9	1.03	34.87	33.33	17.95	10.00	2.18	.64	.00	.00	.00	4979	6.4
10	.38	36.28	33.21	17.95	8.85	2.82	.51	.00	.00	.00	4903	6.3
11	.38	34.74	36.03	17.44	8.59	2.18	.51	.13	.00	.00	4915	6.3
12	.26	26.54	45.77	15.26	8.72	2.56	.77	.13	.00	.00	5098	6.5
13	.13	21.92	49.36	15.51	8.21	3.46	1.41	.00	.00	.00	5415	6.9
14	.13	22.56	45.90	17.56	8.97	3.33	1.41	.13	.00	.00	5530	7.1
15	.00	22.69	43.97	16.79	9.74	5.38	1.28	.13	.00	.00	5871	7.5
16	.00	22.69	38.33	18.59	11.92	6.92	1.41	.13	.00	.00	6288	8.1
17	.64	22.95	33.59	18.59	14.10	8.33	1.67	.13	.00	.00	6647	8.5
18	2.18	17.82	35.13	19.36	13.85	10.13	1.54	.00	.00	.00	6857	8.8
19	1.54	14.10	35.13	23.97	15.77	8.46	1.03	.00	.00	.00	7011	9.0
20	.26	8.85	34.23	28.85	19.36	7.69	.77	.00	.00	.00	7486	9.6
21	.64	7.05	33.46	33.72	18.72	5.51	.90	.00	.00	.00	7470	9.6
22	.51	7.05	32.82	38.59	16.03	4.36	.64	.00	.00	.00	7205	9.2
23	.13	9.87	34.74	37.95	14.10	3.08	.13	.00	.00	.00	6730	8.6
24	.64	8.59	38.72	37.31	12.95	1.79	.00	.00	.00	.00	6373	8.2
TOTAL	1.40	20.66	37.41	25.40	10.75	3.65	.68	.04	.00	.00	140308	7.5

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
50-FOOT LEVEL-- OCT

FLUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	3.85	21.09	39.58	27.17	6.58	1.61	.12	.00	.00	.00	5323	6.6
2	4.22	24.69	36.10	28.04	5.83	.74	.37	.00	.00	.00	5080	6.3
3	3.72	25.68	38.83	25.19	5.09	1.24	.12	.00	.12	.00	4824	6.1
4	3.35	29.78	33.13	27.30	5.09	1.12	.12	.00	.12	.00	4785	5.9
5	3.97	29.78	35.24	25.06	4.71	1.12	.12	.00	.00	.00	4672	5.8
6	5.71	25.53	36.97	21.59	4.84	1.12	.25	.00	.00	.00	4543	5.6
7	6.58	29.90	35.36	22.58	4.34	.87	.37	.00	.00	.00	4446	5.5
8	7.20	35.73	32.63	18.24	4.59	1.24	.37	.00	.00	.00	4202	5.2
9	4.84	41.69	25.43	19.98	5.71	1.99	.37	.00	.00	.00	4328	5.4
10	2.61	43.18	26.43	13.90	9.93	3.47	.50	.00	.00	.00	4822	6.0
11	1.49	41.74	30.06	12.17	9.44	4.10	.99	.00	.00	.00	4980	6.2
12	1.49	38.96	35.11	10.79	8.31	3.97	1.36	.00	.00	.00	4979	6.2
13	.87	37.59	35.11	11.41	8.31	4.96	1.49	.25	.00	.00	5252	6.5
14	.50	35.98	36.35	11.54	8.44	5.46	1.61	.12	.00	.00	5428	6.7
15	.87	34.86	35.61	11.41	9.80	5.58	1.49	.37	.00	.00	5603	7.0
16	.87	37.10	30.77	14.27	8.93	5.83	2.11	.12	.00	.00	5673	7.0
17	5.33	26.92	34.12	17.00	9.93	5.46	1.24	.00	.00	.00	5622	7.0
18	5.96	21.22	35.61	21.59	11.04	3.97	.62	.00	.00	.00	5719	7.1
19	2.23	16.75	35.86	29.78	11.79	3.10	.37	.12	.00	.00	6227	7.7
20	1.66	13.40	40.69	28.91	12.66	1.99	.37	.12	.00	.00	6286	7.8
21	2.11	14.52	39.08	31.14	10.55	1.99	.62	.00	.00	.00	6154	7.6
22	1.24	16.38	38.34	33.25	8.56	1.74	.50	.00	.00	.00	5931	7.4
23	1.99	18.73	39.45	30.40	7.82	1.24	.25	.12	.00	.00	5641	7.0
24	2.48	19.48	39.21	30.02	7.32	1.24	.12	.12	.00	.00	5483	6.8
TOTAL	3.14	28.53	35.21	21.78	7.90	2.71	.66	.06	.01	.00	126003	6.5

TABLE 47. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
50-FOOT LEVEL-- NOV

HOUR	SPEED CLASS										TOTAL SPEED	AVG SPEED
	C	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	4.62	29.62	37.44	19.23	6.54	1.54	.77	.26	.00	.00	4699	6.0
2	4.74	30.13	34.74	21.67	6.03	1.79	.77	.13	.00	.00	4717	6.0
3	6.15	30.51	34.62	20.64	5.51	1.92	.64	.00	.00	.00	4523	5.8
4	6.67	30.51	34.74	19.87	5.13	1.79	1.15	.13	.00	.00	4494	5.8
5	6.15	32.18	31.54	21.54	5.64	1.92	.77	.26	.00	.00	4577	5.9
6	6.92	33.97	30.77	20.51	4.74	2.44	.26	.38	.00	.00	4377	5.6
7	6.92	37.18	29.10	19.62	5.26	1.03	.64	.26	.00	.00	4201	5.4
8	8.59	33.59	32.69	18.59	4.74	1.54	.13	.13	.00	.00	4065	5.2
9	8.60	39.67	26.83	17.07	4.62	2.57	.51	.13	.00	.00	4048	5.2
10	6.55	39.41	25.29	17.72	7.06	2.95	.90	.13	.00	.00	4475	5.7
11	4.62	42.05	23.46	14.87	8.72	4.36	1.67	.26	.00	.00	4842	6.2
12	3.21	41.67	23.97	15.77	8.33	4.49	2.18	.38	.00	.00	5046	6.5
13	2.56	40.00	26.92	13.21	10.13	4.62	2.18	.38	.00	.00	5146	6.6
14	3.21	37.18	29.49	14.23	8.33	4.74	2.56	.26	.00	.00	5211	6.7
15	4.36	39.87	27.05	13.46	8.97	4.10	2.05	.00	.13	.00	4998	6.4
16	6.92	35.51	28.85	13.85	9.23	4.10	1.28	.13	.13	.00	4837	6.2
17	6.92	31.79	31.54	17.69	7.69	3.21	.90	.13	.13	.00	4778	6.1
18	5.00	27.31	33.85	22.56	8.72	1.79	.51	.13	.13	.00	5067	6.5
19	3.85	28.97	34.49	22.56	7.82	1.67	.51	.13	.00	.00	4954	6.4
20	4.62	25.38	37.05	24.36	6.03	2.31	.26	.00	.00	.00	4914	6.2
21	5.26	25.77	35.77	23.97	6.03	2.69	.51	.00	.00	.00	4938	6.3
22	5.90	24.23	40.38	20.26	6.54	2.31	.38	.00	.00	.00	4844	6.2
23	5.13	27.69	37.44	20.26	7.18	2.05	.13	.00	.13	.00	4786	6.1
24	5.38	25.64	39.62	19.36	6.79	2.44	.64	.13	.00	.00	4781	6.1
TOTAL	5.53	32.91	31.99	18.87	6.91	2.68	.93	.15	.03	.00	113318	6.1

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
50-FOOT LEVEL-- DEC

HOUR	SPEED CLASS										TOTAL SPEED	AVG SPEED
	C	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	7.07	30.15	31.51	20.47	7.57	1.86	1.24	.12	.00	.00	4959	6.2
2	7.07	29.78	33.75	18.98	6.70	2.61	.74	.37	.00	.00	4876	6.0
3	9.31	29.78	30.02	21.22	5.58	3.23	.50	.25	.12	.00	4860	6.0
4	5.33	34.86	31.39	18.36	6.70	2.23	.74	.12	.25	.00	4781	5.9
5	7.20	32.88	30.89	19.11	6.95	1.99	.74	.00	.25	.00	4774	5.9
6	7.69	32.38	32.26	18.49	5.46	2.73	.74	.25	.00	.00	4647	5.8
7	7.57	32.13	32.88	19.23	5.21	2.11	.62	.25	.00	.00	4550	5.6
8	7.94	33.00	31.39	19.48	5.21	1.86	.87	.25	.00	.00	4520	5.6
9	6.58	35.61	31.51	16.25	6.70	2.73	.25	.37	.00	.00	4555	5.7
10	7.57	40.57	25.31	15.88	6.20	3.10	1.24	.12	.00	.00	4517	5.6
11	5.46	40.82	23.70	17.25	8.56	1.99	1.86	.37	.00	.00	4804	6.0
12	4.34	41.44	21.96	16.73	7.20	4.09	1.86	.37	.00	.00	5126	6.4
13	4.56	37.22	25.19	16.63	9.06	4.84	1.61	.50	.00	.00	5345	6.6
14	6.08	37.34	24.32	16.75	7.94	4.84	2.36	.12	.25	.00	5374	6.7
15	6.45	37.10	25.06	16.63	8.06	4.34	1.74	.50	.12	.00	5143	6.4
16	7.07	36.10	27.67	16.63	7.82	2.61	1.61	.37	.00	.12	4943	6.1
17	9.06	29.40	32.51	17.12	7.69	2.61	1.24	.37	.00	.00	4915	6.1
18	7.69	29.40	30.52	20.97	7.32	2.98	.99	.12	.00	.00	5062	6.2
19	6.70	27.79	33.13	21.34	6.45	3.23	1.12	.25	.00	.00	5160	6.4
20	6.70	27.54	32.13	21.22	7.57	3.85	.87	.12	.00	.00	5189	6.4
21	7.69	25.81	33.75	21.46	7.44	3.10	.74	.00	.00	.00	5099	6.3
22	6.58	28.54	32.38	21.09	8.19	1.99	1.24	.00	.00	.00	5034	6.2
23	6.08	30.02	32.13	21.34	6.95	1.86	1.24	.25	.12	.00	5002	6.2
24	6.33	29.40	31.76	22.21	7.20	1.86	1.12	.00	.12	.00	5004	6.2
TOTAL	6.65	32.88	29.88	19.03	7.07	2.86	1.14	.23	.05	.01	118239	6.1

TABLE 47. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
50-FOOT LEVEL-- ANNUAL

FLOOR	SPEED CLASS										TOTAL SPEED	AVG SPEED
	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	2.37	16.04	32.10	33.69	13.03	2.19	.46	.11	.00	.01	75305	7.9
2	2.66	17.26	33.40	34.07	10.33	1.73	.40	.13	.02	.00	71531	7.5
3	3.07	18.91	34.51	33.06	8.33	1.55	.43	.12	.02	.00	68007	7.2
4	3.01	21.75	34.85	31.33	7.01	1.48	.44	.07	.04	.00	64900	6.8
5	3.41	22.96	35.70	29.30	6.66	1.50	.38	.07	.02	.00	62927	6.6
6	4.05	25.19	37.15	25.31	6.14	1.66	.37	.13	.00	.00	60027	6.3
7	4.20	29.09	32.32	24.72	7.55	1.68	.33	.11	.00	.00	59770	6.3
8	3.74	29.82	32.56	22.35	8.97	2.02	.46	.06	.00	.01	60828	6.4
9	2.97	32.82	32.63	19.02	9.21	2.61	.64	.07	.00	.01	60420	6.4
10	2.36	34.52	32.89	16.85	9.44	3.02	.79	.13	.00	.01	60890	6.4
11	1.63	31.16	36.51	16.61	9.51	3.01	1.34	.20	.02	.01	63516	6.7
12	1.19	27.33	39.70	16.98	9.39	3.62	1.44	.32	.02	.00	66590	7.0
13	1.00	24.56	40.50	17.28	10.22	4.48	1.55	.36	.06	.00	70149	7.4
14	1.20	22.67	39.68	18.66	10.68	4.85	1.90	.28	.07	.01	73122	7.7
15	1.38	21.99	38.46	18.76	11.19	5.73	2.07	.33	.08	.00	75515	8.0
16	1.79	22.40	35.19	19.39	12.20	6.33	2.37	.29	.03	.01	77605	8.2
17	2.62	20.33	33.52	20.16	13.05	7.31	2.52	.26	.03	.00	80591	8.5
18	2.89	18.46	31.64	22.06	14.10	7.99	2.65	.15	.04	.00	84212	8.9
19	2.32	16.30	30.26	24.57	15.49	8.80	2.12	.14	.01	.00	87290	9.2
20	2.13	13.95	30.53	25.83	17.16	8.68	1.61	.09	.02	.00	89029	9.4
21	2.28	13.12	28.85	27.88	17.85	8.66	1.28	.06	.01	.00	90035	9.5
22	2.23	13.36	28.92	26.48	18.08	7.74	1.13	.04	.01	.00	88559	9.3
23	2.02	14.91	28.65	30.39	18.11	5.12	.68	.09	.02	.00	84159	8.9
24	2.27	14.69	30.92	32.67	15.27	3.40	.48	.06	.03	.00	79260	8.3
TOTAL	2.46	21.82	33.81	24.57	11.62	4.38	1.16	.15	.02	.00	1754237	7.7

TABLE 48. Monthly and Annual Percent Frequency of Hourly Wind Speed Class and Average Speed, 200-Foot Level, 1955 Through 1980

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
200 FOOT LEVEL-- JAN

FLUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	4.47	23.82	21.09	21.96	18.61	6.45	1.99	1.12	.50	.00	7324	9.1
2	4.84	23.57	20.84	24.32	17.74	5.09	2.11	.87	.37	.25	7184	8.9
3	4.47	21.96	25.06	22.46	18.24	4.47	1.74	.99	.25	.37	7085	8.8
4	4.47	24.44	22.21	24.07	16.50	4.71	2.23	.87	.50	.00	6984	8.7
5	4.47	22.33	26.92	21.34	16.63	4.22	2.61	1.12	.25	.12	6923	8.6
6	3.85	24.19	23.45	23.82	15.76	5.21	2.36	1.12	.25	.00	6994	8.7
7	4.71	26.30	21.96	20.84	17.12	5.58	2.23	.87	.12	.25	6923	8.6
8	3.74	25.56	23.57	22.83	15.88	5.09	2.23	.87	.12	.12	6849	8.5
9	4.34	23.33	25.56	25.31	13.15	4.96	2.36	.62	.25	.12	6767	8.4
10	4.96	27.17	24.94	22.33	12.03	4.22	2.85	.99	.37	.12	6463	8.0
11	3.47	30.62	24.94	20.97	12.63	4.34	2.98	.74	.37	.12	6427	8.0
12	2.61	30.89	26.30	18.11	11.29	5.83	2.98	1.24	.62	.12	6647	8.2
13	1.74	32.42	26.46	16.77	11.55	5.22	3.11	1.74	.62	.37	6603	8.5
14	2.36	31.68	26.71	15.65	11.68	5.96	3.98	1.12	.62	.25	6744	8.4
15	1.74	31.39	26.30	18.49	10.17	5.71	4.34	1.24	.37	.25	6771	8.4
16	3.85	30.89	24.44	17.87	12.03	5.46	3.85	.99	.62	.00	6664	8.3
17	5.58	24.44	24.57	20.72	14.76	5.71	2.61	1.24	.25	.12	6916	8.6
18	5.23	20.72	26.05	20.60	16.63	7.20	2.36	.50	.50	.12	7224	9.0
19	4.09	21.96	23.57	20.22	19.11	5.96	3.35	1.36	.12	.25	7570	9.4
20	3.60	20.47	24.07	20.84	19.48	6.33	2.98	1.74	.25	.25	7761	9.6
21	3.74	20.97	23.95	22.21	17.49	6.95	3.10	.87	.62	.12	7674	9.5
22	3.10	23.04	21.22	22.95	18.49	5.46	3.60	.99	.37	.00	7486	9.3
23	3.74	25.06	21.34	21.96	18.73	5.21	2.98	.62	.25	.12	7235	9.0
24	4.56	22.08	23.33	21.59	18.86	5.96	1.99	.74	.50	.00	7210	8.9
TOTAL	3.94	25.40	24.12	21.18	15.58	5.47	2.79	1.02	.38	.14	168628	8.7

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
200 FOOT LEVEL-- FEB

FLUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	4.74	18.23	21.09	24.22	23.13	6.26	3.13	1.22	.00	.00	7353	10.0
2	2.66	18.23	20.95	25.17	22.72	6.53	2.59	.95	.00	.00	7294	9.9
3	3.40	19.05	21.09	21.50	23.95	6.53	3.27	1.69	.14	.00	7282	9.9
4	3.61	18.64	23.40	22.59	19.73	7.35	3.54	.68	.14	.14	7146	9.7
5	3.27	19.59	22.72	22.72	20.95	6.67	3.13	.41	.41	.14	7009	9.5
6	3.27	20.00	22.66	25.44	18.23	7.35	2.18	.14	.54	.00	6868	9.3
7	2.59	23.67	21.50	23.67	18.78	7.48	1.63	.54	.14	.00	6692	9.1
8	3.67	23.40	21.63	24.49	15.18	4.90	1.63	.82	.27	.00	6561	8.9
9	3.40	24.35	25.44	21.90	16.05	4.90	2.72	1.09	.14	.00	6357	8.6
10	2.06	26.71	22.45	22.45	14.01	4.90	3.13	.82	.68	.00	6292	8.6
11	1.77	29.25	25.17	21.09	12.52	5.58	2.45	1.50	.54	.14	6296	8.6
12	.62	26.57	30.20	16.73	11.84	6.26	3.13	1.63	.68	.14	6403	8.7
13	.68	27.76	29.52	15.92	13.06	6.67	3.95	1.50	.82	.14	6718	9.1
14	.68	27.76	27.21	16.46	14.01	6.80	3.95	2.18	.95	.00	7039	9.6
15	1.77	24.63	27.89	17.01	14.29	6.94	4.08	2.45	.68	.27	7137	9.7
16	.95	25.71	23.95	19.59	14.29	7.76	4.35	2.31	.68	.41	7371	10.0
17	2.86	22.64	23.81	20.54	15.24	8.30	4.49	1.90	.54	.27	7427	10.1
18	3.13	17.14	23.61	24.76	16.87	8.71	3.54	1.36	.41	.27	7565	10.3
19	2.45	14.25	22.72	26.94	18.23	9.52	4.22	1.36	.14	.14	7897	10.7
20	2.04	15.51	21.36	24.63	22.86	8.44	3.40	1.50	.27	.00	7894	10.7
21	2.59	16.33	17.82	23.95	24.90	9.39	2.99	1.63	.00	.00	7978	10.9
22	3.13	15.78	19.59	23.13	24.63	8.84	3.67	1.22	.00	.00	7888	10.7
23	2.06	17.14	19.59	24.63	24.08	7.89	2.45	1.22	.14	.00	7629	10.4
24	2.18	19.05	18.64	23.81	25.58	7.07	2.59	.95	.00	.14	7522	10.2
TOTAL	2.51	21.45	23.10	22.22	18.71	7.13	3.17	1.27	.35	.09	171618	9.7

TABLE 48. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
200FEET LEVEL-- MAR

HOUR	SPEED CLASS										TOTAL SPEED	AVG SPEED
	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.50	7.57	20.35	29.16	30.15	8.68	2.61	.50	.37	.12	9402	11.7
2	.74	10.92	17.99	29.65	26.67	10.17	2.73	.62	.37	.12	9264	11.5
3	.62	12.66	19.48	28.54	27.17	7.57	2.98	.62	.37	.00	8954	11.1
4	1.12	13.90	20.72	27.05	27.42	6.70	2.23	.62	.25	.00	8620	10.7
5	1.24	15.63	21.22	25.81	23.57	8.93	3.10	.25	.25	.00	8415	10.4
6	1.74	16.13	23.33	26.18	21.46	7.57	3.10	.37	.12	.00	8111	10.1
7	1.14	18.98	22.21	24.44	23.20	7.07	2.61	.37	.00	.00	7956	9.9
8	.74	20.60	24.94	24.32	18.86	7.57	2.48	.50	.00	.00	7574	9.4
9	.99	22.21	27.79	22.33	15.14	7.69	2.98	.74	.12	.00	7451	9.2
10	.50	26.43	27.79	16.13	16.00	7.32	4.34	1.24	.25	.00	7547	9.4
11	.37	24.57	29.53	16.63	14.39	6.95	4.71	2.11	.62	.12	7805	9.7
12	.25	22.46	30.52	17.25	13.52	7.57	5.09	2.48	.74	.12	8165	10.1
13	.12	17.62	35.11	16.63	13.15	7.82	6.58	1.74	.99	.25	8507	10.6
14	.25	14.52	35.73	15.51	15.26	8.06	7.57	2.11	.87	.12	8932	11.1
15	.00	13.52	31.27	20.22	13.90	9.43	8.44	2.48	.62	.12	9345	11.6
16	.12	13.15	30.77	19.23	13.90	10.17	9.43	2.73	.50	.00	9613	11.9
17	.37	14.02	25.56	20.10	15.76	11.91	9.31	2.48	.50	.00	9839	12.2
18	.99	10.92	24.32	22.95	17.49	12.53	8.56	1.74	.37	.12	9963	12.4
19	1.24	8.44	20.35	23.70	22.33	16.00	6.20	1.49	.12	.12	10368	12.9
20	.74	6.70	18.36	25.93	25.43	15.14	6.58	.74	.37	.00	10526	13.1
21	.62	5.63	18.73	25.43	27.79	14.76	5.96	.62	.25	.00	10535	13.1
22	.62	5.18	16.25	26.42	28.16	12.66	5.58	.87	.25	.00	10172	12.6
23	.37	10.30	16.87	28.91	25.93	12.41	4.47	.50	.25	.00	9733	12.1
24	.50	6.31	20.10	29.53	28.54	8.44	3.47	.87	.12	.12	9476	11.8
TOTAL	.66	14.36	24.14	23.42	21.05	9.71	5.05	1.20	.36	.06	216277	11.2

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
200FEET LEVEL-- APR

HOUR	SPEED CLASS										TOTAL SPEED	AVG SPEED
	0	1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.13	4.87	17.56	27.44	31.28	14.49	3.33	.90	.00	.00	9977	12.6
2	.13	6.15	17.31	29.62	31.28	12.31	2.82	.26	.13	.00	9639	12.4
3	.51	6.41	18.59	31.92	29.23	10.64	2.31	.26	.13	.00	9265	11.9
4	.26	10.90	19.23	27.56	30.26	9.36	2.05	.26	.13	.00	8840	11.3
5	1.16	13.35	20.80	24.90	27.86	8.99	2.82	.13	.00	.00	8400	10.8
6	1.41	14.62	22.05	26.79	26.03	6.79	1.67	.64	.00	.00	8005	10.3
7	1.79	17.18	24.49	28.21	21.15	4.23	2.44	.38	.13	.00	7358	9.4
8	1.03	24.23	22.95	22.56	19.49	6.28	2.44	1.03	.00	.00	7244	9.3
9	.64	22.18	26.26	20.51	17.44	8.06	3.85	1.03	.00	.00	7521	9.6
10	.13	24.49	28.33	18.33	15.51	7.82	4.62	.77	.00	.00	7302	9.4
11	.00	20.64	33.33	18.08	15.26	7.18	4.10	1.28	.13	.00	7423	9.5
12	.00	16.41	37.31	17.56	14.87	8.46	3.85	1.15	.38	.00	7641	9.8
13	.00	12.69	35.38	22.95	12.56	10.90	3.85	1.41	.26	.00	8091	10.4
14	.13	10.26	35.51	21.67	14.87	9.49	6.28	1.41	.38	.00	8503	10.9
15	.00	9.36	35.13	20.26	14.74	10.26	7.69	2.05	.51	.00	8974	11.5
16	.00	9.36	32.85	20.13	13.85	11.67	8.08	2.82	.26	.00	9352	12.0
17	.00	9.62	28.33	18.85	17.05	12.05	10.26	3.59	.13	.13	10131	13.0
18	.26	9.10	22.69	19.36	18.85	14.49	11.67	3.21	.38	.00	10789	13.6
19	.64	6.54	16.54	22.95	22.82	17.44	9.74	2.82	.38	.13	11305	14.5
20	.77	14.49	14.49	22.31	23.33	19.74	11.79	2.31	.26	.00	11771	15.1
21	.38	4.36	12.18	22.95	28.08	19.49	10.13	2.18	.26	.00	11921	15.3
22	.38	4.74	14.10	21.67	29.36	18.72	9.74	1.28	.00	.00	11496	14.7
23	.13	4.62	15.77	21.92	32.82	17.69	5.51	1.54	.00	.00	10960	14.1
24	.64	5.38	17.69	22.95	31.79	15.77	4.74	.90	.13	.00	10342	13.3
TOTAL	.44	11.35	23.75	22.98	22.49	11.76	5.66	1.40	.17	.01	222250	11.9

TABLE 48. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
200FCOT LEVEL-- MAY

FLUR	C	SPEED CLASS								TOTAL SPEED	AVG SPEED	
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46			GT.46
1	.00	5.83	9.68	29.90	37.59	13.52	3.35	.12	.00	.00	10694	13.3
2	.62	4.59	12.03	29.40	40.32	10.67	2.36	.00	.00	.00	10262	12.7
3	.50	5.96	13.77	33.75	36.35	8.31	1.24	.12	.00	.00	9669	12.0
4	.74	7.69	18.49	30.77	33.25	7.20	1.61	.25	.00	.00	9201	11.4
5	1.24	10.79	19.73	28.16	31.51	6.70	1.36	.50	.00	.00	8761	10.9
6	1.49	12.90	22.08	30.27	27.05	5.09	.87	.25	.00	.00	8095	10.0
7	1.66	19.46	21.96	30.15	20.10	5.46	.99	.00	.00	.00	7276	9.0
8	1.24	21.96	27.05	24.69	17.74	5.21	1.99	.12	.00	.00	6995	8.7
9	.25	25.93	30.15	22.08	14.89	4.71	1.99	.00	.00	.00	6521	8.1
10	.25	25.81	35.24	19.60	12.90	4.59	1.61	.00	.00	.00	6227	7.7
11	.12	20.35	40.32	19.98	13.03	4.96	.99	.25	.00	.00	6416	8.0
12	.00	14.52	44.67	20.22	13.03	5.58	1.86	.12	.00	.00	6795	8.4
13	.25	11.17	41.69	24.69	13.77	5.71	2.23	.50	.00	.00	7206	8.6
14	.37	8.44	41.69	23.08	17.25	5.83	2.98	.25	.12	.00	7683	9.5
15	.25	8.06	37.97	21.84	18.73	8.19	4.09	.74	.12	.00	8309	10.3
16	.00	9.66	34.12	20.84	18.24	11.04	4.71	1.24	.12	.00	8913	11.1
17	.12	10.05	27.67	22.95	17.37	12.03	6.95	2.48	.37	.00	9728	12.1
18	.37	10.55	22.21	21.34	18.86	14.39	9.06	2.98	.12	.12	10582	13.1
19	.74	7.69	17.37	22.46	18.49	18.98	12.03	2.11	.12	.00	11507	14.2
20	.25	4.71	14.27	20.72	21.84	22.83	13.40	1.74	.25	.00	12563	15.6
21	.00	4.22	12.16	18.24	25.93	22.46	15.01	1.86	.00	.12	13054	16.2
22	.25	4.47	11.41	19.73	26.55	21.96	13.52	2.11	.00	.00	12839	15.9
23	.37	3.85	12.66	20.10	30.65	22.46	8.93	.99	.00	.00	12129	15.0
24	.12	4.59	11.04	23.57	37.34	17.25	5.71	.37	.00	.00	11390	14.1
TOTAL	.48	10.97	24.14	24.11	23.45	11.05	4.95	.80	.05	.01	222815	11.5

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
200FCOT LEVEL-- JUN

FLUR	C	SPEED CLASS								TOTAL SPEED	AVG SPEED	
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46			GT.46
1	.13	3.97	11.28	20.77	38.08	21.28	4.49	.00	.00	.00	11209	14.4
2	.00	3.06	12.05	28.21	38.59	16.03	2.05	.00	.00	.00	10472	13.4
3	.00	4.74	12.56	31.54	38.85	11.28	1.03	.00	.00	.00	9752	12.5
4	.26	5.51	16.28	33.08	36.67	7.05	.90	.26	.00	.00	9102	11.7
5	.90	7.69	18.08	33.33	32.44	6.54	.90	.13	.00	.00	8622	11.1
6	1.41	13.21	23.46	30.13	27.44	3.08	1.28	.00	.00	.00	7590	9.7
7	1.15	18.59	22.44	29.74	21.54	6.03	.38	.13	.00	.00	7170	9.2
8	.38	21.28	28.21	25.00	18.46	5.64	.90	.13	.00	.00	6777	8.7
9	.64	22.69	35.51	22.44	13.85	4.36	.51	.00	.00	.00	6071	7.8
10	.13	22.31	41.67	20.38	12.18	2.95	.38	.00	.00	.00	5745	7.4
11	.00	13.21	49.62	20.77	12.05	3.46	.90	.00	.00	.00	6026	7.7
12	.13	9.49	48.85	23.97	12.69	3.46	1.41	.00	.00	.00	6393	8.2
13	.13	6.92	48.85	23.97	14.36	3.72	2.05	.00	.00	.00	6720	8.2
14	.00	4.87	44.62	28.46	13.21	6.03	2.69	.13	.00	.00	7364	9.4
15	.13	7.05	42.18	23.59	15.90	6.92	3.46	.77	.00	.00	7734	9.9
16	.00	6.67	36.92	23.85	16.41	9.45	5.38	1.03	.26	.00	8511	10.9
17	.00	7.05	31.03	23.08	17.05	10.77	8.33	2.31	.38	.00	9572	12.2
18	.13	5.64	24.36	22.44	15.64	16.28	11.79	3.59	.13	.00	11051	14.2
19	.00	4.23	16.52	22.31	16.15	21.41	14.87	4.10	.00	.00	12363	15.8
20	.51	3.08	13.72	20.26	17.44	23.08	18.08	3.72	.13	.00	13099	16.8
21	.26	2.56	10.77	17.44	20.38	25.51	20.13	2.82	.13	.00	13621	17.5
22	.00	3.72	10.77	15.51	21.28	28.21	17.82	2.69	.00	.00	13652	17.5
23	.13	4.23	8.72	15.26	27.05	29.87	13.46	1.03	.26	.00	13134	16.8
24	.38	3.33	9.62	18.72	33.46	24.74	9.36	.38	.00	.00	12128	15.5
TOTAL	.28	8.55	25.77	23.93	22.13	12.38	5.94	.97	.05	.00	223878	12.0

TABLE 48. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
200FCOT LEVEL-- JUL

FOUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.12	3.10	8.19	23.33	42.80	18.98	3.23	.25	.00	.00	11707	14.5
2	.00	2.11	10.05	26.67	45.91	13.52	1.49	.25	.00	.00	11104	13.8
3	.12	3.72	12.03	30.40	42.68	10.67	.25	.00	.12	.00	10230	12.7
4	.37	5.33	13.77	34.74	37.97	7.32	.37	.12	.00	.00	9566	11.5
5	.75	6.63	17.89	34.66	33.42	6.09	.37	.00	.00	.00	8963	11.1
6	.12	10.31	23.23	34.41	28.32	3.11	.12	.37	.00	.00	8000	9.9
7	.62	14.52	29.53	34.24	17.74	2.61	.74	.00	.00	.00	7001	8.7
8	.37	17.87	35.48	28.54	13.65	3.10	.99	.00	.00	.00	6498	8.1
9	.00	29.10	41.17	17.66	8.21	3.36	.50	.00	.00	.00	5305	6.6
10	.25	31.06	46.09	12.92	7.20	1.74	.75	.00	.00	.00	4956	6.2
11	.25	21.12	53.51	15.03	6.71	2.48	.37	.12	.00	.00	5175	6.4
12	.12	15.88	55.71	17.99	6.95	2.48	.62	.12	.00	.12	5554	6.5
13	.00	12.78	52.85	20.97	10.17	1.99	.99	.25	.00	.00	6018	7.5
14	.00	7.94	52.85	21.96	13.03	2.61	1.36	.25	.00	.00	6531	8.1
15	.00	7.32	48.01	24.32	12.90	5.33	1.61	.37	.12	.00	7119	8.8
16	.00	8.44	43.18	23.70	14.64	5.71	3.60	.62	.12	.00	7666	9.5
17	.00	9.55	35.36	23.45	17.00	8.19	5.33	.99	.12	.00	8529	10.6
18	.12	6.93	28.16	25.31	15.63	11.54	8.68	1.61	.00	.00	9752	12.1
19	.12	6.08	21.34	25.19	16.87	15.38	13.40	1.61	.00	.00	11296	14.0
20	.37	3.35	15.76	24.69	15.26	20.97	17.12	2.36	.12	.00	12770	15.8
21	.50	3.47	11.41	18.24	16.87	25.93	21.09	2.48	.00	.00	13964	17.3
22	.12	3.65	10.67	15.76	18.98	26.05	21.34	2.98	.12	.12	14326	17.8
23	.12	3.47	10.30	15.01	25.43	29.28	15.01	1.36	.00	.00	13622	16.9
24	.25	3.10	8.19	19.48	34.49	27.17	7.20	.12	.00	.00	12582	15.6
TOTAL	.20	9.96	28.54	23.69	20.95	10.65	5.27	.68	.03	.01	218234	11.3

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
200FCOT LEVEL-- AUG

FOUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.00	3.72	9.06	26.67	42.93	15.38	2.11	.12	.00	.00	11011	13.7
2	.50	3.72	11.54	31.76	40.07	12.16	.25	.00	.00	.00	10217	12.7
3	.37	6.82	15.38	33.50	35.11	8.06	.74	.00	.00	.00	9338	11.6
4	.87	8.68	18.24	33.00	32.75	6.08	.37	.00	.00	.00	8710	10.8
5	.74	8.81	22.70	34.00	28.66	4.71	.37	.00	.00	.00	8305	10.3
6	1.49	10.42	26.05	35.36	23.08	3.35	.25	.00	.00	.00	7640	9.5
7	1.66	18.24	29.65	31.14	16.75	2.23	.12	.00	.00	.00	6436	8.0
8	.99	22.36	34.04	28.20	12.17	2.24	.00	.00	.00	.00	5840	7.3
9	.25	28.66	39.58	18.98	10.05	2.11	.25	.12	.00	.00	5324	6.6
10	.37	35.86	39.08	15.38	6.82	1.86	.50	.12	.00	.00	4803	6.0
11	.00	31.51	45.78	14.39	5.71	2.36	.12	.12	.00	.00	4774	5.9
12	.00	22.33	52.85	15.38	7.57	1.49	.25	.12	.00	.00	5079	6.3
13	.00	15.63	56.58	16.25	8.56	2.11	.62	.25	.00	.00	5556	6.5
14	.00	12.66	53.35	20.10	9.43	3.23	.99	.25	.00	.00	6086	7.6
15	.12	8.93	51.74	21.22	11.79	4.34	1.12	.74	.00	.00	6619	8.2
16	.00	10.42	43.42	23.95	13.28	5.83	2.48	.62	.00	.00	7231	9.0
17	.00	14.02	35.24	23.45	12.78	8.68	4.71	1.12	.00	.00	8071	10.0
18	.25	11.17	30.77	20.97	16.13	11.79	7.57	1.36	.00	.00	9265	11.5
19	.62	7.57	22.83	24.07	15.63	16.38	10.67	2.11	.00	.12	10756	13.3
20	.99	4.59	17.62	23.20	18.11	19.73	13.40	2.36	.00	.00	11979	14.9
21	.62	4.47	14.52	20.97	18.11	21.84	17.74	1.74	.00	.00	12829	15.5
22	.25	4.22	13.52	19.48	20.35	24.57	16.25	1.36	.00	.00	12966	16.1
23	.12	2.73	11.54	23.08	28.54	23.08	10.55	.37	.00	.00	12355	15.3
24	.00	3.10	9.93	25.06	37.97	20.97	2.73	.25	.00	.00	11520	14.2
TOTAL	.43	12.53	29.37	24.15	19.68	9.36	3.92	.55	.00	.01	202710	10.5

TABLE 48. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
200 FCGT LEVEL-- SEP

FLUX	C	SPEED CLASS								TOTAL SPEED	AVG SPEED	
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46			GT .46
1	.38	6.79	17.69	30.77	32.69	10.00	1.54	.13	.00	.00	9120	11.7
2	1.03	8.72	21.03	28.85	31.79	7.69	.90	.00	.00	.00	8545	11.0
3	1.15	11.67	21.54	27.95	29.23	6.79	1.41	.26	.00	.00	8207	10.5
4	2.31	12.95	23.59	25.13	28.33	6.15	1.41	.13	.00	.00	7868	10.1
5	3.21	17.31	20.13	27.82	25.26	5.26	.90	.13	.00	.00	7417	9.5
6	2.69	17.95	22.18	29.87	20.90	4.87	1.41	.13	.00	.00	7072	9.1
7	2.95	19.62	24.03	28.97	18.33	3.08	1.03	.00	.00	.00	6515	8.4
8	2.69	27.82	27.18	25.38	12.18	3.59	.64	.51	.00	.00	5839	7.5
9	.51	30.38	32.18	20.26	9.87	5.26	1.28	.26	.00	.00	5704	7.3
10	.13	33.08	31.54	18.72	10.38	3.85	2.05	.26	.00	.00	5584	7.2
11	.38	30.90	35.64	18.08	9.36	3.59	1.79	.26	.00	.00	5529	7.1
12	.13	23.46	43.85	16.28	10.64	3.21	2.05	.26	.13	.00	5719	7.3
13	.13	21.03	45.51	16.67	9.36	4.23	2.31	.77	.00	.00	6055	7.8
14	.00	20.51	43.46	18.08	10.00	4.62	2.82	.51	.00	.00	6226	8.0
15	.00	20.13	41.15	16.54	12.05	6.28	3.33	.38	.13	.00	6669	8.5
16	.00	18.08	38.46	18.33	11.92	7.82	4.49	.77	.13	.00	7262	9.3
17	.51	18.97	31.03	20.00	12.56	9.87	6.54	.38	.13	.00	7865	10.1
18	1.67	12.05	29.87	21.67	14.62	10.51	9.49	.13	.00	.00	8730	11.2
19	1.48	8.46	23.59	27.82	15.51	14.23	8.46	.64	.00	.00	9451	12.1
20	.64	7.18	19.87	27.56	19.87	15.77	8.46	.64	.00	.00	10070	12.9
21	.26	6.67	18.85	27.56	23.59	16.54	5.51	1.03	.00	.00	10086	12.9
22	.26	6.15	18.33	30.51	24.87	13.72	5.13	1.03	.00	.00	9809	12.6
23	.26	5.51	17.69	32.05	28.97	11.92	3.46	.13	.00	.00	9490	12.2
24	.38	6.41	15.38	35.13	30.64	10.13	1.67	.26	.00	.00	9259	11.5
TOTAL	.46	16.32	27.74	24.58	18.87	7.87	3.25	.37	.02	.00	184091	9.8

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
200 FCGT LEVEL-- OCT

FLUX	L	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	2.11	16.00	22.21	27.92	23.45	6.70	1.49	.12	.00	.00	7886	9.8
2	2.73	16.13	23.57	24.94	25.56	5.46	1.24	.37	.00	.00	7668	9.5
3	2.98	19.85	22.95	25.31	22.58	5.09	.99	.00	.12	.12	7239	9.0
4	3.23	20.22	26.18	23.08	20.97	5.33	.62	.25	.00	.12	7017	8.7
5	2.73	23.33	24.94	22.83	20.47	4.71	.74	.25	.00	.00	6729	8.3
6	3.97	26.30	23.20	22.83	17.00	5.21	1.24	.25	.00	.00	6542	8.1
7	3.23	27.54	22.95	23.57	17.25	4.34	.74	.37	.00	.00	6386	7.9
8	2.61	28.91	25.56	23.70	15.01	2.61	1.12	.50	.00	.00	6075	7.5
9	2.73	36.72	24.94	19.60	11.41	2.98	1.49	.12	.00	.00	5385	6.7
10	1.61	39.95	24.94	15.26	9.93	6.33	1.61	.37	.00	.00	5621	7.0
11	.87	37.47	30.02	13.90	9.06	5.21	2.98	.50	.00	.00	5754	7.1
12	.67	34.62	34.99	12.53	7.69	6.33	2.11	.87	.00	.00	5749	7.1
13	.37	33.00	36.23	11.56	8.68	6.08	3.10	.62	.25	.00	6041	7.5
14	.37	31.02	37.47	11.79	8.31	5.96	4.09	.87	.12	.00	6300	7.8
15	.50	29.53	36.60	11.54	10.42	6.08	3.85	1.24	.25	.00	6552	8.1
16	.50	30.15	31.89	14.52	10.42	6.82	4.22	1.49	.00	.00	6810	8.4
17	2.98	23.57	30.02	17.95	11.66	8.56	4.34	.87	.00	.00	7188	8.9
18	3.65	17.25	25.93	23.33	16.13	9.31	3.47	.74	.00	.00	7788	9.7
19	2.11	12.78	25.81	25.31	19.73	9.93	3.85	.37	.12	.00	8443	10.5
20	.87	12.53	26.43	27.05	18.73	11.17	2.73	.37	.12	.00	8484	10.5
21	1.24	13.15	23.70	28.91	21.34	9.06	1.99	.50	.12	.00	8362	10.4
22	1.66	12.53	22.06	29.03	23.57	7.94	2.48	.50	.00	.00	8406	10.4
23	1.36	13.15	21.71	30.77	23.45	7.82	1.49	.12	.12	.00	8207	10.2
24	1.74	12.53	22.21	29.65	25.31	7.20	1.12	.00	.25	.00	8193	10.2
TOTAL	1.97	23.68	26.94	21.54	16.59	6.51	2.21	.49	.06	.01	168825	8.7

TABLE 48. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
200FCT LEVEL-- NOV

FLOOR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	4.10	19.10	27.05	25.51	16.67	4.62	2.18	.38	.38	.00	6819	8.7
2	3.59	23.72	23.85	22.56	18.72	5.26	1.54	.51	.26	.00	6735	8.6
3	3.46	24.62	25.38	21.79	16.92	4.74	2.44	.64	.00	.00	6582	8.4
4	4.36	25.77	22.95	23.21	16.15	4.23	1.92	1.28	.13	.00	6513	8.2
5	4.74	23.97	25.00	20.64	17.95	4.49	2.05	.90	.26	.00	6597	8.5
6	4.23	26.28	24.10	22.31	15.00	5.00	2.44	.13	.51	.00	6425	8.2
7	3.65	27.31	25.13	22.82	13.85	4.87	1.28	.64	.26	.00	6134	7.9
8	3.33	28.65	25.51	22.05	15.00	3.21	1.54	.38	.13	.00	5986	7.7
9	4.68	28.63	25.29	22.85	12.58	3.34	1.80	.51	.13	.00	5818	7.5
10	5.01	33.38	24.52	17.84	11.68	4.36	2.05	.90	.26	.00	5675	7.3
11	3.46	37.56	25.64	13.21	9.74	4.87	4.10	1.15	.26	.00	5820	7.5
12	2.44	37.95	23.85	15.64	8.59	6.54	3.72	.90	.38	.00	5999	7.7
13	1.92	36.03	26.67	14.49	9.74	5.77	3.72	1.28	.38	.00	6105	7.8
14	2.69	33.08	28.21	15.13	9.74	5.64	3.46	1.92	.13	.00	6182	7.9
15	2.82	34.23	27.44	14.62	10.38	5.38	3.59	1.28	.13	.13	6076	7.8
16	5.38	29.74	26.54	16.67	10.13	6.54	3.85	.64	.38	.13	6203	8.0
17	6.03	23.72	27.95	18.59	13.59	5.38	3.59	.64	.38	.13	6546	8.4
18	3.33	21.79	28.21	18.72	17.56	7.56	2.05	.51	.13	.13	6922	8.9
19	3.72	19.62	27.95	21.54	18.08	6.92	1.41	.51	.26	.00	6895	8.8
20	3.21	20.38	25.13	25.90	17.31	5.77	2.05	.26	.00	.00	6874	8.8
21	2.95	21.28	23.72	25.77	17.56	5.90	2.05	.64	.13	.00	7016	9.0
22	4.36	18.59	24.87	25.51	19.62	4.36	2.31	.26	.13	.00	6882	8.8
23	3.72	20.13	24.36	25.51	18.33	5.90	1.54	.38	.00	.13	6911	8.9
24	3.33	20.77	26.28	23.85	17.95	5.00	2.18	.38	.26	.00	6896	8.8
TOTAL	3.79	26.52	25.65	20.70	14.70	5.24	2.45	.71	.22	.03	154611	8.3

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
200FCT LEVEL-- DEC

FLOOR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	4.34	23.33	23.08	21.34	18.36	6.08	2.11	.74	.62	.00	7220	9.0
2	4.64	22.58	24.94	21.59	16.13	5.83	2.73	.74	.50	.12	7161	8.9
3	5.96	23.95	22.58	21.09	17.12	4.84	2.98	.99	.25	.25	7069	8.8
4	5.09	25.56	21.46	22.33	16.87	4.84	2.36	1.12	.12	.25	6953	8.6
5	3.65	25.01	21.64	23.33	16.25	5.21	2.11	1.36	.00	.25	7031	8.7
6	4.54	25.19	22.63	24.32	14.89	4.09	2.98	.87	.25	.00	6824	8.5
7	5.71	24.32	25.43	22.21	14.39	4.84	2.11	.62	.37	.00	6599	8.2
8	4.84	27.30	23.70	20.22	16.50	4.22	2.23	.50	.50	.00	6530	8.1
9	4.84	25.19	26.43	21.46	13.77	4.96	2.36	.62	.37	.00	6565	8.1
10	4.59	29.90	25.31	19.85	12.03	4.09	2.85	1.24	.00	.12	6259	7.8
11	3.60	34.24	23.95	17.62	12.28	4.34	1.99	1.36	.50	.12	6212	7.7
12	3.47	32.75	23.62	19.11	11.29	3.97	3.60	1.61	.37	.00	6419	8.0
13	3.60	33.75	24.69	15.88	10.30	5.96	4.34	.87	.50	.12	6567	8.1
14	4.59	34.12	21.96	16.50	10.05	6.45	3.97	1.74	.37	.25	6658	8.2
15	4.34	32.75	23.95	17.37	10.05	5.71	3.60	1.61	.50	.12	6556	8.1
16	4.22	29.65	24.19	19.73	11.79	5.96	2.48	1.24	.62	.12	6643	8.2
17	5.58	24.44	25.81	19.35	14.52	5.71	2.85	1.36	.25	.12	6883	8.5
18	6.08	22.08	25.19	20.35	15.38	5.96	3.60	1.12	.25	.00	7061	8.8
19	4.84	21.34	27.42	19.11	17.49	4.71	3.47	1.36	.12	.12	7221	9.0
20	4.59	22.08	24.19	21.22	16.87	5.96	3.72	1.12	.25	.00	7329	9.1
21	5.58	20.35	22.58	23.95	16.87	6.20	3.47	.62	.37	.00	7370	9.1
22	5.09	20.64	23.70	22.21	17.62	5.96	3.47	.99	.12	.00	7339	9.1
23	4.22	23.95	22.46	21.46	17.87	6.20	2.48	.74	.50	.12	7308	9.1
24	4.47	23.33	22.58	21.59	18.24	6.33	1.99	1.12	.25	.12	7173	8.9
TOTAL	4.70	26.20	23.92	20.55	14.87	5.35	2.91	1.07	.33	.09	164950	8.5

TABLE 48. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
200FEET LEVEL-- ANNUAL

FLOOR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	1.56	11.34	17.32	25.76	29.69	11.06	2.62	.46	.16	.01	109722	11.6
2	1.62	11.43	17.98	26.90	29.67	9.23	1.90	.38	.14	.04	105545	11.1
3	1.56	13.43	19.19	27.51	28.15	7.41	1.77	.41	.12	.06	100672	10.6
4	2.23	14.95	20.52	27.25	26.44	6.35	1.62	.48	.11	.04	96520	10.2
5	2.35	16.27	21.83	26.66	24.59	6.03	1.70	.43	.09	.04	93172	9.8
6	2.52	18.11	23.24	27.66	21.27	5.04	1.65	.36	.14	.00	88166	9.3
7	2.62	21.30	24.46	26.68	18.34	4.80	1.36	.33	.08	.02	82446	8.7
8	2.13	24.17	26.70	24.34	16.15	4.47	1.52	.44	.08	.01	78768	8.3
9	1.95	26.64	30.06	21.28	13.01	4.72	1.83	.42	.08	.01	74789	7.9
10	1.73	29.87	31.65	18.23	11.70	4.50	2.22	.56	.13	.02	72474	7.6
11	1.19	27.58	34.88	17.45	10.99	4.60	2.29	.78	.20	.04	73657	7.6
12	.91	24.10	37.79	17.56	10.81	5.09	2.55	.87	.27	.04	76563	8.1
13	.75	21.71	38.35	18.07	11.26	5.50	3.06	.91	.32	.07	80387	8.5
14	.96	19.70	37.47	18.69	12.23	5.88	3.68	1.05	.29	.05	84248	8.9
15	.67	18.88	35.85	18.93	12.93	6.71	4.10	1.27	.28	.07	87865	9.2
16	1.25	18.47	32.69	19.87	13.40	7.84	4.74	1.37	.31	.05	92239	9.7
17	2.00	16.77	28.89	20.76	14.94	8.93	5.77	1.61	.25	.06	98695	10.4
18	2.13	13.94	25.98	21.81	16.65	10.86	6.82	1.57	.19	.06	106692	11.2
19	1.82	11.58	22.21	23.44	18.37	13.08	7.66	1.65	.12	.07	115072	12.1
20	1.55	10.45	19.61	23.68	19.69	14.60	8.67	1.57	.17	.02	121120	12.6
21	1.59	10.28	17.54	22.95	21.54	15.36	9.14	1.41	.16	.02	124410	13.1
22	1.61	10.65	17.19	22.65	22.77	14.90	8.78	1.36	.08	.01	123261	13.0
23	1.44	11.16	16.90	23.38	25.14	15.02	6.05	.75	.13	.03	118713	12.5
24	1.58	10.96	17.07	24.58	28.37	13.04	3.73	.53	.13	.03	113691	12.0
TOTAL	1.69	17.26	25.62	22.75	19.09	8.54	3.97	.87	.17	.04	2318887	10.2

TABLE 49. Monthly and Annual Percent Frequency of Hourly Wind Speed Class and Average Speed, 400-Foot Level, 1955 Through 1980

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
400FOOT LEVEL-- JAN

FLUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	7.07	20.10	21.34	19.73	18.36	7.69	2.85	2.11	.62	.12	7831	9.7
2	6.08	22.21	19.98	21.71	18.11	6.20	3.35	1.24	.74	.37	7705	9.6
3	7.07	19.73	23.57	21.22	16.50	6.58	3.23	.87	.74	.50	7563	9.4
4	6.33	22.33	20.97	21.22	17.99	5.71	2.85	1.74	.62	.25	7523	9.3
5	6.82	20.84	23.08	21.96	16.50	4.71	3.60	1.36	.99	.12	7447	9.2
6	6.95	20.84	22.21	22.08	16.87	5.33	3.35	1.24	.99	.12	7482	9.3
7	5.33	23.95	21.71	20.97	16.50	6.20	2.85	1.24	.99	.25	7449	9.2
8	4.84	22.58	23.70	20.97	16.25	6.33	2.73	1.86	.50	.25	7468	9.3
9	5.56	23.45	21.46	21.22	17.49	6.20	1.86	1.86	.50	.37	7407	9.2
10	6.70	23.57	21.96	23.20	14.52	4.22	3.60	.99	.99	.25	7125	8.6
11	5.71	26.18	24.19	20.84	12.41	5.21	2.85	1.49	.74	.37	6947	8.6
12	3.72	29.90	25.06	18.24	10.79	5.83	2.98	2.11	.87	.50	7050	8.7
13	3.85	31.39	23.70	16.75	11.41	5.46	4.09	1.74	.87	.74	7150	8.9
14	4.59	32.63	22.83	15.01	11.29	6.20	3.72	2.23	.99	.50	7045	8.7
15	4.34	29.65	24.94	17.49	9.93	5.46	4.84	2.11	.87	.37	7154	8.9
16	6.82	28.78	22.70	16.25	12.53	5.71	4.22	1.74	.99	.25	7059	8.8
17	7.94	25.43	20.84	19.73	13.65	4.96	4.47	1.86	.87	.25	7257	9.0
18	8.44	20.72	24.32	18.61	13.52	7.94	4.22	1.24	.87	.12	7528	9.2
19	6.20	22.70	20.22	19.23	16.87	7.32	4.71	1.61	.87	.25	7994	9.5
20	5.58	20.84	22.33	17.74	17.99	7.20	4.71	1.99	1.24	.37	8291	10.3
21	5.83	20.47	21.96	19.60	17.12	7.69	3.97	2.23	.74	.37	8209	10.2
22	5.83	21.09	21.96	19.35	17.00	7.82	3.72	2.11	.74	.37	8047	10.0
23	6.33	21.46	19.73	21.46	17.00	7.69	3.72	1.86	.50	.25	7809	9.7
24	6.70	20.10	22.58	19.35	17.99	7.69	3.47	1.12	.87	.12	7801	9.7
TOTAL	6.03	23.79	22.39	19.75	15.36	6.31	3.58	1.66	.82	.31	180341	9.3

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
400FOOT LEVEL-- FEB

FLUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	4.90	17.96	17.28	22.72	21.63	9.12	3.13	2.59	.68	.00	7862	10.7
2	4.63	17.14	18.64	23.13	22.18	7.21	4.76	2.04	.27	.00	7818	10.6
3	4.90	17.01	18.91	23.81	19.86	7.89	4.49	2.18	.82	.14	7892	10.7
4	5.17	17.28	20.95	22.99	17.41	8.71	4.49	2.45	.41	.14	7766	10.6
5	4.63	17.69	21.22	23.27	20.00	6.67	4.08	1.77	.41	.27	7620	10.4
6	4.90	17.01	22.86	21.50	21.22	5.85	4.90	1.09	.41	.27	7444	10.1
7	5.17	18.64	22.99	21.63	18.10	8.16	4.08	.68	.54	.00	7256	9.9
8	5.31	20.41	21.09	20.41	20.95	6.94	3.40	.82	.68	.00	7131	9.7
9	6.26	20.14	21.90	22.45	17.55	6.12	2.86	1.90	.82	.00	6991	9.5
10	5.03	23.95	22.86	20.27	16.33	6.26	2.18	1.77	1.09	.27	6842	9.3
11	2.99	28.44	22.72	20.68	13.47	5.99	2.31	2.59	.68	.14	6592	9.0
12	2.72	28.67	27.52	16.35	11.58	7.22	3.54	2.04	.68	.27	6634	9.0
13	1.90	28.44	25.85	16.60	11.97	7.21	4.35	2.45	.82	.41	6992	9.5
14	1.50	27.62	24.63	15.92	14.01	7.48	4.08	3.13	1.50	.14	7344	10.0
15	2.59	25.31	25.17	15.65	14.69	7.76	4.08	3.40	.95	.41	7463	10.2
16	2.59	25.44	21.09	19.05	13.20	9.25	4.90	2.59	1.36	.54	7756	10.6
17	4.22	21.50	23.27	17.96	14.42	8.44	5.44	2.99	1.09	.68	7939	10.8
18	4.35	17.14	22.31	21.50	15.24	9.80	5.71	2.31	.95	.68	8161	11.1
19	3.54	15.65	20.95	21.63	18.64	9.66	5.71	3.27	.68	.27	8485	11.5
20	3.40	16.73	19.46	20.41	20.00	11.43	4.63	2.86	1.09	.00	8544	11.6
21	5.03	15.10	18.37	20.82	20.14	11.84	5.44	2.18	1.09	.00	8620	11.7
22	4.76	16.33	15.51	21.22	23.27	11.29	4.22	2.45	.95	.00	8566	11.7
23	3.81	17.55	19.46	18.78	23.95	9.25	4.35	2.31	.41	.14	8237	11.2
24	5.17	14.97	21.22	20.68	21.90	9.25	4.49	1.63	.54	.14	7997	10.9
TOTAL	4.14	20.23	21.51	20.39	17.99	8.28	4.23	2.23	.79	.20	183952	10.4

TABLE 49. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
400FCOT LEVEL-- MAR

FLUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	1.61	8.66	16.50	24.44	29.03	12.41	4.34	2.36	.12	.50	10437	12.5
2	1.49	9.18	17.00	23.20	29.90	11.54	5.71	1.12	.50	.37	10371	12.5
3	.99	11.04	15.63	27.42	26.30	12.16	3.60	2.11	.50	.25	10058	12.5
4	1.24	12.16	18.36	22.33	28.41	12.16	3.10	1.61	.50	.12	9712	12.0
5	2.73	12.78	16.25	27.30	24.44	9.06	5.71	1.36	.12	.25	9486	11.8
6	3.10	13.77	17.62	26.30	24.32	8.19	4.71	1.61	.25	.12	9110	11.5
7	2.23	14.27	19.60	24.57	23.82	9.06	4.71	1.49	.25	.00	9038	11.2
8	2.11	16.13	19.85	25.81	21.71	7.82	5.09	1.12	.37	.00	8700	10.8
9	1.74	19.73	22.95	24.94	16.25	8.06	4.34	1.86	.00	.12	8241	10.2
10	1.61	26.05	23.20	19.35	14.39	8.19	4.96	1.61	.50	.12	7941	9.9
11	.87	25.06	26.52	17.00	13.65	7.69	4.96	2.73	.74	.37	8133	10.1
12	.37	23.45	27.79	17.49	12.78	8.56	5.71	2.61	1.12	.12	8459	10.5
13	.12	19.48	30.89	17.49	12.78	8.44	6.70	2.48	1.12	.50	8870	11.0
14	.27	15.88	32.13	16.00	14.76	8.68	7.44	3.47	.62	.62	9326	11.6
15	.12	14.64	28.29	19.85	13.77	9.43	9.18	3.60	.99	.12	9805	12.2
16	.37	12.66	30.02	17.49	14.39	10.05	9.31	4.71	.74	.25	10114	12.5
17	.74	13.28	24.81	18.24	16.13	11.41	9.80	4.47	.99	.12	10480	13.0
18	1.24	10.55	21.46	21.46	16.75	12.66	10.05	4.59	.99	.25	10944	13.6
19	1.99	8.06	18.36	20.60	18.49	15.76	11.54	4.34	.74	.12	11641	14.4
20	1.12	6.95	14.89	21.96	22.58	16.13	11.66	3.72	.87	.12	11984	14.9
21	1.24	7.20	13.65	22.33	23.82	16.00	11.04	4.47	.00	.25	11952	14.8
22	1.24	8.66	14.02	20.22	26.05	16.63	9.93	2.23	.95	.00	11706	14.5
23	1.12	9.31	15.26	21.59	27.92	14.27	7.07	2.98	.37	.12	11051	13.7
24	1.61	8.68	16.63	23.45	25.56	15.38	5.58	2.61	.25	.25	10701	13.3
TOTAL	1.31	13.65	20.92	21.70	20.75	11.24	6.93	2.72	.57	.21	238260	12.3

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
400FCOT LEVEL-- APR

FLUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.28	4.87	15.36	20.13	30.13	18.21	8.21	2.31	.38	.00	11390	14.0
2	1.03	6.15	14.10	21.41	30.13	18.97	6.15	1.92	.13	.00	10994	14.1
3	1.03	6.67	15.13	21.79	32.95	15.13	5.64	1.28	.26	.13	10641	13.6
4	.38	8.97	17.95	21.41	32.18	12.44	5.51	.90	.26	.00	10021	12.8
5	1.54	9.76	18.10	22.21	32.35	8.47	6.55	.77	.13	.13	9659	12.4
6	2.69	12.82	13.72	26.79	29.87	7.69	4.87	1.03	.51	.00	9187	11.8
7	2.56	12.69	19.10	27.95	24.49	8.21	3.46	1.15	.38	.00	8620	11.1
8	2.44	19.74	21.28	23.46	19.87	7.82	3.72	1.41	.26	.00	7941	10.2
9	.64	23.49	23.49	20.15	16.17	9.37	5.13	1.28	.26	.00	7846	10.1
10	.39	25.93	25.67	18.23	13.74	9.88	5.01	1.16	.00	.00	7556	9.7
11	.26	21.44	31.58	17.07	14.51	8.99	4.36	1.28	.51	.00	7660	9.8
12	.13	18.10	34.27	17.46	14.12	8.34	5.52	1.54	.39	.13	7926	10.2
13	.00	14.23	33.21	20.26	14.36	10.77	4.62	1.92	.51	.13	8404	10.8
14	.00	12.31	33.46	19.87	15.26	9.10	7.31	1.79	.77	.13	8808	11.3
15	.13	10.00	33.46	19.23	14.10	11.03	8.33	2.82	.77	.13	9394	12.0
16	.13	10.13	30.51	20.00	13.97	11.41	8.97	4.23	.64	.00	9855	12.6
17	.26	9.10	26.79	20.13	13.46	13.08	11.67	4.36	.90	.26	10758	13.8
18	.64	7.31	21.67	19.23	17.05	14.49	11.79	7.18	.51	.13	11672	15.0
19	.90	5.77	14.62	19.62	20.64	16.15	14.10	6.54	1.28	.38	12710	16.2
20	1.03	5.26	12.31	18.46	18.97	18.72	16.67	6.67	1.79	.13	13512	17.3
21	.51	4.74	11.03	17.05	21.41	21.03	15.90	6.54	1.67	.13	13750	17.6
22	.77	5.00	11.67	16.79	21.41	22.82	13.97	6.92	.64	.00	13321	17.1
23	.51	5.90	11.15	17.95	26.28	21.79	11.67	3.97	.77	.00	12624	16.2
24	.77	7.18	12.05	20.13	27.05	18.59	11.03	2.82	.38	.00	11831	15.2
TOTAL	.80	11.15	20.90	20.28	21.44	13.44	8.34	2.99	.59	.07	246080	13.1

TABLE 49. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
400FCOT LEVEL-- MAY

FOUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.50	5.09	9.43	17.49	33.37	23.95	8.44	1.74	.00	.00	12509	15.5
2	.50	4.09	10.92	21.22	34.37	21.84	5.83	1.24	.00	.00	11943	14.8
3	.37	4.09	13.03	22.08	37.84	17.87	4.09	.50	.12	.00	11253	14.0
4	.99	7.26	13.28	22.08	36.23	16.25	2.98	.87	.12	.00	10692	13.3
5	.99	9.68	13.90	23.45	34.37	13.52	3.23	.62	.25	.00	10242	12.7
6	1.24	8.93	15.38	28.04	32.38	10.42	2.61	.99	.00	.00	9704	12.0
7	2.23	13.40	17.99	32.26	23.33	7.82	2.73	.25	.00	.00	8397	10.4
8	1.49	19.73	26.30	24.57	18.11	6.95	2.61	.25	.00	.00	7397	9.2
9	.25	26.55	27.79	21.96	15.14	5.96	2.23	.12	.00	.00	6784	8.4
10	.25	28.29	29.90	20.97	13.52	5.21	1.74	.12	.00	.00	6447	8.0
11	.12	21.59	37.47	20.22	13.77	5.21	1.24	.37	.00	.00	6589	8.2
12	.00	16.00	40.69	21.09	13.90	5.71	2.23	.37	.00	.00	7001	8.7
13	.12	13.65	36.85	25.93	13.28	6.20	3.35	.62	.00	.00	7434	9.2
14	.25	9.80	39.08	22.95	16.63	6.58	4.09	.50	.12	.00	7958	9.9
15	.25	9.55	34.37	22.08	19.11	8.31	4.96	.74	.62	.00	8663	10.7
16	.25	8.56	32.01	21.46	18.24	11.29	6.08	1.99	.00	.12	9368	11.6
17	.50	9.43	25.93	23.70	16.13	12.28	8.06	3.47	.37	.12	10244	12.7
18	.62	9.80	21.46	20.47	17.00	14.39	10.67	4.71	.62	.25	11283	14.0
19	.99	7.07	15.88	19.98	18.24	17.12	14.27	5.09	1.36	.00	12685	15.7
20	.25	4.09	13.77	16.63	18.11	19.11	19.85	7.32	.74	.12	14350	17.8
21	.37	2.85	10.55	15.63	18.73	21.59	20.35	9.31	.50	.12	15173	18.6
22	.12	4.09	10.05	14.39	20.10	22.46	18.49	9.18	1.12	.00	15098	18.7
23	.62	4.22	9.93	14.52	24.69	24.69	15.26	5.58	.50	.00	14209	17.6
24	.25	4.47	9.80	15.63	28.54	27.17	10.79	3.10	.25	.00	13376	16.6
TOTAL	.56	10.51	21.49	21.20	22.30	13.83	7.34	2.46	.28	.03	248799	12.9

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
400FCOT LEVEL-- JUN

FOUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.64	3.97	8.85	14.62	27.31	28.59	13.97	2.65	.00	.00	13142	16.8
2	.26	3.21	9.49	18.72	31.92	27.44	8.33	.64	.00	.00	12307	15.8
3	.26	3.59	11.03	21.41	35.26	21.79	6.67	.00	.00	.00	11557	14.8
4	.26	4.87	11.54	26.03	35.77	17.05	3.85	.64	.00	.00	10675	13.7
5	.64	6.28	14.23	25.64	37.05	12.95	2.56	.64	.00	.00	10094	12.9
6	1.41	8.08	15.90	29.62	33.33	9.23	2.18	.26	.00	.00	9087	11.6
7	.90	15.38	21.92	29.62	22.82	7.44	1.79	.00	.13	.00	7829	10.0
8	.64	20.26	28.08	24.36	17.95	7.18	1.41	.13	.00	.00	7010	9.0
9	.90	24.01	31.96	20.67	15.79	5.78	.90	.00	.00	.00	6215	8.0
10	.13	24.90	36.59	20.28	13.99	3.34	.77	.00	.00	.00	5870	7.5
11	.00	16.17	44.80	20.92	12.71	3.85	1.03	.39	.00	.13	6262	8.0
12	.00	11.81	44.54	23.23	14.25	4.62	1.54	.00	.00	.00	6528	8.4
13	.13	9.23	45.26	23.21	15.38	4.36	2.31	.13	.00	.00	6885	8.8
14	.00	6.41	40.77	27.31	15.13	7.18	2.95	.26	.00	.00	7596	9.7
15	.13	7.56	40.00	22.69	16.67	7.18	4.49	1.28	.00	.00	8008	10.2
16	.00	6.92	34.36	23.72	17.18	9.87	5.90	1.15	.90	.00	8936	11.5
17	.13	7.31	27.44	23.08	18.08	11.67	8.21	3.46	.51	.13	10045	12.9
18	.13	5.51	23.08	21.03	16.03	15.64	11.15	6.54	.90	.00	11711	15.0
19	.00	3.33	15.64	21.28	16.67	16.92	17.82	7.18	1.15	.00	13387	17.2
20	.51	2.31	12.18	19.87	13.72	16.67	23.46	9.74	1.54	.00	14793	19.0
21	.26	2.69	9.23	15.26	16.15	19.49	23.59	12.31	1.03	.00	15645	20.1
22	.26	4.23	7.56	11.54	16.41	22.69	25.26	10.64	1.41	.00	15864	20.3
23	.77	4.87	7.18	10.51	18.33	27.69	22.95	7.05	.64	.00	15216	19.5
24	.51	4.10	8.21	12.18	24.62	26.41	18.85	5.13	.00	.00	14142	18.1
TOTAL	.37	8.62	22.91	21.12	20.94	13.96	8.83	2.90	.34	.01	248804	13.3

TABLE 49. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
400FCGT LEVEL-- JUL

FOUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.25	2.61	7.34	16.29	29.23	29.85	12.69	1.74	.00	.00	13739	17.1
2	.25	1.62	7.34	18.03	36.44	29.48	6.22	.37	.25	.00	12952	16.1
3	.12	3.23	8.71	20.90	40.67	23.51	2.61	.12	.12	.00	11885	14.8
4	.62	3.23	10.20	24.00	41.67	18.16	1.87	.25	.00	.00	11165	13.9
5	.75	3.86	13.33	26.28	41.22	12.83	1.74	.00	.00	.00	10378	12.9
6	.62	6.72	13.33	32.88	36.86	8.34	.87	.37	.00	.00	9635	12.0
7	1.49	9.19	24.60	37.02	22.73	3.98	.87	.12	.00	.00	7881	9.8
8	.37	17.74	32.51	30.02	14.02	4.09	.99	.25	.00	.00	6699	8.2
9	.25	30.27	38.09	18.36	8.56	3.97	.37	.12	.00	.00	5420	6.7
10	.12	33.13	42.68	13.52	7.20	2.61	.74	.00	.00	.00	4992	6.2
11	.12	23.45	50.12	15.88	6.95	2.48	.87	.12	.00	.00	5238	6.5
12	.00	19.35	50.25	17.99	8.44	3.10	.62	.12	.12	.00	5567	6.9
13	.00	13.65	49.75	21.46	11.17	2.85	.74	.25	.12	.00	6119	7.6
14	.00	10.42	49.50	21.46	13.52	2.98	1.61	.37	.12	.00	6657	8.2
15	.00	8.56	45.16	24.69	13.52	5.09	2.23	.50	.25	.00	7293	9.0
16	.12	9.60	39.70	23.62	14.89	6.45	3.85	1.12	.25	.00	7952	9.9
17	.00	10.05	33.37	24.32	16.00	8.68	5.71	1.49	.37	.00	8860	11.0
18	.00	9.06	26.80	24.81	15.88	11.04	9.55	2.23	.62	.00	10213	12.7
19	.12	5.46	19.85	25.06	15.76	13.52	14.64	5.33	.25	.00	12109	15.0
20	.25	2.85	13.28	22.33	15.01	15.38	20.97	8.93	.87	.12	14414	17.9
21	.67	3.10	9.31	17.62	13.03	15.51	27.54	11.66	1.36	.00	16063	19.9
22	.74	2.98	11.29	11.66	13.77	19.23	26.05	12.90	1.36	.00	16500	20.5
23	.67	5.09	7.95	12.30	14.53	24.97	26.09	7.45	.75	.00	15714	19.5
24	.50	3.23	7.58	13.29	22.73	29.44	19.13	4.10	.60	.00	14769	18.3
TOTAL	.35	9.95	25.51	21.42	19.73	12.39	7.86	2.50	.28	.01	242214	12.5

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
400FCGT LEVEL-- AUG

FOUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.12	5.47	7.44	17.87	34.37	27.54	7.94	1.24	.00	.00	12935	16.0
2	.37	3.10	8.19	20.84	38.09	25.06	4.22	.12	.00	.00	12121	15.0
3	.50	4.22	10.30	24.94	40.07	17.12	2.48	.37	.00	.00	11034	13.7
4	.62	4.71	15.14	26.30	37.59	13.28	2.23	.12	.00	.00	10355	12.8
5	.87	5.58	15.76	29.28	36.23	11.17	.74	.37	.00	.00	9756	12.1
6	1.49	6.20	17.00	34.24	32.01	8.06	.87	.12	.00	.00	9153	11.4
7	1.61	8.81	21.71	37.84	25.56	3.72	.74	.00	.00	.00	8023	10.0
8	1.61	18.61	32.26	30.40	13.40	3.47	.25	.00	.00	.00	6302	7.8
9	.25	29.65	35.98	21.46	9.18	2.96	.50	.00	.00	.00	5437	6.7
10	.62	37.84	35.24	16.15	6.45	2.11	.87	.12	.00	.00	4840	6.0
11	.00	33.00	42.68	15.76	5.96	2.23	.12	.25	.00	.00	4797	6.0
12	.25	24.44	48.76	15.88	8.44	1.74	.37	.12	.00	.00	5125	6.4
13	.00	19.23	51.36	16.38	9.55	2.48	.74	.25	.00	.00	5635	7.0
14	.00	15.14	50.00	20.10	9.43	3.97	1.12	.12	.12	.00	6191	7.7
15	.00	11.41	46.65	22.83	11.41	5.58	1.36	.62	.12	.00	6830	8.5
16	.00	12.78	39.33	24.19	13.03	7.32	2.36	.87	.12	.00	7496	9.3
17	.12	13.77	34.99	21.96	11.79	10.42	5.21	1.74	.00	.00	8421	10.4
18	.25	11.41	27.54	22.83	14.14	12.78	7.57	2.98	.50	.00	9835	12.2
19	.62	6.70	21.22	22.33	15.63	14.52	14.52	4.09	.37	.00	11811	14.7
20	1.12	3.97	13.77	22.21	17.00	14.76	17.99	8.19	.99	.00	13708	17.0
21	.87	4.09	13.40	18.61	13.90	17.49	19.35	11.79	.50	.00	14765	18.3
22	.67	5.58	11.17	14.89	15.76	19.60	20.97	10.92	.25	.00	14879	18.5
23	.50	3.23	12.66	13.77	21.34	24.57	18.49	5.46	.00	.00	14276	17.7
24	.00	3.85	9.18	14.64	28.29	30.02	13.03	.87	.12	.00	13547	16.6
TOTAL	.53	12.12	25.90	21.93	19.53	11.75	6.00	2.11	.13	.00	227272	11.7

TABLE 49. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
400F COT LEVEL-- SEP

HOUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	.38	6.28	14.62	24.87	32.31	15.51	5.38	.51	.13	.00	10383	13.3
2	1.54	6.28	17.05	25.64	31.15	14.36	3.59	.38	.00	.00	9882	12.7
3	1.28	8.46	16.79	26.03	31.92	11.67	2.56	1.28	.00	.00	9500	12.2
4	1.79	9.36	16.41	30.64	27.69	10.00	3.33	.64	.13	.00	9145	11.7
5	2.44	10.51	17.18	30.26	28.08	8.08	2.95	.38	.13	.00	8716	11.2
6	2.44	12.05	20.64	27.05	27.82	6.67	2.69	.64	.00	.00	8260	10.6
7	2.69	13.21	21.92	31.92	22.18	5.51	2.18	.38	.00	.00	7763	10.0
8	3.33	18.21	25.77	30.51	14.87	5.26	1.41	.64	.00	.00	6836	8.6
9	1.41	27.60	31.07	20.80	11.30	5.65	1.54	.64	.00	.00	6052	7.8
10	.90	32.35	30.55	17.46	11.94	3.85	2.57	.26	.13	.00	5782	7.4
11	.51	31.45	32.73	19.26	8.99	5.01	1.67	.26	.13	.00	5716	7.3
12	.64	25.26	40.51	16.41	10.64	3.72	2.44	.26	.13	.00	5867	7.5
13	.13	22.05	42.82	16.28	10.38	4.10	2.82	1.41	.00	.00	6286	8.1
14	.13	21.41	40.77	17.69	11.15	5.13	2.56	1.03	.13	.00	6448	8.3
15	.00	21.03	36.92	18.21	12.35	6.79	3.97	.90	.13	.00	6983	9.0
16	.00	17.95	36.15	18.72	11.92	8.72	5.26	1.15	.13	.00	7596	9.7
17	.64	16.67	32.05	18.85	12.56	8.85	8.59	1.67	.13	.00	8360	10.7
18	1.54	11.94	27.21	22.21	12.32	10.27	11.42	3.08	.00	.00	9518	12.2
19	1.03	8.09	22.08	24.90	14.63	14.12	10.91	3.85	.39	.00	10637	13.7
20	2.16	7.31	16.92	23.21	17.44	14.49	13.97	4.23	.26	.00	11354	14.6
21	1.54	7.96	16.30	21.31	20.41	16.05	11.68	3.98	.77	.00	11393	14.6
22	1.41	7.31	16.41	22.56	22.44	16.54	9.36	3.46	.51	.00	11185	14.3
23	.51	6.41	15.64	23.33	26.67	17.44	8.33	1.54	.13	.00	10900	14.0
24	.64	5.90	15.38	25.26	28.72	17.95	5.26	.90	.00	.00	10508	13.5
TOTAL	1.21	14.79	25.16	23.06	19.15	9.82	5.27	1.39	.14	.00	205170	11.0

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
400F COT LEVEL-- OCT

HOUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	3.85	14.27	17.74	25.06	24.81	10.67	2.85	.62	.12	.00	8755	10.9
2	3.97	13.90	19.11	22.95	26.80	9.93	2.48	.74	.12	.00	8686	10.6
3	4.34	13.15	19.11	26.67	25.06	8.81	2.23	.37	.00	.25	8369	10.4
4	2.98	16.38	19.98	27.17	22.08	8.81	2.11	.25	.12	.12	8215	10.2
5	4.59	16.38	19.73	26.80	22.46	7.44	1.86	.74	.00	.00	7881	9.8
6	4.47	17.99	21.09	26.80	20.35	5.46	3.10	.62	.12	.00	7639	9.5
7	3.85	18.73	23.33	23.82	20.84	6.33	2.23	.62	.25	.00	7517	9.3
8	3.97	21.71	21.34	24.32	21.46	4.47	1.99	.62	.12	.00	7228	9.0
9	4.71	27.79	22.95	23.45	15.38	3.10	2.23	.37	.00	.00	6239	7.7
10	3.23	36.48	23.82	16.13	10.55	6.58	2.85	.37	.00	.00	5951	7.4
11	1.86	38.21	25.93	14.64	8.81	5.96	3.35	1.12	.12	.00	5996	7.4
12	1.86	35.11	31.64	13.28	7.44	7.07	2.48	.99	.12	.00	5956	7.4
13	.74	33.75	33.62	12.16	8.44	5.71	4.09	1.24	.25	.00	6273	7.8
14	.62	30.65	34.37	13.52	8.56	6.45	4.09	1.36	.37	.00	6571	8.2
15	.99	29.65	33.25	13.28	9.43	6.82	4.09	1.99	.50	.00	6895	8.6
16	.99	30.40	29.78	13.90	9.68	7.82	5.09	1.99	.37	.00	7223	9.0
17	3.72	23.08	27.67	17.25	11.91	8.56	4.71	2.61	.50	.00	7786	9.7
18	5.09	17.62	23.57	19.98	14.14	11.04	6.20	2.23	.12	.00	8567	10.6
19	4.09	14.52	22.33	20.47	17.37	12.03	7.07	1.99	.00	.12	9240	11.5
20	3.60	13.40	21.22	22.08	19.73	11.91	5.83	1.74	.50	.00	9323	11.6
21	2.48	12.90	20.72	23.57	21.09	12.03	5.46	.99	.74	.00	9393	11.7
22	3.35	12.78	20.60	19.98	24.81	12.41	4.47	1.36	.25	.00	9290	11.5
23	3.72	12.16	18.49	26.30	21.71	13.77	2.98	.74	.12	.00	9096	11.3
24	3.23	12.03	18.86	23.57	27.54	10.05	3.97	.50	.25	.00	9110	11.3
TOTAL	3.18	21.38	23.76	20.71	17.52	8.47	3.66	1.09	.21	.02	187199	9.7

X-73

TABLE 49. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
400FEET LEVEL-- NDV

FLUK	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	5.51	18.85	24.36	21.79	17.18	7.31	2.82	1.67	.26	.26	7450	9.6
2	5.58	20.51	21.28	23.46	17.82	6.67	3.33	1.03	.51	.00	7363	9.4
3	5.51	21.28	23.33	20.77	18.33	6.15	3.08	1.15	.38	.00	7189	9.2
4	5.51	24.23	19.74	22.56	17.44	5.38	2.82	1.67	.51	.13	7168	9.2
5	5.77	22.69	20.64	22.18	17.18	6.79	2.69	1.28	.38	.38	7266	9.3
6	5.51	22.95	22.56	23.33	14.62	6.03	2.95	1.41	.64	.00	7051	9.0
7	6.03	20.77	26.15	21.92	15.38	6.41	1.79	.77	.77	.00	6865	8.8
8	5.13	22.44	26.03	21.28	15.90	5.26	2.56	.90	.38	.13	6719	8.6
9	4.49	26.70	24.26	18.87	17.07	4.49	2.44	1.28	.26	.13	6625	8.5
10	7.45	27.60	24.01	17.97	13.61	4.36	3.08	1.28	.51	.13	6293	8.1
11	6.29	32.99	25.93	11.42	11.42	5.13	4.62	1.41	.64	.13	6233	8.0
12	4.62	35.17	23.75	14.89	9.11	5.91	4.62	1.41	.35	.13	6262	8.0
13	2.82	35.38	25.77	13.59	9.10	6.79	4.23	1.54	.77	.00	6421	8.2
14	3.33	33.46	27.05	13.46	10.51	5.51	3.59	2.18	.90	.00	6484	8.3
15	4.74	34.23	24.74	13.33	10.38	6.03	3.85	2.18	.38	.13	6405	8.2
16	7.05	30.00	24.36	15.38	9.10	7.31	3.85	2.18	.51	.26	6585	8.4
17	7.69	24.74	24.62	16.28	12.95	6.79	4.36	1.67	.77	.13	7001	9.0
18	6.28	20.90	25.64	17.44	14.49	8.21	5.13	1.28	.38	.26	7459	9.6
19	6.67	20.77	23.72	18.08	16.92	8.46	3.72	1.15	.38	.13	7362	9.4
20	5.60	19.49	23.46	20.38	19.23	7.82	3.08	1.28	.26	.00	7464	9.6
21	4.36	21.15	20.90	21.79	19.62	7.18	3.46	1.15	.38	.00	7575	9.7
22	6.28	20.38	18.72	24.10	19.10	6.92	3.72	.51	.26	.00	7411	9.5
23	6.92	18.59	20.64	22.95	18.46	7.18	4.23	.77	.13	.13	7450	9.6
24	5.64	20.00	22.82	19.87	20.00	7.18	2.44	1.41	.51	.13	7477	9.6
TOTAL	5.56	24.80	23.52	19.05	15.21	6.47	3.44	1.36	.47	.11	167578	9.0

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
400FEET LEVEL-- DEC

FLUK	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	6.45	22.08	19.85	20.47	18.36	6.58	3.35	1.24	1.24	.37	7934	9.8
2	6.70	22.70	18.86	21.71	17.00	6.70	3.10	1.99	.87	.37	7796	9.7
3	6.82	23.95	19.23	20.72	16.38	7.44	1.99	2.48	.50	.50	7674	9.5
4	7.44	22.08	20.47	20.60	17.25	6.08	3.10	2.11	.62	.25	7622	9.5
5	5.59	24.10	20.99	19.38	16.77	6.96	3.48	1.74	.75	.25	7651	9.5
6	7.20	22.83	20.35	22.08	16.63	5.33	2.85	1.74	.87	.12	7418	9.2
7	6.58	22.36	23.23	21.24	15.16	5.71	3.73	1.24	.62	.12	7307	9.1
8	6.95	23.20	22.21	20.47	16.25	5.58	3.23	1.36	.37	.37	7224	9.0
9	7.32	24.32	20.72	20.60	15.38	5.83	3.23	1.99	.62	.00	7294	9.0
10	7.44	24.07	22.58	21.84	13.40	4.84	2.85	1.99	.87	.12	7128	8.8
11	5.71	29.07	20.99	19.75	13.17	5.71	2.98	1.24	1.24	.12	6925	8.6
12	6.21	30.68	19.63	19.63	12.05	4.84	3.73	2.24	.50	.50	6926	8.6
13	5.96	31.18	22.24	16.27	11.06	5.84	4.60	1.99	.62	.25	6982	8.7
14	7.70	30.15	21.12	16.89	9.69	6.58	4.22	2.36	.99	.25	7066	8.8
15	7.70	29.69	22.73	16.02	10.19	5.96	4.60	1.86	.99	.25	6919	8.6
16	7.07	27.67	21.71	17.74	12.66	6.58	3.47	1.99	.62	.50	7173	8.9
17	7.44	25.81	21.46	18.36	13.28	7.07	3.23	1.99	.99	.37	7395	9.2
18	7.57	23.20	21.84	19.11	15.26	5.58	4.34	2.36	.62	.12	7594	9.4
19	6.95	22.08	22.33	17.25	17.37	7.20	3.47	2.61	.50	.25	7885	9.8
20	6.58	21.34	21.96	17.87	17.87	6.58	4.09	2.98	.62	.12	7970	9.9
21	6.55	18.49	21.96	20.60	17.12	7.94	3.60	2.61	.62	.12	8039	10.0
22	7.20	19.98	19.73	21.96	17.12	7.07	3.97	2.36	.50	.12	7972	9.9
23	6.20	20.35	21.59	20.10	18.49	6.95	3.60	1.24	.99	.50	7977	9.9
24	7.44	20.35	20.35	21.22	17.12	7.32	3.72	1.24	.99	.25	7867	9.8
TOTAL	6.88	24.24	21.17	19.66	15.21	6.35	3.52	1.95	.76	.26	179742	9.3

TABLE 49. Continued

PERCENT FREQUENCY OF HOURLY WIND SPEED CLASS AND AVERAGE SPEED- 1955-1980
400FEET LEVEL-- ANNUAL

HOUR	C	SPEED CLASS									TOTAL SPEED	AVG SPEED
		1-3	4-7	8-12	13-18	19-24	25-31	32-38	39-46	GT.46		
1	2.63	10.66	14.99	20.44	26.37	16.49	6.34	1.67	.29	.11	124367	13.1
2	2.68	10.82	15.13	21.82	27.87	15.49	4.75	1.06	.28	.09	119938	12.6
3	2.76	11.34	16.21	23.15	28.48	13.04	3.54	1.05	.28	.15	114615	12.1
4	2.77	12.71	17.06	23.94	27.71	11.18	3.17	1.10	.27	.08	110059	11.6
5	3.11	13.33	17.85	24.84	27.25	9.07	3.26	.92	.26	.12	106196	11.2
6	3.50	14.17	18.53	26.76	25.54	7.23	2.98	.93	.32	.05	101170	10.7
7	3.38	15.93	22.01	27.60	20.93	6.53	2.59	.66	.33	.03	93945	9.5
8	3.17	20.06	25.06	24.74	17.54	5.92	2.44	.78	.22	.06	86655	9.1
9	2.80	25.34	26.91	21.25	14.58	5.61	2.30	.95	.20	.05	80551	8.5
10	2.81	28.73	28.28	18.82	12.43	5.11	2.60	.80	.34	.07	76767	8.1
11	2.03	27.27	32.23	17.77	11.29	5.28	2.53	1.10	.40	.11	77092	8.1
12	1.71	24.78	34.58	17.67	11.11	5.54	2.97	1.15	.36	.14	79301	8.4
13	1.32	22.62	35.16	18.04	11.56	5.83	3.55	1.33	.42	.17	83451	8.8
14	1.55	20.46	34.71	18.36	12.48	6.31	3.90	1.56	.55	.14	87494	9.2
15	1.75	19.24	33.02	18.81	12.92	7.11	4.67	1.82	.55	.12	91812	9.7
16	2.12	18.40	30.20	19.31	13.40	8.47	5.26	2.14	.55	.16	97113	10.2
17	2.78	16.67	26.96	20.01	14.19	9.35	6.61	2.64	.62	.17	104546	11.0
18	3.01	13.76	23.92	20.72	15.15	11.15	8.15	3.39	.59	.15	114485	12.1
19	2.76	11.66	19.77	20.86	17.26	12.74	10.23	3.92	.66	.13	125946	13.3
20	2.55	10.35	17.12	20.26	18.13	13.35	12.28	4.98	.90	.08	135707	14.2
21	2.52	10.04	15.61	19.51	18.52	14.49	12.66	5.79	.78	.08	140577	14.6
22	2.73	10.68	14.90	18.20	19.74	15.47	12.06	5.44	.75	.04	139839	14.7
23	2.65	10.73	14.95	18.63	21.59	16.72	10.76	3.42	.44	.09	134559	14.2
24	2.70	10.38	15.35	19.09	24.18	17.26	8.50	2.12	.35	.07	129126	13.6
TOTAL	2.57	16.26	22.94	20.86	18.76	10.20	5.75	2.11	.45	.10	2555311	11.2

WIND SPEED AND DIRECTION VERSUS STABILITY

Tables 50, 51 and 52 show the joint percent frequency distribution between wind direction and six class intervals of wind speed.

These tables show the joint frequency distribution, in percent, between six class intervals of wind speed and eighteen class intervals of wind direction, with each grouping broken down into four stability categories as follows: VS (very stable), MS (moderately stable), N (neutral) and U (unstable). Table 50 relates ΔT_1 to the 200-foot wind and Table 51 relates ΔT_2 to the same wind. Table 52 relates ΔT_6 to the 400-foot wind.

The ΔT s, together with the stability category determination for each, are explained below, where T is temperature in °F, and the subscripts denote height above ground surface in feet.

	<u>$\Delta T_1 = T_{200} - T_3$</u>	<u>$\Delta T_2 = T_{250} - T_{50}$</u>	<u>$\Delta T_6 = T_{400} - T_{250}$</u>
VS	<u>≥ 3.5</u>	<u>≥ 3.5</u>	<u>≥ 2.5</u>
MS	3.4 to -0.4	3.4 to -0.4	2.4 to -0.3
N	-0.5 to -1.4	-0.5 to -1.4	-0.4 to -1.1
U	<u>≤ -1.5</u>	<u>≤ -1.5</u>	<u>≤ -1.2</u>

Monthly and annual hourly average temperatures measured on the Hanford Meteorology Tower are summarized in Tables 53 through 60. The temperatures are recorded hourly on the half-hour. Temperature data used in Figures 26 through 28 and Tables 50 through 52 are taken from these summaries.

TABLE 50. Seasonal and Annual Percent Frequency Distribution of Wind Speed and Direction Versus Stability (1955 Through 1980) at 200-Foot Level, Using ΔT_1

WINTER

SPEED CLASS		NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
0-3	U	0.41	0.33	0.25	0.20	0.17	0.14	0.07	0.07	0.05	0.05	0.05	0.07	0.11	0.18	0.30	0.36	0.22	0.09	3.12
0-3	N	0.58	0.53	0.45	0.56	0.58	0.76	0.50	0.30	0.21	0.17	0.21	0.37	0.39	0.59	0.73	0.79	1.46	0.25	9.42
0-3	MS	0.37	0.33	0.31	0.40	0.58	0.72	0.45	0.38	0.25	0.22	0.23	0.40	0.45	0.57	0.58	0.59	1.34	0.31	8.47
0-3	VS	0.33	0.32	0.22	0.29	0.36	0.57	0.36	0.37	0.25	0.28	0.30	0.45	0.38	0.51	0.52	0.54	0.73	0.41	7.18
4-7	U	0.32	0.27	0.20	0.16	0.13	0.14	0.06	0.05	0.05	0.04	0.04	0.06	0.19	0.70	0.63	0.50	0.00	0.00	3.55
4-7	N	0.18	0.20	0.18	0.17	0.18	0.24	0.20	0.10	0.07	0.12	0.15	0.26	0.50	1.11	0.64	0.37	0.00	0.01	4.68
4-7	MS	0.33	0.27	0.19	0.23	0.26	0.47	0.33	0.24	0.20	0.25	0.25	0.56	0.88	1.35	1.06	0.70	0.00	0.04	7.62
4-7	VS	0.28	0.21	0.16	0.21	0.22	0.32	0.36	0.38	0.29	0.41	0.49	0.93	1.03	1.05	0.91	0.58	0.00	0.07	7.89
8-12	U	0.12	0.07	0.03	0.02	0.01	0.02	0.02	0.03	0.07	0.06	0.11	0.07	0.29	1.14	0.35	0.15	0.00	0.00	2.54
8-12	N	0.06	0.05	0.02	0.01	0.02	0.07	0.06	0.03	0.06	0.06	0.09	0.12	0.88	1.73	0.32	0.13	0.00	0.00	3.69
8-12	MS	0.14	0.07	0.03	0.06	0.10	0.28	0.20	0.15	0.23	0.36	0.42	0.69	1.65	2.88	0.81	0.24	0.00	0.00	8.31
8-12	VS	0.09	0.06	0.04	0.04	0.04	0.11	0.14	0.13	0.12	0.30	0.55	1.00	1.43	1.73	0.74	0.20	0.00	0.00	6.73
13-18	U	0.11	0.02	0.00	0.00	0.00	0.00	0.01	0.02	0.07	0.12	0.19	0.11	0.25	0.44	0.08	0.10	0.00	0.00	1.52
13-18	N	0.07	0.01	0.00	0.01	0.00	0.01	0.02	0.03	0.07	0.12	0.12	0.07	0.67	1.06	0.09	0.10	0.00	0.00	2.44
13-18	MS	0.15	0.04	0.00	0.01	0.04	0.08	0.13	0.23	0.33	0.72	0.90	0.81	1.97	2.79	0.35	0.16	0.00	0.00	8.71
13-18	VS	0.04	0.02	0.01	0.00	0.00	0.03	0.04	0.05	0.10	0.19	0.31	0.54	0.87	1.24	0.16	0.04	0.00	0.00	3.63
19-24	U	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.01	0.04	0.15	0.13	0.06	0.07	0.10	0.01	0.03	0.00	0.00	0.68
19-24	N	0.05	0.01	0.00	0.00	0.00	0.00	0.01	0.04	0.08	0.16	0.11	0.03	0.10	0.16	0.00	0.06	0.00	0.00	0.81
19-24	MS	0.06	0.04	0.00	0.00	0.00	0.02	0.09	0.19	0.41	0.93	0.64	0.39	0.51	0.61	0.04	0.03	0.00	0.00	3.96
19-24	VS	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.03	0.07	0.07	0.07	0.11	0.11	0.00	0.00	0.00	0.00	0.49
GT.24	U	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.07	0.22	0.20	0.06	0.03	0.05	0.00	0.02	0.00	0.00	0.70
GT.24	N	0.02	0.01	0.00	0.00	0.00	0.00	0.01	0.02	0.12	0.26	0.09	0.03	0.02	0.02	0.00	0.02	0.00	0.00	0.64
GT.24	MS	0.02	0.04	0.01	0.00	0.00	0.01	0.06	0.18	0.75	1.10	0.51	0.15	0.14	0.11	0.01	0.01	0.00	0.00	3.09
GT.24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.04	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.10
TOTALS	U	1.03	0.73	0.50	0.38	0.31	0.31	0.15	0.18	0.33	0.64	0.72	0.43	0.94	2.61	1.37	1.17	0.22	0.09	12.12
TOTALS	N	0.96	0.81	0.65	0.73	0.78	1.08	0.79	0.52	0.60	0.90	0.77	0.89	2.55	4.68	1.79	1.46	1.46	0.26	21.69
TOTALS	MS	1.06	0.78	0.54	0.70	0.99	1.58	1.27	1.37	2.17	3.58	2.95	3.00	5.60	8.30	2.85	1.73	1.34	0.35	40.16
TOTALS	VS	0.74	0.61	0.42	0.53	0.62	1.04	0.93	0.95	0.82	1.28	1.73	3.00	3.81	4.64	2.34	1.36	0.73	0.48	26.03

TABLE 50. Continued

SPRING

SPEED CLASS		NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
0-3	U	0.55	0.66	0.36	0.42	0.30	0.32	0.15	0.18	0.16	0.16	0.12	0.18	0.17	0.30	0.38	0.65	0.06	0.51	5.64
0-3	N	0.09	0.15	0.10	0.13	0.14	0.16	0.07	0.07	0.04	0.05	0.04	0.09	0.05	0.11	0.14	0.18	0.09	0.11	1.80
0-3	MS	0.08	0.10	0.07	0.11	0.15	0.17	0.08	0.09	0.06	0.07	0.08	0.13	0.11	0.11	0.11	0.14	0.13	0.09	1.87
0-3	VS	0.13	0.12	0.11	0.16	0.20	0.23	0.17	0.13	0.15	0.19	0.14	0.34	0.23	0.27	0.25	0.21	0.26	0.18	3.47
4-7	U	1.02	1.00	0.72	0.68	0.57	0.76	0.48	0.60	0.55	0.67	0.48	0.48	0.62	1.18	1.25	1.36	0.00	0.29	12.70
4-7	N	0.07	0.09	0.07	0.09	0.12	0.21	0.12	0.08	0.06	0.06	0.08	0.11	0.16	0.18	0.14	0.10	0.00	0.02	1.76
4-7	MS	0.09	0.12	0.11	0.16	0.19	0.33	0.15	0.18	0.14	0.18	0.27	0.41	0.36	0.36	0.24	0.22	0.00	0.02	3.53
4-7	VS	0.14	0.13	0.12	0.15	0.20	0.28	0.22	0.24	0.21	0.32	0.47	0.93	0.93	0.80	0.50	0.37	0.00	0.01	6.01
8-12	U	0.59	0.40	0.17	0.14	0.11	0.24	0.21	0.28	0.50	0.72	0.70	0.49	0.80	1.55	0.63	0.59	0.00	0.01	8.14
8-12	N	0.06	0.03	0.03	0.04	0.05	0.08	0.08	0.05	0.07	0.12	0.15	0.19	0.29	0.33	0.11	0.06	0.00	0.00	1.75
8-12	MS	0.11	0.08	0.04	0.06	0.07	0.20	0.19	0.17	0.26	0.32	0.60	1.26	1.38	0.91	0.32	0.15	0.00	0.00	6.10
8-12	VS	0.11	0.13	0.12	0.10	0.07	0.13	0.22	0.16	0.13	0.24	0.56	1.46	1.87	1.49	0.51	0.21	0.00	0.00	7.52
13-18	U	0.38	0.19	0.07	0.02	0.01	0.03	0.08	0.12	0.36	0.78	1.07	0.53	0.95	1.20	0.16	0.22	0.00	0.00	6.15
13-18	N	0.07	0.02	0.02	0.01	0.01	0.04	0.05	0.08	0.09	0.18	0.30	0.19	0.40	0.36	0.04	0.04	0.00	0.00	1.90
13-18	MS	0.08	0.06	0.03	0.03	0.02	0.08	0.18	0.14	0.25	0.51	1.12	2.02	3.41	1.93	0.18	0.11	0.00	0.00	10.14
13-18	VS	0.05	0.04	0.04	0.03	0.01	0.05	0.14	0.03	0.02	0.06	0.32	0.55	1.18	1.36	0.19	0.08	0.00	0.00	4.16
19-24	U	0.12	0.07	0.02	0.00	0.00	0.00	0.01	0.05	0.21	0.56	0.68	0.24	0.60	0.73	0.04	0.05	0.00	0.00	3.36
19-24	N	0.02	0.02	0.01	0.00	0.00	0.01	0.02	0.06	0.11	0.19	0.22	0.09	0.32	0.33	0.02	0.01	0.00	0.00	1.41
19-24	MS	0.04	0.03	0.02	0.01	0.00	0.03	0.07	0.07	0.16	0.48	0.72	0.50	2.07	1.43	0.04	0.01	0.00	0.00	5.68
19-24	VS	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.02	0.07	0.19	0.01	0.00	0.00	0.00	0.36
GT.24	U	0.03	0.03	0.02	0.01	0.00	0.00	0.00	0.02	0.15	0.78	0.60	0.18	0.41	0.61	0.01	0.02	0.00	0.00	2.88
GT.24	N	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.06	0.23	0.12	0.05	0.25	0.28	0.00	0.00	0.00	0.00	1.03
GT.24	MS	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.05	0.17	0.40	0.22	0.06	0.78	0.92	0.00	0.01	0.00	0.00	2.64
GT.24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
TOTALS	U	2.69	2.35	1.36	1.28	0.98	1.34	0.94	1.25	1.93	3.67	3.65	2.09	3.55	5.58	2.47	2.88	0.06	0.81	38.87
TOTALS	N	0.31	0.32	0.23	0.28	0.32	0.50	0.34	0.36	0.43	0.82	0.91	0.72	1.46	1.60	0.44	0.40	0.09	0.13	9.64
TOTALS	MS	0.40	0.39	0.27	0.38	0.44	0.80	0.68	0.69	1.04	1.96	3.00	4.39	8.11	5.65	0.89	0.64	0.13	0.11	29.96
TOTALS	VS	0.43	0.43	0.40	0.45	0.48	0.69	0.76	0.57	0.52	0.82	1.52	3.30	4.27	4.11	1.46	0.87	0.26	0.19	21.52

X-78

TABLE 50. Continued

SUMMER

SPEED CLASS		NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
0-3	U	0.50	0.61	0.32	0.38	0.37	0.35	0.20	0.31	0.18	0.31	0.20	0.25	0.20	0.31	0.34	0.58	0.05	1.02	6.50
0-3	N	0.08	0.07	0.07	0.09	0.08	0.11	0.06	0.05	0.05	0.04	0.06	0.07	0.06	0.09	0.08	0.10	0.06	0.08	1.30
0-3	MS	0.05	0.03	0.04	0.04	0.07	0.10	0.04	0.07	0.03	0.04	0.06	0.10	0.10	0.09	0.05	0.07	0.06	0.06	1.10
0-3	VS	0.08	0.06	0.05	0.05	0.06	0.10	0.06	0.08	0.07	0.10	0.13	0.20	0.17	0.15	0.10	0.12	0.13	0.05	1.76
4-7	U	1.68	1.49	0.95	1.14	0.98	1.19	0.80	0.99	0.88	1.01	0.85	0.86	0.87	1.54	1.59	1.86	0.00	0.83	19.52
4-7	N	0.08	0.07	0.06	0.07	0.15	0.18	0.07	0.07	0.06	0.08	0.08	0.16	0.13	0.17	0.11	0.10	0.00	0.02	1.66
4-7	MS	0.07	0.07	0.07	0.09	0.15	0.19	0.08	0.12	0.08	0.17	0.20	0.38	0.30	0.20	0.13	0.07	0.00	0.01	2.38
4-7	VS	0.12	0.11	0.09	0.12	0.14	0.19	0.14	0.12	0.12	0.20	0.37	0.80	0.76	0.50	0.32	0.23	0.00	0.01	4.35
8-12	U	0.78	0.53	0.24	0.29	0.26	0.24	0.19	0.27	0.53	1.11	1.08	0.72	1.00	1.90	0.86	0.74	0.00	0.01	10.75
8-12	N	0.04	0.03	0.05	0.05	0.06	0.05	0.05	0.03	0.05	0.08	0.15	0.18	0.25	0.27	0.05	0.04	0.00	0.00	1.42
8-12	MS	0.08	0.08	0.05	0.10	0.12	0.11	0.10	0.07	0.08	0.20	0.48	1.29	1.48	0.63	0.15	0.13	0.00	0.00	5.13
8-12	VS	0.12	0.11	0.09	0.10	0.09	0.07	0.14	0.10	0.07	0.14	0.43	1.25	2.03	1.27	0.43	0.18	0.00	0.00	6.64
13-18	U	0.23	0.18	0.07	0.05	0.02	0.05	0.05	0.05	0.21	0.84	1.07	0.50	0.94	1.65	0.17	0.13	0.00	0.00	6.22
13-18	N	0.03	0.02	0.01	0.01	0.01	0.01	0.03	0.02	0.03	0.08	0.27	0.25	0.41	0.38	0.04	0.02	0.00	0.00	1.61
13-18	MS	0.06	0.04	0.04	0.03	0.01	0.02	0.07	0.05	0.06	0.17	0.63	1.49	4.60	2.06	0.16	0.06	0.00	0.00	9.55
13-18	VS	0.03	0.03	0.02	0.02	0.00	0.02	0.08	0.01	0.01	0.03	0.11	0.28	1.30	1.38	0.15	0.03	0.00	0.00	3.50
19-24	U	0.04	0.05	0.01	0.01	0.00	0.00	0.01	0.02	0.08	0.28	0.45	0.17	0.44	1.17	0.06	0.01	0.00	0.00	2.81
19-24	N	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.07	0.17	0.08	0.45	0.58	0.01	0.01	0.00	0.00	1.42
19-24	MS	0.02	0.03	0.02	0.00	0.00	0.00	0.01	0.01	0.02	0.09	0.17	0.31	2.79	2.75	0.05	0.01	0.00	0.00	6.28
19-24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.04	0.21	0.00	0.00	0.00	0.00	0.28
GT.24	U	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.16	0.26	0.07	0.24	0.98	0.02	0.00	0.00	0.00	1.79
GT.24	N	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.03	0.07	0.02	0.39	0.75	0.00	0.00	0.00	0.00	1.30
GT.24	MS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.03	0.03	1.05	1.57	0.01	0.00	0.00	0.00	2.74
GT.24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
TOTALS	U	3.23	2.88	1.60	1.87	1.62	1.83	1.25	1.64	1.91	3.71	3.92	2.58	3.69	7.55	3.05	3.33	0.05	1.87	47.58
TOTALS	N	0.24	0.21	0.20	0.22	0.30	0.35	0.22	0.17	0.21	0.37	0.80	0.76	1.60	2.24	0.30	0.27	0.06	0.10	8.71
TOTALS	MS	0.27	0.26	0.21	0.27	0.35	0.43	0.30	0.33	0.28	0.69	1.58	3.61	10.30	7.31	0.54	0.34	0.06	0.07	27.18
TOTALS	VS	0.35	0.31	0.26	0.31	0.29	0.39	0.43	0.32	0.27	0.46	1.04	2.52	4.31	3.51	1.00	0.56	0.13	0.06	16.53

TABLE 50. Continued

AUTUMN

SPEED CLASS		NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
0-3	U	0.87	0.97	0.62	0.67	0.52	0.40	0.17	0.12	0.08	0.10	0.10	0.14	0.18	0.31	0.53	0.79	0.23	0.41	7.24
0-3	N	0.32	0.33	0.28	0.35	0.39	0.47	0.20	0.18	0.11	0.08	0.08	0.12	0.14	0.28	0.37	0.35	0.51	0.15	4.71
0-3	MS	0.20	0.19	0.18	0.27	0.33	0.49	0.22	0.20	0.12	0.13	0.18	0.16	0.22	0.33	0.28	0.37	0.61	0.17	4.66
0-3	VS	0.34	0.29	0.24	0.35	0.42	0.56	0.38	0.39	0.33	0.29	0.34	0.54	0.52	0.60	0.60	0.53	0.88	0.33	7.94
4-7	U	1.02	0.73	0.50	0.59	0.63	0.53	0.23	0.20	0.24	0.25	0.21	0.23	0.35	0.89	1.25	1.42	0.00	0.09	9.35
4-7	N	0.13	0.11	0.08	0.11	0.23	0.28	0.13	0.08	0.07	0.07	0.09	0.13	0.19	0.48	0.35	0.16	0.00	0.01	2.71
4-7	MS	0.19	0.12	0.15	0.19	0.28	0.45	0.30	0.22	0.16	0.21	0.20	0.36	0.51	0.73	0.52	0.37	0.00	0.01	4.98
4-7	VS	0.29	0.20	0.16	0.21	0.27	0.44	0.46	0.45	0.35	0.46	0.67	1.29	1.58	1.47	0.92	0.55	0.00	0.02	9.81
8-12	U	0.47	0.25	0.07	0.04	0.04	0.10	0.06	0.07	0.15	0.26	0.32	0.19	0.31	1.00	0.62	0.46	0.00	0.00	4.41
8-12	N	0.06	0.04	0.02	0.03	0.03	0.08	0.07	0.06	0.05	0.07	0.12	0.11	0.24	0.60	0.17	0.07	0.00	0.00	1.81
8-12	MS	0.10	0.06	0.03	0.05	0.10	0.23	0.27	0.18	0.24	0.35	0.43	0.85	1.28	1.46	0.50	0.19	0.00	0.00	6.33
8-12	VS	0.18	0.08	0.06	0.06	0.05	0.13	0.31	0.15	0.13	0.27	0.64	1.53	2.49	2.37	0.83	0.28	0.00	0.00	9.56
13-18	U	0.28	0.13	0.02	0.01	0.00	0.02	0.03	0.03	0.12	0.34	0.39	0.16	0.34	0.61	0.11	0.11	0.00	0.00	2.69
13-18	N	0.05	0.02	0.00	0.00	0.00	0.03	0.04	0.07	0.08	0.14	0.17	0.09	0.25	0.38	0.10	0.06	0.00	0.00	1.47
13-18	MS	0.12	0.04	0.00	0.02	0.01	0.08	0.17	0.19	0.29	0.55	0.80	1.02	2.11	1.90	0.24	0.13	0.00	0.00	7.65
13-18	VS	0.08	0.03	0.01	0.02	0.00	0.03	0.09	0.03	0.02	0.08	0.24	0.43	1.44	1.98	0.31	0.05	0.00	0.00	4.83
19-24	U	0.06	0.05	0.01	0.00	0.00	0.00	0.01	0.01	0.06	0.26	0.32	0.07	0.19	0.36	0.01	0.03	0.00	0.00	1.47
19-24	N	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.03	0.08	0.15	0.16	0.03	0.12	0.19	0.01	0.03	0.00	0.00	0.85
19-24	MS	0.05	0.05	0.02	0.00	0.00	0.01	0.04	0.14	0.24	0.49	0.45	0.25	0.97	1.08	0.03	0.03	0.00	0.00	3.85
19-24	VS	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.03	0.02	0.08	0.21	0.00	0.00	0.00	0.00	0.38
GT.24	U	0.01	0.05	0.01	0.00	0.00	0.00	0.00	0.01	0.07	0.32	0.21	0.06	0.10	0.21	0.01	0.01	0.00	0.00	1.09
GT.24	N	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.07	0.16	0.07	0.03	0.07	0.12	0.00	0.00	0.00	0.00	0.55
GT.24	MS	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.07	0.26	0.38	0.18	0.06	0.28	0.38	0.01	0.01	0.00	0.00	1.64
GT.24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
TOTALS	U	2.71	2.18	1.22	1.31	1.19	1.05	0.49	0.45	0.72	1.53	1.56	0.85	1.49	3.38	2.55	2.83	0.23	0.51	26.24
TOTALS	N	0.58	0.51	0.39	0.50	0.65	0.86	0.46	0.44	0.46	0.68	0.67	0.51	1.02	2.04	0.99	0.67	0.51	0.16	12.11
TOTALS	MS	0.65	0.47	0.39	0.53	0.72	1.27	1.02	1.00	1.30	2.09	2.24	2.71	5.37	5.89	1.58	1.11	0.61	0.18	29.12
TOTALS	VS	0.89	0.61	0.48	0.64	0.74	1.16	1.26	1.03	0.84	1.11	1.91	3.81	6.10	6.63	2.66	1.42	0.88	0.36	32.53

TABLE 50. Continued

ANNUAL

SPEED CLASS		NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
0-3	U	0.58	0.64	0.39	0.42	0.34	0.30	0.14	0.17	0.12	0.16	0.12	0.16	0.17	0.27	0.39	0.60	0.14	0.51	5.62
0-3	N	0.26	0.27	0.22	0.28	0.30	0.37	0.21	0.15	0.10	0.09	0.10	0.16	0.16	0.27	0.33	0.36	0.53	0.15	4.29
0-3	MS	0.17	0.16	0.15	0.20	0.28	0.37	0.20	0.18	0.12	0.11	0.14	0.20	0.22	0.27	0.25	0.29	0.53	0.16	4.01
0-3	VS	0.22	0.20	0.15	0.21	0.26	0.36	0.25	0.24	0.20	0.21	0.23	0.38	0.32	0.38	0.37	0.35	0.49	0.24	5.07
4-7	U	1.01	0.88	0.59	0.64	0.58	0.66	0.39	0.46	0.43	0.49	0.40	0.41	0.51	1.08	1.18	1.29	0.00	0.30	11.30
4-7	N	0.11	0.12	0.10	0.11	0.17	0.23	0.13	0.09	0.07	0.08	0.10	0.16	0.24	0.48	0.31	0.18	0.00	0.01	2.70
4-7	MS	0.17	0.14	0.13	0.17	0.22	0.36	0.22	0.19	0.14	0.20	0.23	0.43	0.51	0.66	0.49	0.34	0.00	0.02	4.62
4-7	VS	0.21	0.16	0.13	0.17	0.21	0.31	0.29	0.30	0.24	0.35	0.50	0.99	1.07	0.95	0.66	0.43	0.00	0.03	7.00
8-12	U	0.49	0.31	0.13	0.12	0.10	0.15	0.12	0.16	0.31	0.54	0.56	0.37	0.60	1.40	0.62	0.49	0.00	0.00	6.48
8-12	N	0.05	0.04	0.03	0.03	0.04	0.07	0.06	0.04	0.06	0.08	0.13	0.15	0.41	0.73	0.16	0.07	0.00	0.00	2.17
8-12	MS	0.11	0.07	0.04	0.07	0.10	0.20	0.19	0.14	0.20	0.31	0.48	1.02	1.45	1.47	0.44	0.18	0.00	0.00	6.47
8-12	VS	0.12	0.10	0.08	0.07	0.07	0.11	0.20	0.13	0.11	0.24	0.54	1.31	1.95	1.71	0.63	0.22	0.00	0.00	7.60
13-18	U	0.25	0.13	0.04	0.02	0.01	0.02	0.04	0.06	0.19	0.52	0.68	0.33	0.62	0.98	0.13	0.14	0.00	0.00	4.16
13-18	N	0.06	0.02	0.01	0.01	0.01	0.02	0.04	0.05	0.07	0.13	0.21	0.15	0.43	0.54	0.07	0.05	0.00	0.00	1.86
13-18	MS	0.10	0.05	0.02	0.02	0.02	0.06	0.13	0.15	0.23	0.49	0.86	1.34	3.03	2.17	0.23	0.11	0.00	0.00	9.02
13-18	VS	0.05	0.03	0.02	0.02	0.00	0.03	0.09	0.03	0.04	0.09	0.24	0.45	1.20	1.49	0.20	0.05	0.00	0.00	4.03
19-24	U	0.07	0.05	0.01	0.00	0.00	0.00	0.01	0.02	0.10	0.31	0.40	0.13	0.33	0.60	0.03	0.03	0.00	0.00	2.09
19-24	N	0.02	0.01	0.00	0.00	0.00	0.00	0.01	0.03	0.07	0.14	0.16	0.06	0.25	0.32	0.01	0.03	0.00	0.00	1.12
19-24	MS	0.04	0.04	0.01	0.00	0.00	0.02	0.05	0.10	0.21	0.50	0.50	0.36	1.59	1.47	0.04	0.02	0.00	0.00	4.95
19-24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.07	0.18	0.00	0.00	0.00	0.00	0.38
GT.24	U	0.02	0.03	0.01	0.00	0.00	0.00	0.00	0.01	0.08	0.37	0.32	0.09	0.20	0.46	0.01	0.01	0.00	0.00	1.62
GT.24	N	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.17	0.09	0.03	0.18	0.29	0.00	0.01	0.00	0.00	0.88
GT.24	MS	0.01	0.01	0.00	0.00	0.00	0.01	0.02	0.07	0.30	0.48	0.23	0.07	0.56	0.75	0.00	0.01	0.00	0.00	2.53
GT.24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
TOTALS	U	2.42	2.04	1.17	1.21	1.03	1.13	0.71	0.88	1.23	2.40	2.47	1.49	2.42	4.79	2.36	2.56	0.14	0.82	31.27
TOTALS	N	0.52	0.46	0.37	0.43	0.51	0.70	0.45	0.37	0.42	0.69	0.79	0.72	1.68	2.63	0.88	0.70	0.53	0.16	13.02
TOTALS	MS	0.60	0.47	0.35	0.47	0.62	1.02	0.81	0.84	1.20	2.08	2.44	3.43	7.36	6.79	1.46	0.95	0.53	0.18	31.60
TOTALS	VS	0.60	0.49	0.39	0.48	0.53	0.82	0.84	0.71	0.61	0.92	1.55	3.16	4.62	4.71	1.86	1.05	0.49	0.27	24.11

TABLE 51. Seasonal and Annual Percent Frequency Distribution of Wind Speed and Direction Versus Stability (1955 Through 1980) at 200-Foot Level Using ΔT_2

SPRING

SPEED CLASS		NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
0-3	U	0.33	0.44	0.21	0.26	0.21	0.26	0.13	0.09	0.09	0.10	0.07	0.10	0.10	0.18	0.22	0.40	0.04	0.32	3.56
0-3	N	0.32	0.37	0.27	0.32	0.27	0.28	0.10	0.17	0.12	0.15	0.11	0.20	0.14	0.25	0.32	0.45	0.16	0.30	4.27
0-3	MS	0.16	0.19	0.15	0.19	0.27	0.30	0.21	0.17	0.17	0.20	0.16	0.33	0.26	0.31	0.28	0.28	0.28	0.22	4.11
0-3	VS	0.04	0.03	0.02	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.05	0.10	0.05	0.05	0.06	0.06	0.05	0.05	0.82
4-7	U	0.80	0.74	0.51	0.47	0.42	0.58	0.39	0.42	0.37	0.45	0.31	0.30	0.39	0.78	0.86	0.94	0.00	0.20	8.94
4-7	N	0.32	0.39	0.32	0.38	0.30	0.47	0.25	0.32	0.27	0.34	0.34	0.39	0.48	0.62	0.54	0.56	0.00	0.09	6.39
4-7	MS	0.18	0.20	0.16	0.22	0.32	0.46	0.29	0.33	0.26	0.33	0.57	1.04	1.01	0.96	0.62	0.48	0.00	0.03	7.48
4-7	VS	0.01	0.01	0.01	0.01	0.03	0.06	0.04	0.05	0.06	0.10	0.09	0.19	0.18	0.17	0.11	0.05	0.00	0.00	1.19
8-12	U	0.47	0.33	0.13	0.12	0.08	0.20	0.17	0.19	0.34	0.50	0.46	0.31	0.54	1.11	0.48	0.44	0.00	0.01	5.89
8-12	N	0.21	0.15	0.09	0.09	0.10	0.15	0.16	0.21	0.35	0.44	0.50	0.62	0.78	0.85	0.29	0.27	0.00	0.00	5.27
8-12	MS	0.17	0.16	0.14	0.14	0.13	0.26	0.31	0.23	0.25	0.42	0.92	2.24	2.75	1.77	0.67	0.27	0.00	0.00	10.84
8-12	VS	0.01	0.01	0.00	0.00	0.00	0.04	0.05	0.03	0.02	0.04	0.12	0.22	0.26	0.55	0.13	0.02	0.00	0.00	1.51
13-18	U	0.32	0.15	0.06	0.02	0.00	0.02	0.06	0.08	0.24	0.54	0.74	0.36	0.73	0.94	0.13	0.19	0.00	0.00	4.58
13-18	N	0.16	0.08	0.03	0.02	0.02	0.04	0.11	0.18	0.31	0.57	0.85	0.86	1.27	0.88	0.10	0.11	0.00	0.00	5.59
13-18	MS	0.10	0.07	0.06	0.05	0.02	0.11	0.25	0.12	0.17	0.41	1.16	1.96	3.68	2.32	0.26	0.15	0.00	0.00	10.90
13-18	VS	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.05	0.12	0.26	0.70	0.08	0.01	0.00	0.00	1.27
19-24	U	0.09	0.05	0.02	0.00	0.00	0.00	0.01	0.03	0.16	0.41	0.47	0.19	0.51	0.64	0.03	0.04	0.00	0.00	2.64
19-24	N	0.06	0.04	0.01	0.00	0.00	0.02	0.04	0.10	0.21	0.54	0.68	0.35	1.06	0.82	0.04	0.03	0.00	0.00	4.01
19-24	MS	0.02	0.03	0.02	0.02	0.00	0.02	0.06	0.05	0.11	0.28	0.49	0.30	1.43	1.10	0.04	0.01	0.00	0.00	3.96
19-24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.05	0.13	0.00	0.00	0.00	0.00	0.21
GT.24	U	0.02	0.03	0.02	0.01	0.00	0.00	0.00	0.01	0.11	0.64	0.47	0.14	0.37	0.57	0.01	0.02	0.00	0.00	2.43
GT.24	N	0.02	0.01	0.01	0.01	0.00	0.00	0.01	0.05	0.19	0.59	0.36	0.12	0.69	0.81	0.00	0.01	0.00	0.00	2.88
GT.24	MS	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.02	0.08	0.18	0.11	0.04	0.38	0.42	0.00	0.01	0.00	0.00	1.25
GT.24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
TOTALS	U	2.04	1.75	0.95	0.89	0.71	1.07	0.75	0.82	1.32	2.63	2.52	1.40	2.65	4.22	1.72	2.02	0.04	0.54	28.03
TOTALS	N	1.10	1.03	0.74	0.82	0.68	0.95	0.67	1.03	1.46	2.63	2.84	2.54	4.41	4.23	1.29	1.43	0.16	0.39	28.41
TOTALS	MS	0.63	0.66	0.54	0.62	0.74	1.16	1.12	0.91	1.03	1.82	3.41	5.91	9.52	6.88	1.87	1.20	0.28	0.25	38.54
TOTALS	VS	0.06	0.05	0.03	0.06	0.08	0.16	0.16	0.11	0.12	0.18	0.32	0.64	0.81	1.61	0.38	0.14	0.05	0.05	5.02

TABLE 51. Continued

SUMMER

SPEED CLASS		NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
0-3	U	0.39	0.42	0.22	0.24	0.28	0.27	0.16	0.20	0.11	0.21	0.15	0.17	0.14	0.23	0.22	0.40	0.05	0.71	4.57
0-3	N	0.20	0.27	0.18	0.23	0.20	0.22	0.11	0.17	0.11	0.14	0.12	0.16	0.13	0.17	0.20	0.30	0.09	0.40	3.41
0-3	MS	0.10	0.08	0.08	0.09	0.09	0.16	0.08	0.11	0.09	0.10	0.15	0.26	0.23	0.22	0.13	0.17	0.14	0.11	2.39
0-3	VS	0.02	0.01	0.00	0.01	0.01	0.01	0.01	0.02	0.01	0.03	0.04	0.03	0.04	0.03	0.01	0.02	0.02	0.01	0.30
4-7	U	1.35	1.20	0.77	0.91	0.76	0.93	0.57	0.69	0.65	0.70	0.57	0.60	0.61	1.12	1.16	1.40	0.00	0.62	14.61
4-7	N	0.43	0.40	0.28	0.36	0.42	0.49	0.30	0.37	0.29	0.40	0.38	0.47	0.44	0.60	0.55	0.58	0.00	0.21	6.97
4-7	MS	0.16	0.13	0.13	0.15	0.22	0.32	0.19	0.22	0.18	0.32	0.45	0.97	0.86	0.61	0.40	0.24	0.00	0.04	5.59
4-7	VS	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.05	0.09	0.16	0.15	0.08	0.05	0.04	0.00	0.00	0.75
8-12	U	0.66	0.45	0.21	0.24	0.20	0.21	0.16	0.20	0.41	0.78	0.76	0.50	0.73	1.46	0.70	0.62	0.00	0.01	8.32
8-12	N	0.18	0.14	0.10	0.14	0.15	0.11	0.09	0.11	0.19	0.43	0.55	0.63	0.73	0.77	0.24	0.19	0.00	0.00	4.76
8-12	MS	0.16	0.16	0.11	0.16	0.17	0.14	0.22	0.14	0.12	0.28	0.75	2.06	2.97	1.45	0.41	0.26	0.00	0.00	9.55
8-12	VS	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.03	0.08	0.25	0.32	0.40	0.16	0.02	0.00	0.00	1.32
13-18	U	0.21	0.16	0.05	0.05	0.01	0.03	0.04	0.04	0.16	0.64	0.83	0.38	0.76	1.34	0.14	0.11	0.00	0.00	4.96
13-18	N	0.07	0.04	0.03	0.02	0.01	0.03	0.06	0.04	0.11	0.32	0.65	0.78	1.48	0.97	0.10	0.05	0.00	0.00	4.76
13-18	MS	0.06	0.06	0.05	0.04	0.01	0.05	0.12	0.05	0.05	0.15	0.59	1.31	4.77	2.39	0.21	0.08	0.00	0.00	9.98
13-18	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.02	0.05	0.23	0.76	0.07	0.01	0.00	0.00	1.17
19-24	U	0.04	0.04	0.01	0.01	0.00	0.00	0.01	0.02	0.05	0.23	0.34	0.12	0.41	1.13	0.05	0.02	0.00	0.00	2.47
19-24	N	0.03	0.04	0.01	0.00	0.00	0.00	0.00	0.01	0.04	0.16	0.34	0.30	1.54	1.44	0.03	0.01	0.00	0.00	3.95
19-24	MS	0.01	0.02	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.05	0.12	0.15	1.73	1.99	0.03	0.01	0.00	0.00	4.16
19-24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.16	0.00	0.00	0.00	0.00	0.20
GT.24	U	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.13	0.22	0.06	0.24	0.95	0.02	0.00	0.00	0.00	1.66
GT.24	N	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.07	0.14	0.05	1.05	1.63	0.01	0.00	0.00	0.00	3.00
GT.24	MS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.01	0.39	0.71	0.00	0.00	0.00	0.00	1.17
GT.24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTALS	U	2.64	2.30	1.27	1.44	1.25	1.43	0.94	1.16	1.40	2.69	2.87	1.83	2.89	6.24	2.30	2.54	0.05	1.34	36.58
TOTALS	N	0.91	0.89	0.61	0.76	0.79	0.85	0.57	0.71	0.76	1.52	2.18	2.39	5.37	5.57	1.13	1.13	0.10	0.61	26.85
TOTALS	MS	0.50	0.45	0.38	0.45	0.50	0.67	0.62	0.53	0.46	0.92	2.07	4.76	10.95	7.36	1.18	0.76	0.14	0.15	32.84
TOTALS	VS	0.03	0.02	0.01	0.02	0.02	0.04	0.05	0.06	0.05	0.11	0.22	0.50	0.78	1.43	0.29	0.08	0.02	0.01	3.73

X-83

TABLE 51. Continued

AUTUMN

SPEED CLASS		NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
0-3	U	0.54	0.58	0.35	0.44	0.33	0.33	0.12	0.07	0.07	0.07	0.07	0.06	0.08	0.18	0.26	0.43	0.09	0.26	4.34
0-3	N	0.65	0.77	0.56	0.66	0.69	0.65	0.30	0.26	0.15	0.15	0.16	0.24	0.29	0.51	0.68	0.77	0.85	0.31	8.64
0-3	MS	0.46	0.38	0.34	0.45	0.52	0.75	0.40	0.43	0.32	0.33	0.38	0.52	0.55	0.68	0.67	0.68	1.09	0.39	9.35
0-3	VS	0.08	0.07	0.07	0.09	0.12	0.18	0.15	0.13	0.10	0.06	0.10	0.16	0.13	0.14	0.16	0.16	0.21	0.12	2.22
4-7	U	0.78	0.52	0.36	0.41	0.49	0.45	0.17	0.14	0.16	0.16	0.12	0.14	0.23	0.55	0.83	0.97	0.00	0.06	6.55
4-7	N	0.43	0.37	0.28	0.37	0.47	0.46	0.25	0.19	0.17	0.21	0.22	0.31	0.43	0.95	0.83	0.67	0.00	0.03	6.65
4-7	MS	0.36	0.24	0.20	0.28	0.41	0.67	0.54	0.48	0.39	0.47	0.59	1.21	1.64	1.74	1.18	0.75	0.00	0.02	11.18
4-7	VS	0.05	0.04	0.04	0.04	0.04	0.13	0.17	0.15	0.10	0.14	0.24	0.35	0.34	0.34	0.20	0.11	0.00	0.01	2.47
8-12	U	0.39	0.20	0.06	0.03	0.03	0.09	0.04	0.04	0.09	0.16	0.20	0.13	0.23	0.69	0.46	0.35	0.00	0.00	3.21
8-12	N	0.19	0.10	0.04	0.06	0.06	0.11	0.12	0.14	0.18	0.31	0.34	0.36	0.54	1.01	0.37	0.23	0.00	0.00	4.17
8-12	MS	0.24	0.12	0.07	0.08	0.13	0.30	0.45	0.26	0.26	0.43	0.79	1.75	3.03	2.99	1.04	0.40	0.00	0.00	12.35
8-12	VS	0.00	0.00	0.00	0.01	0.00	0.03	0.10	0.03	0.02	0.05	0.18	0.44	0.53	0.73	0.25	0.02	0.00	0.00	2.38
13-18	U	0.21	0.10	0.01	0.01	0.00	0.01	0.02	0.02	0.06	0.20	0.25	0.20	0.26	0.47	0.10	0.09	0.00	0.00	1.92
13-18	N	0.15	0.07	0.01	0.01	0.01	0.04	0.06	0.12	0.23	0.52	0.51	0.37	0.65	0.74	0.15	0.13	0.00	0.00	3.77
13-18	MS	0.16	0.06	0.02	0.03	0.00	0.10	0.21	0.17	0.20	0.38	0.77	1.10	2.86	2.68	0.39	0.12	0.00	0.00	9.24
13-18	VS	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.01	0.01	0.06	0.13	0.36	0.99	0.12	0.01	0.00	0.00	1.71
19-24	U	0.04	0.04	0.02	0.00	0.00	0.00	0.00	0.01	0.05	0.19	0.22	0.05	0.16	0.30	0.01	0.03	0.00	0.00	1.12
19-24	N	0.05	0.04	0.01	0.00	0.00	0.01	0.03	0.08	0.21	0.44	0.41	0.12	0.40	0.54	0.03	0.04	0.00	0.00	2.40
19-24	MS	0.04	0.03	0.02	0.00	0.00	0.00	0.04	0.11	0.13	0.28	0.32	0.19	0.78	0.85	0.02	0.02	0.00	0.00	2.84
19-24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.14	0.00	0.00	0.00	0.00	0.19
GT.24	U	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.25	0.17	0.05	0.09	0.19	0.01	0.01	0.00	0.00	0.91
GT.24	N	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.05	0.22	0.48	0.20	0.07	0.23	0.33	0.01	0.01	0.00	0.00	1.62
GT.24	MS	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.04	0.12	0.13	0.09	0.03	0.13	0.19	0.00	0.01	0.00	0.00	0.76
GT.24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTALS	U	1.97	1.47	0.81	0.89	0.85	0.89	0.36	0.28	0.51	1.03	1.03	0.53	1.06	2.39	1.68	1.89	0.09	0.32	18.05
TOTALS	N	1.47	1.35	0.91	1.10	1.23	1.28	0.77	0.82	1.16	2.11	1.83	1.48	2.54	4.08	2.07	1.85	0.85	0.34	27.25
TOTALS	MS	1.26	0.84	0.66	0.85	1.06	1.83	1.65	1.50	1.43	2.01	2.94	4.81	8.98	9.12	3.31	1.99	1.09	0.41	45.73
TOTALS	VS	0.13	0.11	0.11	0.13	0.16	0.34	0.44	0.31	0.23	0.27	0.57	1.07	1.39	2.35	0.72	0.30	0.21	0.13	8.97

TABLE 51. Continued

WINTER

SPEED CLASS		NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
0-3	U	0.24	0.25	0.17	0.13	0.16	0.15	0.10	0.04	0.03	0.03	0.03	0.05	0.08	0.10	0.17	0.22	0.15	0.07	2.17
0-3	N	0.78	0.65	0.58	0.69	0.77	0.86	0.53	0.40	0.27	0.26	0.26	0.48	0.55	0.79	0.96	1.01	1.95	0.30	12.11
0-3	MS	0.55	0.49	0.40	0.54	0.66	0.98	0.64	0.55	0.36	0.34	0.41	0.65	0.63	0.84	0.82	0.90	1.51	0.49	11.76
0-3	VS	0.11	0.11	0.07	0.09	0.10	0.20	0.10	0.12	0.09	0.09	0.09	0.12	0.08	0.12	0.18	0.14	0.14	0.21	2.16
4-7	U	0.24	0.19	0.12	0.10	0.13	0.14	0.03	0.04	0.03	0.03	0.04	0.04	0.12	0.41	0.41	0.31	0.00	0.00	2.38
4-7	N	0.34	0.33	0.28	0.27	0.22	0.31	0.26	0.16	0.12	0.21	0.20	0.44	0.78	1.62	0.95	0.67	0.00	0.02	7.18
4-7	MS	0.43	0.33	0.26	0.31	0.36	0.57	0.51	0.44	0.34	0.44	0.55	1.06	1.48	1.93	1.57	0.95	0.00	0.06	11.61
4-7	VS	0.11	0.10	0.06	0.07	0.08	0.15	0.15	0.13	0.11	0.13	0.15	0.29	0.21	0.25	0.31	0.23	0.00	0.04	2.56
8-12	U	0.09	0.06	0.03	0.01	0.01	0.03	0.01	0.02	0.05	0.04	0.08	0.05	0.22	0.70	0.22	0.11	0.00	0.00	1.72
8-12	N	0.16	0.07	0.04	0.03	0.06	0.10	0.10	0.08	0.15	0.23	0.22	0.29	1.26	2.42	0.53	0.23	0.00	0.00	5.96
8-12	MS	0.15	0.10	0.05	0.07	0.10	0.31	0.25	0.20	0.23	0.43	0.74	1.33	2.49	3.83	1.17	0.34	0.00	0.01	11.80
8-12	VS	0.01	0.01	0.01	0.01	0.01	0.04	0.06	0.04	0.05	0.08	0.12	0.22	0.27	0.53	0.30	0.04	0.00	0.00	1.81
13-18	U	0.09	0.01	0.00	0.00	0.00	0.01	0.00	0.02	0.05	0.08	0.13	0.06	0.16	0.30	0.06	0.08	0.00	0.00	1.05
13-18	N	0.17	0.04	0.00	0.01	0.01	0.02	0.05	0.13	0.22	0.39	0.41	0.26	0.94	1.38	0.17	0.20	0.00	0.00	4.39
13-18	MS	0.10	0.04	0.01	0.01	0.03	0.09	0.13	0.17	0.26	0.65	0.94	1.09	2.44	3.26	0.39	0.11	0.00	0.00	9.73
13-18	VS	0.01	0.80	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.02	0.05	0.12	0.22	0.59	0.07	0.00	0.00	0.00	1.14
19-24	U	0.05	0.03	0.01	0.00	0.00	0.00	0.00	0.01	0.02	0.11	0.11	0.04	0.04	0.09	0.01	0.02	0.00	0.00	0.55
19-24	N	0.08	0.03	0.00	0.00	0.01	0.01	0.04	0.11	0.26	0.53	0.29	0.12	0.18	0.22	0.02	0.09	0.00	0.00	1.98
19-24	MS	0.02	0.02	0.00	0.00	0.00	0.02	0.07	0.12	0.27	0.67	0.54	0.35	0.52	0.61	0.03	0.01	0.00	0.00	3.26
19-24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.02	0.04	0.06	0.00	0.00	0.00	0.00	0.17
GT.24	U	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.06	0.18	0.15	0.04	0.02	0.04	0.00	0.01	0.00	0.00	0.56
GT.24	N	0.04	0.03	0.01	0.00	0.00	0.01	0.01	0.09	0.47	0.79	0.35	0.09	0.06	0.06	0.01	0.04	0.00	0.00	2.04
GT.24	MS	0.01	0.02	0.00	0.00	0.00	0.01	0.05	0.12	0.45	0.65	0.31	0.11	0.10	0.08	0.00	0.00	0.00	0.00	1.92
GT.24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
TOTALS	U	0.73	0.55	0.33	0.25	0.29	0.32	0.16	0.13	0.25	0.47	0.54	0.29	0.64	1.64	0.87	0.76	0.15	0.07	8.43
TOTALS	N	1.57	1.16	0.91	1.00	1.07	1.30	0.98	0.97	1.49	2.42	1.73	1.68	3.77	6.49	2.63	2.23	1.95	0.31	33.66
TOTALS	MS	1.27	1.00	0.73	0.93	1.16	1.98	1.65	1.60	1.91	3.18	3.48	4.58	7.67	10.55	3.99	2.32	1.51	0.56	50.07
TOTALS	VS	0.23	0.22	0.15	0.16	0.18	0.40	0.34	0.32	0.28	0.33	0.42	0.77	0.82	1.54	0.86	0.42	0.14	0.24	7.84

TABLE 51. Continued

ANNUAL

SPEED CLASS		NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
0-3	U	0.37	0.42	0.24	0.27	0.25	0.25	0.13	0.10	0.08	0.10	0.08	0.10	0.10	0.17	0.22	0.36	0.08	0.34	3.66
0-3	N	0.48	0.51	0.40	0.47	0.48	0.50	0.26	0.25	0.16	0.18	0.16	0.27	0.27	0.43	0.54	0.63	0.76	0.33	7.09
0-3	MS	0.32	0.28	0.24	0.32	0.38	0.54	0.33	0.31	0.24	0.24	0.27	0.44	0.41	0.51	0.47	0.51	0.75	0.30	6.88
0-3	VS	0.06	0.05	0.04	0.06	0.07	0.11	0.07	0.08	0.06	0.05	0.07	0.10	0.08	0.08	0.10	0.09	0.10	0.09	1.37
4-7	U	0.79	0.66	0.44	0.47	0.45	0.53	0.29	0.32	0.30	0.33	0.26	0.27	0.34	0.72	0.82	0.91	0.00	0.22	8.14
4-7	N	0.38	0.37	0.29	0.35	0.35	0.43	0.27	0.26	0.21	0.29	0.29	0.40	0.53	0.94	0.72	0.62	0.00	0.09	6.80
4-7	MS	0.28	0.23	0.19	0.24	0.33	0.50	0.38	0.37	0.29	0.39	0.54	1.07	1.25	1.31	0.94	0.61	0.00	0.04	8.95
4-7	VS	0.04	0.04	0.03	0.03	0.04	0.09	0.10	0.09	0.07	0.10	0.14	0.25	0.22	0.21	0.16	0.11	0.00	0.01	1.73
8-12	U	0.40	0.26	0.11	0.10	0.08	0.13	0.10	0.11	0.23	0.37	0.38	0.25	0.43	0.99	0.46	0.38	0.00	0.00	4.80
8-12	N	0.19	0.11	0.07	0.08	0.09	0.12	0.12	0.13	0.22	0.35	0.41	0.48	0.83	1.26	0.36	0.23	0.00	0.00	5.04
8-12	MS	0.18	0.13	0.09	0.11	0.13	0.25	0.31	0.21	0.21	0.39	0.80	1.85	2.81	2.50	0.82	0.32	0.00	0.00	11.13
8-12	VS	0.01	0.01	0.00	0.00	0.00	0.03	0.05	0.03	0.03	0.05	0.12	0.28	0.35	0.55	0.21	0.03	0.00	0.00	1.75
13-18	U	0.21	0.11	0.03	0.02	0.00	0.02	0.03	0.04	0.13	0.37	0.49	0.23	0.48	0.76	0.11	0.12	0.00	0.00	3.14
13-18	N	0.14	0.06	0.02	0.02	0.01	0.03	0.07	0.12	0.22	0.45	0.61	0.57	1.09	0.99	0.13	0.12	0.00	0.00	4.63
13-18	MS	0.10	0.06	0.04	0.04	0.02	0.09	0.18	0.13	0.17	0.39	0.86	1.37	3.44	2.66	0.31	0.12	0.00	0.00	9.97
13-18	VS	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.01	0.01	0.04	0.10	0.27	0.76	0.08	0.01	0.00	0.00	1.32
19-24	U	0.05	0.04	0.01	0.00	0.00	0.00	0.01	0.02	0.07	0.23	0.29	0.10	0.28	0.54	0.02	0.03	0.00	0.00	1.70
19-24	N	0.05	0.04	0.01	0.00	0.00	0.01	0.03	0.07	0.18	0.42	0.43	0.23	0.80	0.76	0.03	0.04	0.00	0.00	3.09
19-24	MS	0.02	0.02	0.01	0.01	0.00	0.01	0.04	0.07	0.13	0.32	0.37	0.25	1.12	1.14	0.03	0.01	0.00	0.00	3.56
19-24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.04	0.12	0.00	0.00	0.00	0.00	0.19
GT.24	U	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.06	0.30	0.26	0.07	0.18	0.44	0.01	0.01	0.00	0.00	1.39
GT.24	N	0.02	0.02	0.01	0.00	0.00	0.00	0.01	0.05	0.22	0.48	0.26	0.08	0.51	0.71	0.01	0.01	0.00	0.00	2.39
GT.24	MS	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.05	0.16	0.24	0.13	0.05	0.25	0.35	0.00	0.00	0.00	0.00	1.28
GT.24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
TOTALS	U	1.85	1.52	0.84	0.87	0.78	0.93	0.56	0.60	0.87	1.71	1.75	1.01	1.82	3.63	1.64	1.80	0.08	0.57	22.83
TOTALS	N	1.26	1.11	0.79	0.92	0.94	1.10	0.75	0.88	1.22	2.17	2.15	2.03	4.03	5.10	1.77	1.66	0.76	0.41	29.04
TOTALS	MS	0.91	0.73	0.58	0.71	0.86	1.41	1.26	1.13	1.20	1.98	2.98	5.02	9.28	8.47	2.58	1.56	0.75	0.34	41.76
TOTALS	VS	0.11	0.10	0.07	0.09	0.11	0.24	0.25	0.20	0.17	0.22	0.38	0.74	0.95	1.73	0.56	0.23	0.10	0.11	6.38

98-X

TABLE 52. Seasonal and Annual Percent Frequency Distribution of Wind Speed and Direction Versus Stability (1955 Through 1980) at 400-Foot Level, Using ΔT_6

		WINTER																		
SPEED CLASS		NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
0-3	U	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.01	0.17
0-3	N	0.45	0.40	0.34	0.41	0.33	0.47	0.28	0.20	0.11	0.12	0.13	0.25	0.36	0.60	0.57	0.69	1.64	0.16	7.51
0-3	MS	0.94	0.86	0.77	1.15	1.10	1.38	0.78	0.62	0.39	0.44	0.46	0.82	0.99	1.33	1.40	1.50	3.94	0.72	19.60
0-3	VS	0.05	0.06	0.03	0.07	0.07	0.10	0.08	0.07	0.05	0.04	0.06	0.07	0.07	0.06	0.06	0.09	0.13	0.12	1.28
4-7	U	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.04	0.02	0.02	0.00	0.00	0.14
4-7	N	0.30	0.20	0.19	0.18	0.15	0.23	0.13	0.13	0.07	0.09	0.15	0.26	0.48	1.09	0.96	0.60	0.00	0.01	5.22
4-7	MS	0.59	0.44	0.38	0.45	0.50	0.82	0.51	0.47	0.35	0.48	0.58	1.18	1.71	2.82	2.37	1.49	0.00	0.04	15.18
4-7	VS	0.04	0.03	0.03	0.04	0.03	0.06	0.05	0.07	0.06	0.10	0.09	0.14	0.10	0.12	0.13	0.06	0.00	0.01	1.16
8-12	U	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.03	0.02	0.01	0.00	0.00	0.10
8-12	N	0.16	0.05	0.03	0.02	0.03	0.07	0.06	0.06	0.09	0.13	0.14	0.26	0.49	1.37	0.76	0.31	0.00	0.00	4.03
8-12	MS	0.28	0.14	0.07	0.07	0.10	0.30	0.25	0.20	0.32	0.52	0.76	1.26	2.45	5.76	2.04	0.59	0.00	0.00	15.10
8-12	VS	0.01	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.02	0.06	0.07	0.12	0.09	0.15	0.05	0.01	0.00	0.00	0.68
13-18	U	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.02	0.01	0.00	0.00	0.00	0.06
13-18	N	0.18	0.04	0.01	0.00	0.01	0.04	0.03	0.09	0.15	0.33	0.30	0.30	0.32	0.64	0.31	0.24	0.00	0.00	2.99
13-18	MS	0.25	0.07	0.01	0.01	0.01	0.14	0.21	0.21	0.38	0.65	1.08	1.20	2.40	5.12	0.71	0.25	0.00	0.00	12.70
13-18	VS	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.02	0.03	0.04	0.04	0.06	0.13	0.01	0.00	0.00	0.00	0.38
19-24	U	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
19-24	N	0.12	0.05	0.00	0.00	0.00	0.01	0.03	0.10	0.18	0.37	0.27	0.15	0.12	0.16	0.05	0.09	0.00	0.00	1.68
19-24	MS	0.10	0.04	0.01	0.00	0.01	0.03	0.10	0.15	0.38	0.83	0.91	0.59	0.75	1.12	0.06	0.06	0.00	0.00	5.14
19-24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.00	0.00	0.00	0.00	0.08
GT.24	U	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.05
GT.24	N	0.07	0.05	0.00	0.00	0.00	0.01	0.02	0.09	0.33	0.69	0.28	0.09	0.09	0.10	0.01	0.04	0.00	0.00	1.85
GT.24	MS	0.04	0.04	0.00	0.00	0.00	0.02	0.09	0.18	0.82	1.67	1.00	0.34	0.33	0.29	0.01	0.02	0.00	0.00	4.84
GT.24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.02
TOTALS	U	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.04	0.03	0.02	0.05	0.10	0.07	0.04	0.03	0.01	0.55
TOTALS	N	1.28	0.79	0.57	0.61	0.52	0.82	0.55	0.68	0.94	1.73	1.26	1.30	1.86	3.96	2.65	1.97	1.64	0.17	23.29
TOTALS	MS	2.20	1.59	1.25	1.68	1.73	2.70	1.94	1.83	2.65	4.59	4.78	5.39	8.62	16.44	6.58	3.91	3.94	0.76	72.56
TOTALS	VS	0.10	0.09	0.07	0.11	0.12	0.20	0.18	0.19	0.16	0.23	0.27	0.38	0.33	0.49	0.25	0.17	0.13	0.12	3.60

TABLE 52. Continued

SPRING

SPEED CLASS		NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
0-3	U	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.04	0.01	0.03	0.29
0-3	N	0.32	0.32	0.27	0.30	0.21	0.27	0.15	0.17	0.11	0.10	0.09	0.18	0.14	0.23	0.31	0.40	0.23	0.31	4.12
0-3	MS	0.45	0.53	0.36	0.48	0.45	0.55	0.34	0.31	0.22	0.28	0.25	0.47	0.46	0.56	0.52	0.61	0.61	0.55	7.98
0-3	VS	0.00	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.00	0.02	0.01	0.02	0.03	0.02	0.04	0.02	0.27
4-7	U	0.02	0.03	0.02	0.04	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.03	0.02	0.04	0.05	0.06	0.00	0.01	0.49
4-7	N	0.47	0.42	0.38	0.43	0.34	0.45	0.31	0.38	0.34	0.43	0.40	0.41	0.48	0.67	0.78	0.78	0.00	0.08	7.56
4-7	MS	0.69	0.61	0.51	0.58	0.60	0.90	0.52	0.58	0.49	0.56	0.55	1.06	1.16	1.55	1.31	1.01	0.00	0.10	12.77
4-8	VS	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.03	0.06	0.08	0.03	0.01	0.00	0.00	0.29
8-12	U	0.02	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.01	0.03	0.05	0.02	0.02	0.00	0.00	0.24
8-12	N	0.37	0.21	0.15	0.15	0.11	0.22	0.23	0.28	0.35	0.49	0.53	0.68	0.82	1.05	0.58	0.52	0.00	0.00	6.75
8-12	MS	0.51	0.39	0.26	0.20	0.16	0.44	0.44	0.36	0.52	0.74	0.97	1.52	2.40	2.93	1.29	0.65	0.00	0.00	13.80
8-12	VS	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.06	0.13	0.03	0.00	0.00	0.00	0.28
13-18	U	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.04	0.03	0.03	0.03	0.06	0.01	0.01	0.00	0.00	0.24
13-18	N	0.31	0.16	0.08	0.05	0.03	0.06	0.16	0.18	0.34	0.63	0.84	0.96	1.28	0.87	0.30	0.27	0.00	0.00	6.51
13-18	MS	0.34	0.23	0.09	0.09	0.03	0.20	0.27	0.18	0.38	0.78	1.36	2.21	3.82	3.52	0.67	0.38	0.00	0.00	14.53
13-18	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.05	0.13	0.01	0.00	0.00	0.00	0.24
19-24	U	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.04	0.01	0.04	0.06	0.00	0.01	0.00	0.00	0.22
19-24	N	0.10	0.08	0.02	0.00	0.00	0.01	0.04	0.08	0.27	0.59	0.72	0.53	1.02	0.78	0.06	0.06	0.00	0.00	4.38
19-24	MS	0.12	0.07	0.05	0.02	0.00	0.06	0.09	0.10	0.21	0.63	1.08	0.92	2.77	1.88	0.09	0.05	0.00	0.00	8.13
19-24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.00	0.00	0.09
GT.24	U	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.06	0.02	0.03	0.07	0.00	0.00	0.00	0.00	0.27
GT.24	N	0.04	0.04	0.03	0.00	0.00	0.00	0.00	0.05	0.24	0.88	0.74	0.26	0.93	0.97	0.02	0.03	0.00	0.00	4.22
GT.24	MS	0.03	0.05	0.03	0.00	0.00	0.01	0.04	0.07	0.22	0.87	0.72	0.29	2.27	1.66	0.03	0.03	0.00	0.00	6.31
GT.24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.03
TOTALS	U	0.07	0.07	0.06	0.07	0.04	0.04	0.04	0.05	0.07	0.19	0.18	0.11	0.16	0.30	0.11	0.14	0.01	0.04	1.74
TOTALS	N	1.61	1.23	0.92	0.93	0.69	1.03	0.89	1.15	1.66	3.11	3.32	3.02	4.68	4.57	2.05	2.06	0.23	0.39	33.54
TOTALS	MS	2.14	1.88	1.30	1.37	1.24	2.16	1.70	1.60	2.04	3.86	4.92	6.47	12.87	2.09	3.90	2.73	0.61	0.65	63.53
TOTALS	VS	0.01	0.03	0.02	0.01	0.01	0.04	0.05	0.03	0.02	0.04	0.02	0.07	0.23	0.41	0.10	0.03	0.04	0.02	1.20

TABLE 52. Continued

SUMMER

SPEED CLASS		NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
0-3	U	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.04	0.00	0.03	0.29
0-3	N	0.26	0.28	0.20	0.26	0.22	0.24	0.11	0.18	0.10	0.15	0.08	0.19	0.15	0.22	0.20	0.34	0.10	0.49	3.77
0-3	MS	0.40	0.47	0.27	0.35	0.33	0.44	0.24	0.28	0.21	0.28	0.24	0.37	0.33	0.40	0.37	0.49	0.30	0.74	6.52
0-3	VS	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.06
4-7	U	0.05	0.06	0.04	0.02	0.02	0.04	0.03	0.05	0.03	0.03	0.02	0.03	0.03	0.05	0.06	0.05	0.00	0.02	0.65
4-7	N	0.66	0.59	0.48	0.53	0.51	0.59	0.41	0.43	0.37	0.42	0.39	0.47	0.52	0.67	0.76	0.88	0.00	0.22	8.90
4-7	MS	1.02	0.94	0.62	0.74	0.75	0.96	0.58	0.68	0.60	0.79	0.71	1.20	1.32	1.46	1.21	1.25	0.00	0.34	15.17
4-7	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01	0.02	0.02	0.02	0.01	0.00	0.00	0.10
8-12	U	0.03	0.01	0.00	0.01	0.00	0.01	0.01	0.02	0.01	0.04	0.03	0.02	0.03	0.06	0.02	0.03	0.00	0.00	0.34
8-12	N	0.36	0.27	0.18	0.28	0.18	0.18	0.17	0.18	0.29	0.57	0.65	0.67	0.81	0.96	0.58	0.49	0.00	0.00	6.81
8-12	MS	0.64	0.48	0.28	0.30	0.28	0.33	0.28	0.26	0.41	0.74	1.07	1.81	2.70	2.72	1.14	0.75	0.00	0.00	14.18
8-12	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.04	0.10	0.02	0.01	0.00	0.00	0.19
13-18	U	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.02	0.02	0.05	0.03	0.01	0.00	0.00	0.00	0.19
13-18	N	0.16	0.11	0.07	0.05	0.02	0.05	0.09	0.04	0.14	0.48	0.79	0.82	1.26	0.92	0.15	0.10	0.00	0.00	5.25
13-18	MS	0.25	0.21	0.09	0.08	0.04	0.10	0.17	0.08	0.19	0.64	1.11	1.89	4.80	3.78	0.44	0.21	0.00	0.00	14.09
13-18	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.09	0.37	0.01	0.00	0.00	0.00	0.49
19-24	U	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.04	0.05	0.00	0.00	0.00	0.00	0.13
19-24	N	0.05	0.05	0.01	0.01	0.00	0.00	0.02	0.01	0.06	0.24	0.44	0.32	1.21	0.99	0.05	0.02	0.00	0.00	3.49
19-24	MS	0.07	0.08	0.04	0.02	0.00	0.01	0.04	0.02	0.05	0.25	0.63	0.47	3.98	2.83	0.08	0.04	0.00	0.00	8.70
19-24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.22	0.00	0.00	0.00	0.00	0.35
GT.24	U	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.09	0.00	0.00	0.00	0.00	0.14
GT.24	N	0.01	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.19	0.33	0.13	1.10	1.61	0.01	0.00	0.00	0.00	3.45
GT.24	MS	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.04	0.12	0.20	0.08	2.99	3.14	0.01	0.00	0.00	0.00	6.65
GT.24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.00	0.00	0.00	0.00	0.09
TOTALS	U	0.10	0.09	0.05	0.04	0.04	0.06	0.06	0.09	0.07	0.13	0.12	0.10	0.19	0.29	0.11	0.13	0.00	0.05	1.74
TOTALS	N	1.49	1.33	0.95	1.14	0.93	1.07	0.79	0.84	0.98	2.05	2.68	2.59	5.07	5.37	1.75	1.83	0.10	0.71	31.67
TOTALS	MS	2.40	2.20	1.31	1.48	1.41	1.84	1.32	1.33	1.50	2.83	3.97	5.92	16.11	14.33	3.25	2.74	0.30	1.08	65.31
TOTALS	VS	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.02	0.04	0.30	0.78	0.06	0.02	0.00	0.00	1.28

TABLE 52. Continued

AUTUMN

SPEED CLASS		NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
06-X 90	0-3 U	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.02	0.01	0.24
	0-3 N	0.52	0.50	0.45	0.53	0.43	0.45	0.22	0.15	0.08	0.09	0.12	0.20	0.26	0.43	0.53	0.67	0.90	0.23	6.77
	0-3 MS	0.92	0.96	0.73	1.12	0.99	1.23	0.55	0.45	0.36	0.38	0.41	0.72	0.77	1.08	1.11	1.21	2.25	0.71	15.93
	0-3 VS	0.04	0.03	0.03	0.03	0.04	0.04	0.02	0.05	0.03	0.02	0.03	0.05	0.05	0.07	0.06	0.06	0.17	0.06	0.86
	4-7 U	0.02	0.01	0.00	0.01	0.01	0.02	0.00	0.01	0.01	0.01	0.00	0.02	0.01	0.02	0.05	0.03	0.00	0.00	0.23
	4-7 N	0.51	0.34	0.25	0.36	0.36	0.40	0.22	0.19	0.16	0.17	0.23	0.36	0.45	0.82	0.94	0.93	0.00	0.02	6.70
	4-7 MS	0.82	0.57	0.45	0.67	0.82	1.13	0.65	0.51	0.45	0.47	0.70	1.36	1.78	2.55	2.17	1.45	0.00	0.04	16.60
	4-7 VS	0.01	0.01	0.02	0.01	0.02	0.04	0.03	0.02	0.01	0.02	0.04	0.07	0.08	0.12	0.09	0.04	0.00	0.00	0.65
	8-12 U	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.04	0.02	0.02	0.00	0.00	0.14
	8-12 N	0.30	0.18	0.07	0.07	0.07	0.18	0.14	0.15	0.18	0.27	0.28	0.30	0.54	0.96	0.69	0.49	0.00	0.00	4.89
	8-12 MS	0.44	0.24	0.11	0.10	0.14	0.38	0.50	0.31	0.37	0.55	0.90	1.44	2.75	4.55	1.74	0.70	0.00	0.00	15.22
	8-12 VS	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.01	0.02	0.03	0.05	0.12	0.24	0.06	0.01	0.00	0.00	0.58
	13-18 U	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.01	0.00	0.00	0.11
	13-18 N	0.22	0.09	0.02	0.02	0.00	0.05	0.07	0.13	0.22	0.41	0.48	0.45	0.61	0.70	0.30	0.19	0.00	0.00	3.97
	13-18 MS	0.37	0.15	0.03	0.03	0.01	0.19	0.24	0.21	0.25	0.61	1.03	1.37	2.90	4.23	0.68	0.33	0.00	0.00	12.62
	13-18 VS	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.01	0.02	0.09	0.34	0.02	0.00	0.00	0.00	0.51
	19-24 U	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.00	0.01	0.02	0.00	0.01	0.00	0.00	0.08
	19-24 N	0.11	0.07	0.02	0.00	0.00	0.01	0.02	0.08	0.19	0.44	0.37	0.20	0.46	0.39	0.03	0.08	0.00	0.00	2.46
	19-24 MS	0.11	0.06	0.02	0.01	0.00	0.02	0.09	0.12	0.26	0.52	0.77	0.45	1.51	1.46	0.08	0.08	0.00	0.00	5.56
	19-24 VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.08	0.00	0.00	0.00	0.00	0.12
	GT.24 U	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.04
	GT.24 N	0.03	0.06	0.00	0.00	0.00	0.00	0.01	0.06	0.22	0.52	0.33	0.11	0.34	0.41	0.02	0.02	0.00	0.00	2.12
	GT.24 MS	0.03	0.04	0.02	0.00	0.00	0.00	0.03	0.09	0.34	0.64	0.44	0.17	0.90	0.83	0.01	0.02	0.00	0.00	3.57
	GT.24 VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01
	TOTALS U	0.06	0.04	0.01	0.03	0.02	0.04	0.01	0.03	0.03	0.06	0.05	0.05	0.07	0.13	0.10	0.09	0.02	0.01	0.84
	TOTALS N	1.69	1.24	0.81	0.99	0.86	1.09	0.68	0.76	1.05	1.90	1.82	1.63	2.66	3.70	2.51	2.38	0.90	0.25	26.92
	TOTALS MS	2.69	2.03	1.35	1.93	1.95	2.96	2.06	1.70	2.02	3.17	4.25	5.51	10.62	14.70	5.78	3.78	2.25	0.75	69.50
	TOTALS VS	0.06	0.04	0.04	0.04	0.06	0.09	0.08	0.09	0.06	0.08	0.11	0.19	0.37	0.85	0.23	0.11	0.17	0.06	2.73

TABLE 52. Continued

ANNUAL

SPEED CLASS		NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	CALM	VAR	TOTAL
0-3	U	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.02	0.02	0.25
0-3	N	0.39	0.37	0.32	0.38	0.30	0.36	0.19	0.18	0.10	0.11	0.11	0.21	0.23	0.37	0.40	0.52	0.71	0.30	5.53
0-3	MS	0.67	0.70	0.53	0.77	0.71	0.90	0.48	0.42	0.30	0.35	0.34	0.59	0.64	0.84	0.85	0.95	1.77	0.68	12.47
0-3	VS	0.02	0.03	0.02	0.03	0.03	0.04	0.03	0.03	0.02	0.02	0.02	0.04	0.03	0.04	0.04	0.04	0.08	0.05	0.62
4-7	U	0.03	0.03	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.02	0.01	0.02	0.02	0.04	0.04	0.04	0.00	0.01	0.38
4-7	N	0.49	0.39	0.33	0.37	0.34	0.42	0.27	0.28	0.23	0.28	0.29	0.37	0.48	0.81	0.86	0.80	0.00	0.08	7.10
4-7	MS	0.78	0.64	0.49	0.61	0.67	0.95	0.57	0.56	0.47	0.58	0.64	1.20	1.49	2.09	1.76	1.30	0.00	0.13	14.92
4-7	VS	0.02	0.01	0.01	0.01	0.02	0.03	0.03	0.02	0.02	0.03	0.04	0.06	0.06	0.08	0.07	0.03	0.00	0.00	0.55
8-12	U	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.04	0.02	0.02	0.00	0.00	0.20
8-12	N	0.30	0.18	0.11	0.13	0.10	0.16	0.15	0.17	0.23	0.37	0.40	0.48	0.67	1.09	0.65	0.45	0.00	0.00	5.63
8-12	MS	0.47	0.31	0.18	0.16	0.17	0.37	0.37	0.28	0.41	0.64	0.93	1.51	2.57	3.98	1.55	0.67	0.00	0.00	14.57
8-12	VS	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.16	0.04	0.01	0.00	0.00	0.43
13-18	U	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.01	0.03	0.03	0.01	0.00	0.00	0.00	0.15
13-18	N	0.22	0.10	0.04	0.03	0.02	0.05	0.09	0.11	0.21	0.46	0.60	0.64	0.87	0.78	0.27	0.20	0.00	0.00	4.69
13-18	MS	0.30	0.16	0.06	0.05	0.02	0.16	0.22	0.17	0.30	0.67	1.14	1.67	3.48	4.16	0.62	0.29	0.00	0.00	13.49
13-18	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.02	0.07	0.24	0.01	0.00	0.00	0.00	0.40
19-24	U	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.01	0.02	0.03	0.00	0.00	0.00	0.00	0.12
19-24	N	0.09	0.06	0.01	0.00	0.00	0.01	0.03	0.07	0.17	0.41	0.45	0.30	0.71	0.58	0.05	0.06	0.00	0.00	3.01
19-24	MS	0.10	0.06	0.03	0.01	0.01	0.03	0.08	0.10	0.22	0.56	0.85	0.63	2.26	1.83	0.07	0.06	0.00	0.00	6.90
19-24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.09	0.00	0.00	0.00	0.00	0.16
GT.24	U	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.01	0.02	0.05	0.00	0.00	0.00	0.00	0.13
GT.24	N	0.03	0.05	0.01	0.00	0.00	0.00	0.01	0.05	0.20	0.57	0.42	0.15	0.62	0.77	0.01	0.02	0.00	0.00	2.92
GT.24	MS	0.03	0.04	0.02	0.00	0.00	0.01	0.04	0.09	0.36	0.82	0.59	0.22	1.63	1.48	0.01	0.02	0.00	0.00	5.35
GT.24	VS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.04
TOTALS	U	0.06	0.06	0.03	0.04	0.03	0.04	0.03	0.04	0.04	0.10	0.10	0.07	0.12	0.21	0.10	0.10	0.02	0.03	1.22
TOTALS	N	1.52	1.15	0.82	0.92	0.75	1.00	0.73	0.86	1.16	2.20	2.27	2.14	3.58	4.41	2.24	2.06	0.71	0.38	28.88
TOTALS	MS	2.35	1.92	1.30	1.61	1.58	2.41	1.75	1.61	2.05	3.61	4.48	5.83	12.07	14.38	4.87	3.28	1.77	0.81	67.70
TOTALS	VS	0.05	0.04	0.03	0.04	0.05	0.08	0.08	0.08	0.06	0.09	0.11	0.17	0.31	0.63	0.16	0.08	0.08	0.05	2.20

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TABLE 53. Monthly and Annual Hourly Average Tower Temperature at 3 Feet (1955 Through 1980)

FLOOR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1	27.8	34.0	39.4	46.2	54.1	62.2	69.0	68.1	59.8	48.0	36.9	31.4	48.2
2	27.6	33.7	38.7	45.2	52.9	61.0	67.7	66.8	58.5	47.1	36.5	31.3	47.3
3	27.3	33.3	38.0	44.3	51.9	59.7	66.2	65.3	57.4	46.3	36.2	31.1	46.5
4	27.1	32.9	37.5	43.4	50.7	58.5	64.7	63.7	56.4	45.5	35.9	30.8	45.7
5	26.9	32.6	36.7	42.4	49.9	57.9	63.6	62.5	55.3	44.8	35.6	30.6	44.9
6	26.7	32.2	36.2	42.1	52.2	61.2	66.5	62.7	54.3	44.1	35.3	30.4	45.4
7	26.6	32.0	36.3	45.5	56.4	65.0	71.0	67.6	56.6	43.7	34.8	30.3	47.2
8	26.5	32.4	39.5	49.2	59.5	68.1	74.4	71.4	61.4	47.6	35.3	30.2	49.7
9	27.7	35.1	43.1	52.5	62.2	70.4	76.9	74.6	65.4	51.8	37.8	31.2	52.5
10	29.9	37.5	45.8	55.3	64.7	72.8	79.7	77.8	68.4	55.0	40.5	33.2	55.2
11	31.6	40.0	48.5	57.7	66.8	74.9	81.9	80.0	71.5	57.9	42.4	34.7	57.4
12	33.1	41.9	50.6	59.8	69.1	77.5	84.8	82.8	73.9	60.4	44.1	36.2	59.6
13	34.3	43.5	52.4	61.3	70.6	79.1	86.7	84.8	75.9	62.2	45.3	37.1	61.2
14	34.8	44.3	53.5	62.5	71.9	80.5	88.5	86.5	77.6	63.5	46.0	37.6	62.4
15	35.1	45.0	54.2	63.1	72.6	81.3	89.6	87.5	78.5	63.9	46.1	37.6	63.0
16	34.5	44.5	54.1	63.0	72.7	81.6	90.0	87.9	78.5	63.5	45.2	36.5	62.8
17	32.3	43.2	53.1	62.1	71.9	81.1	89.7	87.3	77.5	61.3	42.2	34.3	61.4
18	30.7	40.0	50.6	60.2	70.3	79.2	88.2	85.7	74.5	56.5	40.4	33.4	59.3
19	30.0	38.2	46.5	56.3	67.6	76.8	85.9	82.0	69.2	53.9	39.4	32.9	56.7
20	29.6	37.1	44.4	52.8	63.0	72.4	80.8	76.7	66.2	52.2	38.6	32.5	54.0
21	29.1	36.4	43.1	50.9	60.2	68.5	76.5	73.8	64.2	51.0	38.1	32.2	52.1
22	28.8	35.8	42.1	49.5	58.3	66.4	74.0	72.0	62.9	50.1	37.7	31.9	50.9
23	28.5	35.3	41.1	48.5	56.8	64.9	72.3	70.4	61.7	49.2	37.3	31.7	49.9
24	28.2	34.8	40.3	47.3	55.6	63.6	70.8	69.1	60.5	48.3	37.0	31.5	49.0
AVG	29.8	37.3	44.4	52.5	61.7	70.2	77.5	75.3	66.1	52.8	39.3	32.9	53.3

TABLE 54. Monthly and Annual Hourly Average Tower Temperature at 20 Feet (1955 Through 1980)

FLOOR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1	27.7	36.1	42.3	49.3	55.1	62.0	69.0	69.6	63.5	50.1	39.3	33.8	48.3
2	27.2	35.6	41.7	48.4	54.2	61.1	68.2	68.4	62.2	48.7	39.2	33.7	47.6
3	26.9	35.3	40.9	47.4	53.0	59.9	66.5	66.9	61.4	47.9	39.1	33.4	46.8
4	26.6	35.1	40.7	46.9	52.1	58.9	65.4	65.5	59.7	47.2	39.0	33.0	46.2
5	26.6	34.7	39.9	46.2	51.3	58.2	64.2	64.5	58.7	46.2	38.6	32.8	45.5
6	26.1	34.1	39.3	45.5	52.2	60.1	65.7	63.7	57.4	45.5	38.6	32.9	45.5
7	26.2	33.8	39.0	47.3	55.3	63.0	69.3	67.4	58.3	44.8	38.2	32.5	46.5
8	26.1	33.6	41.2	50.2	57.9	65.7	72.4	71.2	61.8	46.3	38.1	32.6	48.1
9	27.3	35.3	44.0	53.3	60.3	67.4	74.7	73.7	65.5	49.7	39.2	33.0	50.2
10	29.4	27.2	46.2	55.3	62.5	69.9	76.9	76.4	68.0	52.6	41.3	34.6	52.5
11	30.8	39.6	48.9	57.8	64.7	72.0	79.2	79.0	71.2	55.6	42.9	36.3	54.7
12	32.1	41.4	50.9	60.2	67.0	74.4	81.6	81.7	73.9	57.9	43.8	37.4	56.6
13	33.1	42.7	52.5	61.8	68.5	76.5	83.9	84.0	76.1	59.6	44.8	38.3	58.2
14	33.6	43.5	53.5	63.2	69.8	78.0	85.7	85.7	77.4	61.1	45.2	38.8	59.3
15	33.7	43.6	54.2	63.7	70.6	78.9	87.0	86.9	78.5	61.8	45.3	38.9	59.9
16	33.1	43.7	54.2	63.7	70.7	79.3	87.9	87.5	79.1	62.0	44.8	38.2	59.9
17	31.6	42.6	53.3	63.1	70.2	79.1	87.7	87.3	78.8	60.6	43.3	36.7	59.0
18	30.5	40.7	51.4	61.4	69.1	77.8	86.9	85.8	76.4	57.7	42.3	35.9	57.5
19	29.7	39.5	48.7	58.4	66.7	75.7	84.5	82.5	72.8	55.3	41.5	35.4	55.5
20	29.8	38.6	46.9	55.7	62.9	71.9	80.3	78.1	69.7	53.4	41.1	35.1	53.5
21	29.0	38.0	45.7	53.9	60.4	68.6	76.8	75.6	67.5	52.4	40.7	34.8	51.9
22	26.8	37.4	44.7	52.3	58.9	66.3	74.5	73.4	65.9	51.5	40.3	34.3	50.7
23	28.5	37.1	43.9	51.1	57.4	64.6	72.5	71.8	65.1	50.9	39.9	34.1	49.8
24	28.0	36.9	43.0	50.1	56.2	63.2	70.9	70.8	64.6	50.1	39.5	34.0	49.0
AVG	29.3	38.2	46.1	54.4	61.1	68.8	76.3	75.7	68.1	52.9	41.1	35.0	53.9

TABLE 55. Monthly and Annual Hourly Average Tower Temperature at 50 Feet (1955 Through 1980)

HOURL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1	29.8	36.6	42.3	48.8	56.5	64.1	71.2	70.6	63.4	52.1	39.5	33.4	50.8
2	29.6	36.2	41.7	48.0	55.5	63.2	70.0	69.5	62.2	51.2	39.1	33.1	50.0
3	29.4	35.8	41.0	47.1	54.7	62.1	68.8	68.3	61.2	50.3	38.7	32.9	49.3
4	29.1	35.3	40.5	46.3	53.6	61.0	67.7	67.1	60.2	49.6	38.4	32.7	48.5
5	28.9	35.0	39.8	45.6	52.9	60.3	66.6	66.1	59.2	48.8	38.0	32.4	47.9
6	28.7	34.5	39.2	44.9	53.0	61.1	67.0	65.5	58.2	48.0	37.6	32.2	47.6
7	28.5	34.3	38.9	45.8	55.6	63.9	70.0	67.2	58.1	47.3	37.2	32.0	48.3
8	28.3	34.2	39.8	48.4	58.2	66.5	72.9	70.4	60.8	48.1	37.1	31.9	49.8
9	28.5	35.1	42.3	51.1	60.6	68.5	75.2	73.1	63.8	50.7	37.8	32.0	51.6
10	29.7	36.9	44.4	53.2	62.3	70.5	77.2	75.4	66.4	53.4	39.7	33.0	53.6
11	31.1	39.0	46.6	55.3	64.2	72.4	79.5	77.5	69.0	56.1	41.5	34.4	55.7
12	32.5	40.9	48.7	57.2	66.3	74.6	81.9	80.1	71.4	58.6	43.1	35.6	57.7
13	33.6	42.4	50.4	58.9	67.9	76.3	83.8	82.2	73.6	60.4	44.2	36.5	59.3
14	34.4	43.4	51.6	60.1	69.1	77.6	85.5	83.7	75.3	61.8	45.0	37.1	60.5
15	34.7	44.0	52.4	60.7	70.1	78.6	86.7	84.9	76.4	62.5	45.3	37.2	61.2
16	34.4	43.9	52.7	61.0	70.4	79.1	87.4	85.6	76.8	62.5	44.9	36.7	61.4
17	33.3	43.3	52.2	60.6	70.2	79.0	87.6	85.5	76.4	61.4	43.6	35.8	60.8
18	32.5	41.6	50.6	59.4	69.4	78.1	86.9	84.7	74.7	59.3	42.6	35.2	59.7
19	31.9	40.4	48.7	57.1	67.5	76.1	85.2	82.3	71.9	57.4	41.8	34.8	58.0
20	31.5	39.5	47.0	54.8	64.5	73.0	81.8	78.8	69.6	56.0	41.2	34.5	56.1
21	31.1	38.9	45.8	53.0	62.2	70.1	78.6	76.3	67.7	54.8	40.7	34.1	54.5
22	30.9	38.3	44.6	51.8	60.4	68.1	76.1	74.2	66.2	54.0	40.3	33.9	53.3
23	30.6	37.8	44.0	50.7	59.0	66.5	74.2	72.7	65.0	53.3	39.8	33.6	52.4
24	30.2	37.3	43.2	49.9	57.8	65.3	72.8	71.4	64.0	52.5	39.6	33.4	51.5
AVC	31.0	38.5	45.4	52.9	61.6	69.8	77.3	75.5	67.1	54.6	40.7	34.1	54.1

TABLE 56. Monthly and Annual Hourly Average Tower Temperature at 100 Feet (1955 Through 1980)

HOUR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1	30.1	37.0	42.8	49.2	56.9	64.3	71.6	71.0	64.0	52.8	39.9	33.7	51.2
2	29.9	36.6	42.2	48.4	56.0	63.4	70.4	69.9	62.8	51.9	39.5	33.5	50.4
3	29.7	36.2	41.5	47.6	55.1	62.4	69.2	68.8	61.8	51.0	39.1	33.3	49.7
4	29.4	35.7	40.9	46.8	54.1	61.4	68.3	67.7	60.9	50.3	38.8	33.0	49.0
5	29.2	35.3	40.3	46.1	53.4	60.8	67.2	66.8	60.0	49.5	38.4	32.7	48.4
6	29.0	35.0	39.8	45.4	53.2	61.0	67.2	66.1	59.0	48.8	38.1	32.5	48.0
7	28.9	34.7	39.4	45.8	55.0	63.2	69.3	66.8	58.6	48.1	37.7	32.3	48.4
8	28.6	34.6	39.8	47.8	57.4	65.6	72.0	69.6	60.3	48.3	37.5	32.2	49.6
9	28.7	35.0	41.6	50.2	59.7	67.7	74.4	72.2	62.9	50.2	37.7	32.2	51.1
10	29.4	36.5	43.7	52.4	61.6	69.6	76.5	74.5	65.6	53.0	39.4	33.0	53.0
11	30.8	38.5	46.0	54.5	63.5	71.6	78.7	76.7	68.4	55.7	41.0	34.1	55.0
12	32.1	40.3	48.0	56.4	65.4	73.6	80.9	79.1	70.8	57.9	42.5	35.2	56.9
13	33.1	41.7	49.6	58.1	67.1	75.5	83.1	81.4	72.9	59.7	43.7	36.0	58.6
14	33.9	42.8	50.9	59.2	68.3	76.7	84.7	82.9	74.5	61.1	44.5	36.6	59.8
15	34.2	43.4	51.7	60.0	69.3	77.8	85.9	84.1	75.6	61.8	44.8	36.8	60.5
16	34.1	43.4	52.0	60.3	69.6	78.3	86.6	84.8	76.0	61.9	44.5	36.4	60.8
17	33.2	42.8	51.6	59.9	69.4	78.2	86.8	84.7	75.7	61.0	43.5	35.6	60.3
18	32.6	41.6	50.4	58.9	68.7	77.3	86.2	83.9	74.3	59.3	42.6	35.3	59.4
19	32.1	40.6	48.7	56.9	67.1	75.5	84.6	81.8	72.0	57.9	42.1	35.0	58.0
20	31.7	39.8	47.3	54.9	64.4	72.8	81.6	78.8	70.0	56.7	41.5	34.7	56.3
21	31.3	39.2	46.1	53.3	62.3	70.1	78.6	76.4	68.3	55.6	41.2	34.4	54.8
22	31.2	38.7	45.2	52.1	60.5	68.1	76.2	74.5	66.9	54.7	40.7	34.2	53.7
23	30.9	38.2	44.4	51.1	59.3	66.7	74.5	73.0	65.7	53.9	40.2	34.0	52.7
24	30.6	37.7	43.7	50.3	58.1	65.5	73.1	71.8	64.7	53.1	40.0	33.7	51.9
AVG	31.0	36.6	45.3	52.7	61.5	69.5	77.0	75.3	67.1	54.8	40.6	34.2	54.0

TABLE 57. Monthly and Annual Hourly Average Tower Temperature at 200 Feet (1955 Through 1980)

HOUR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1	30.9	38.0	43.7	50.0	57.6	64.9	72.3	71.7	65.0	53.9	40.7	34.4	52.0
2	30.7	37.5	43.2	49.3	56.8	64.1	71.1	70.7	63.8	53.1	40.3	34.2	51.3
3	30.6	37.2	42.5	48.5	55.9	63.1	70.1	69.6	62.9	52.3	40.0	34.1	50.6
4	30.3	36.7	41.9	47.7	55.1	62.3	69.2	68.7	62.1	51.5	39.6	33.6	50.0
5	30.0	36.4	41.3	47.0	54.4	61.6	68.3	67.8	61.1	50.7	39.3	33.5	49.4
6	29.9	36.1	40.7	46.3	54.0	61.5	68.0	67.1	60.3	50.0	38.9	33.4	48.9
7	29.7	35.7	40.4	46.4	54.9	63.0	69.2	67.2	59.8	49.3	38.5	33.1	49.0
8	29.4	35.6	40.4	47.7	57.0	65.2	71.6	69.3	60.4	49.3	38.3	33.0	49.9
9	29.5	35.8	41.6	50.0	59.3	67.3	74.0	71.9	62.7	50.2	38.4	33.0	51.2
10	29.9	36.7	43.5	52.1	61.2	69.2	76.2	74.3	65.4	52.6	39.4	33.4	52.9
11	30.9	38.4	45.6	54.1	63.1	71.2	78.3	76.4	67.9	55.2	40.8	34.2	54.8
12	32.1	40.1	47.6	55.9	64.9	72.2	80.5	78.7	70.2	57.5	42.2	35.1	56.6
13	33.0	41.5	49.2	57.6	66.5	75.0	82.5	80.9	72.3	59.3	43.4	35.9	58.2
14	33.8	42.5	50.4	58.7	67.7	76.2	84.1	82.4	74.0	60.7	44.2	36.5	59.3
15	34.2	43.1	51.2	59.4	68.7	77.2	85.3	83.5	75.1	61.4	44.6	36.8	60.1
16	34.1	43.2	51.6	59.8	69.1	77.7	86.0	84.2	75.6	61.6	44.4	36.6	60.4
17	33.4	42.8	51.3	59.5	69.0	77.7	86.2	84.3	75.4	60.9	43.6	36.1	60.1
18	33.0	41.8	50.4	58.6	68.4	76.9	85.8	83.6	74.1	59.6	43.1	35.9	59.4
19	32.6	41.1	49.0	57.0	66.9	75.2	84.4	81.7	72.2	58.5	42.6	35.6	58.2
20	32.3	40.4	47.8	55.2	64.7	72.8	81.6	79.0	70.5	57.5	42.2	35.3	56.7
21	32.0	39.9	46.8	53.8	62.7	70.3	78.8	76.9	69.1	56.6	41.9	35.1	55.4
22	31.8	39.5	45.9	52.7	61.1	68.6	76.7	75.1	67.8	55.8	41.4	34.9	54.4
23	31.6	39.0	45.2	51.8	59.9	67.1	75.0	73.7	66.7	55.0	41.1	34.7	53.5
24	31.3	38.6	44.6	51.0	58.8	66.0	73.7	72.5	65.6	54.2	40.8	34.5	52.7
AVG	31.5	39.1	45.7	52.9	61.6	69.5	77.0	75.5	67.5	55.3	41.2	34.7	54.3

TABLE 58. Monthly and Annual Hourly Average Tower Temperature at 250 Feet (1955 Through 1980)

HOUR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1	30.9	37.9	43.7	49.9	57.5	64.8	72.2	71.7	65.1	54.0	40.7	34.4	52.0
2	30.7	37.6	43.2	49.2	56.7	64.0	71.1	70.6	63.9	53.2	40.3	34.2	51.3
3	30.6	37.2	42.6	48.4	55.9	63.1	70.1	69.6	63.0	52.3	40.0	34.0	50.6
4	30.3	36.8	41.9	47.7	55.1	62.2	69.2	68.7	62.1	51.6	39.6	33.7	50.0
5	30.0	36.4	41.3	46.9	54.3	61.6	68.4	67.8	61.3	50.8	39.2	33.5	49.4
6	29.9	36.1	40.7	46.3	53.9	61.3	67.8	67.1	60.3	50.1	38.9	33.4	48.9
7	29.7	35.8	40.4	46.2	54.5	62.5	68.7	66.9	59.8	49.4	38.5	33.1	48.9
8	29.4	35.7	40.3	47.3	56.5	64.7	71.0	68.8	60.1	49.3	38.3	33.0	49.6
9	29.5	35.7	41.2	49.5	58.7	66.8	73.5	71.3	62.2	49.9	38.3	32.9	50.9
10	29.8	36.5	43.0	51.5	60.7	68.7	75.5	73.7	64.8	52.2	39.1	33.3	52.5
11	30.6	38.1	45.1	53.6	62.6	70.7	77.7	75.8	67.4	54.7	40.4	34.0	54.3
12	31.7	39.6	47.0	55.4	64.3	72.6	79.9	78.1	69.7	56.9	41.8	34.8	56.1
13	32.6	41.0	48.6	57.0	65.9	74.4	81.9	80.2	71.7	58.7	42.9	35.5	57.6
14	33.4	42.0	49.8	58.1	67.2	75.5	83.4	81.8	73.4	60.1	43.7	36.1	58.8
15	33.8	42.7	50.7	58.9	68.1	76.6	84.6	82.9	74.5	60.9	44.1	36.4	59.6
16	33.7	42.8	51.0	59.2	68.5	77.1	85.4	83.6	75.0	61.1	44.0	36.2	59.9
17	33.1	42.4	50.8	58.9	68.4	77.1	85.6	83.6	74.8	60.4	43.4	35.9	59.6
18	32.8	41.6	50.0	58.1	67.8	76.3	85.1	83.0	73.7	59.2	42.9	35.7	59.0
19	32.4	40.9	48.7	56.6	66.4	74.7	83.8	81.2	71.9	58.3	42.5	35.5	57.8
20	32.2	40.3	47.6	55.0	64.2	72.4	81.2	78.7	70.4	57.4	42.1	35.2	56.5
21	31.9	39.9	46.6	53.6	62.4	70.1	78.5	76.7	69.0	56.5	41.8	35.0	55.3
22	31.7	39.4	45.8	52.6	60.9	68.4	76.5	75.0	67.8	55.8	41.4	34.8	54.2
23	31.5	39.0	45.2	51.7	59.7	66.9	74.9	73.6	66.7	55.0	41.0	34.7	53.4
24	31.3	38.6	44.5	50.9	58.7	65.9	73.6	72.4	65.7	54.3	40.7	34.4	52.7
AVC	31.4	38.9	45.4	52.6	61.2	69.1	76.7	75.1	67.3	55.1	41.1	34.6	54.0

TABLE 59. Monthly and Annual Hourly Average Tower Temperature at 300 Feet (1955 Through 1980)

HOUR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1	31.0	38.0	43.8	50.0	57.6	64.8	72.2	71.7	65.2	54.1	40.7	34.5	52.1
2	30.6	37.6	43.3	49.2	56.8	64.1	71.2	70.7	64.0	53.4	40.4	34.3	51.4
3	30.7	37.3	42.6	48.5	56.0	63.2	70.2	69.7	63.1	52.6	40.0	34.1	50.7
4	30.4	36.9	42.0	47.8	55.1	62.3	69.3	68.8	62.3	51.8	39.7	33.9	50.1
5	30.2	36.6	41.4	47.1	54.4	61.7	68.5	67.9	61.4	51.0	39.3	33.7	49.5
6	30.0	36.2	40.9	46.4	54.0	61.4	68.0	67.2	60.5	50.3	39.0	33.5	49.0
7	29.8	35.9	40.5	46.4	54.5	62.5	68.7	67.0	60.0	49.6	38.7	33.3	49.0
8	29.6	35.8	40.4	47.2	56.4	64.5	70.9	68.7	60.2	49.4	38.4	33.1	49.6
9	29.6	35.8	41.1	49.2	58.5	66.7	73.3	71.1	61.9	49.8	38.4	33.1	50.8
10	30.0	36.5	42.8	51.2	60.4	68.4	75.3	73.4	64.5	52.1	39.2	33.5	52.4
11	30.6	38.0	44.9	53.3	62.3	70.4	77.4	75.5	67.1	54.6	40.3	34.0	54.1
12	31.7	39.5	46.9	55.2	64.1	72.4	79.7	77.9	69.5	56.6	41.7	34.8	55.9
13	32.6	40.9	48.5	56.8	65.8	74.2	81.8	80.1	71.6	58.5	42.8	35.5	57.5
14	32.3	41.9	49.7	58.0	67.0	75.4	83.3	81.6	73.2	59.9	43.6	36.1	58.7
15	33.7	42.5	50.5	58.7	68.0	76.4	84.5	82.8	74.4	60.7	44.0	36.3	59.5
16	33.6	42.6	50.9	59.1	68.4	77.0	85.3	83.5	74.9	60.9	43.9	36.2	59.8
17	33.1	42.3	50.6	58.8	68.3	76.9	85.5	83.5	74.6	60.2	43.2	35.9	59.5
18	32.8	41.4	49.8	57.9	67.7	76.2	85.0	82.8	73.4	59.1	42.8	35.7	58.8
19	32.4	40.8	48.5	56.3	66.2	74.5	83.6	81.0	71.7	58.2	42.4	35.5	57.7
20	32.2	40.3	47.5	54.8	64.1	72.2	80.9	78.6	70.3	57.4	42.0	35.2	56.4
21	32.0	39.8	46.6	53.6	62.4	70.0	78.4	76.6	69.0	56.5	41.8	35.0	55.2
22	31.8	39.5	45.8	52.6	60.9	68.3	76.5	75.0	67.8	55.9	41.4	34.9	54.3
23	31.6	39.0	45.2	51.7	59.7	66.9	74.9	73.6	66.8	55.2	41.1	34.8	53.5
24	31.4	38.7	44.6	50.9	58.8	65.9	73.6	72.5	65.8	54.5	40.8	34.5	52.7
AVG	31.4	38.9	45.4	52.5	61.1	69.0	76.6	75.1	67.2	55.1	41.1	34.6	54.0

TABLE 60. Monthly and Annual Hourly Average Tower Temperature at 400 Feet (1955 Through 1980)

HOUR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1	31.2	38.2	43.9	50.1	57.7	65.0	72.5	72.2	65.5	54.4	40.9	34.7	52.2
2	31.1	37.9	43.4	49.4	56.9	64.2	71.5	71.2	64.4	53.7	40.6	34.5	51.5
3	30.9	37.6	42.8	48.6	56.2	63.3	70.5	70.2	63.5	52.9	40.2	34.3	50.9
4	30.6	37.1	42.3	47.9	55.3	62.5	69.6	69.3	62.7	52.1	39.9	34.1	50.3
5	30.4	36.8	41.6	47.2	54.6	61.9	68.8	68.4	61.8	51.4	39.6	33.9	49.7
6	30.2	36.5	41.1	46.6	54.2	61.6	68.3	67.7	60.9	50.6	39.2	33.8	49.2
7	30.0	36.2	40.8	46.5	54.5	62.4	68.7	67.5	60.5	50.0	38.9	33.5	49.1
8	29.9	36.1	40.6	47.1	56.2	64.3	70.7	68.7	60.4	49.8	38.7	33.4	49.7
9	29.9	36.1	41.0	48.9	58.3	66.6	73.1	70.9	61.7	49.9	38.7	33.3	50.7
10	30.2	36.6	42.6	50.9	60.2	68.4	75.2	73.3	64.2	51.9	39.2	33.7	52.2
11	30.7	38.0	44.7	53.1	62.0	70.1	77.1	75.4	67.1	54.3	40.3	34.2	53.9
12	31.7	39.5	46.7	55.0	63.8	72.1	79.3	77.8	69.4	56.5	41.5	34.8	55.6
13	32.6	40.8	48.2	56.6	65.5	74.0	81.5	80.1	71.4	58.3	42.7	35.5	57.2
14	33.2	41.7	49.4	57.7	66.7	75.2	83.1	81.6	73.1	59.6	43.4	36.0	58.4
15	33.6	42.4	50.2	58.5	67.7	76.2	84.3	82.8	74.2	60.4	43.8	36.2	59.2
16	33.5	42.4	50.6	58.8	68.1	76.8	85.1	83.5	74.6	60.6	43.7	36.1	59.5
17	33.0	42.1	50.3	58.5	68.0	76.7	85.3	83.5	74.4	59.9	43.1	35.9	59.2
18	32.7	41.3	49.5	57.6	67.4	75.9	84.8	82.8	73.2	58.9	42.7	35.7	58.5
19	32.4	40.8	48.4	56.1	65.9	74.2	83.3	80.9	71.6	58.0	42.4	35.5	57.4
20	32.3	40.3	47.4	54.6	63.9	71.9	80.7	78.6	70.3	57.3	42.1	35.4	56.2
21	32.1	39.9	46.6	53.5	62.3	69.9	78.4	76.9	69.1	56.6	41.9	35.2	55.2
22	31.9	39.6	45.9	52.6	60.9	68.4	76.7	75.3	68.0	56.0	41.5	35.0	54.3
23	31.7	39.2	45.3	51.8	59.8	67.1	75.1	74.0	67.1	55.4	41.2	34.9	53.5
24	31.5	38.9	44.7	51.0	58.9	66.0	73.9	73.0	66.1	54.7	41.0	34.7	52.8
AVG	31.6	39.0	45.3	52.4	61.0	68.9	76.6	75.2	67.3	55.1	41.1	34.8	54.0

XI. PERSISTENCE AND EXTREME VALUES

XI. PERSISTENCE AND EXTREME VALUES

PROBABILITY THAT A WINTER MINIMUM WILL FALL BELOW OR A SUMMER MAXIMUM WILL EXCEED A GIVEN TEMPERATURE

The low temperature for each winter (1912-1913 through 1979-1980) is plotted on arithmetic probability paper (Figure 31). Another plot for the high temperature for each summer (1912 through 1980) is shown in Figure 32. A straight line fitted to each plot shows a greater slope during the winter. This is due to the greater range in winter low temperatures.

PROBABILITY THAT A WINTER MINIMUM SUBSOIL TEMPERATURE WILL FALL BELOW OR SUMMER MAXIMUM WILL EXCEED A GIVEN TEMPERATURE

Figures 33 and 34 show plots of annual subsoil temperature extremes for the period 1955 to 1980. Only in 1957 has the temperature at the 36-inch depth fallen to 32°F.

EXTREME VALUE ANALYSIS OF PEAK GUSTS

The annual peak wind gusts for the period of record 1945 through 1980 for three tower levels are plotted on arithmetic probability paper and a straight line fitted to the plots (Figure 35). Equations for the three lines are as follows:

50-foot level	$X_{50}=58.45+5.90y$
200-foot level	$X_{200}=65.46+6.43y$
400-foot level	$X_{400}=69.43+7.79y$

RAINFALL INTENSITY DURATION AND FREQUENCY

Design criteria sometimes require a knowledge of the expected frequency of intensity and short-period rainfall duration (24 hours or less). Figure 36 and Table 53 (based on data 1947 through 1969) show this information for the HMS (Stone, Jenne and Thorp 1972).

FIGURE 31. Lowest Temperature During Each of 68 Winters at Hanford: 1912-13 to 1979-80-- Probability (%) That Lowest Temperature Will be Higher Than Given Temperature

FIGURE 32. Highest Temperature During Each of 66 Summers of Record at Hanford: 1912 Through 1980 (1943-44 Missing)

FIGURE 33. Annual Lowest Subsoil Temperatures, 1955 Through 1980

FIGURE 34. Annual Highest Subsoil Temperatures, 1955 Through 1979

FIGURE 35. Peak Wind Gust Return Period Probability Diagram, Based on Records 1945 Through 1980

TO USE THIS CHART, SELECT ANY DESIRED RAINFALL INTENSITY AND DURATION AND READ FROM THE DIAGONAL LINES THE EXPECTED FREQUENCY OF SUCH INTENSITY AND DURATION. FOR EXAMPLE, RAINFALL INTENSITY OF 1.3 INCHES PER HOUR FOR 10 MINUTES CAN BE EXPECTED TO OCCUR, ON AVERAGE, ONCE EVERY 5 YEARS (POINT A). HOWEVER, SUCH INTENSITY CAN BE EXPECTED FOR 30 MINUTES DURATION ONLY ABOUT ONCE IN 100 YEARS (POINT B). THE RETURN PERIOD FOR THIS INTENSITY FOR 60 MINUTES DURATION IS GREATER THAN 1000 YEARS (POINT C).

THERE ARE, OF COURSE, VARIATIONS IN USE OF THE CHART. SUPPOSE, FOR EXAMPLE, IT IS DESIRED TO FIND THE "100-YEAR STORM" FOR 60 MINUTES. THIS IS 0.8 INCH (POINT D).

FIGURE 36. Rainfall Intensity, Duration and Frequency Based on the Period 1947 to 1969 at Hanford

TABLE 61. Average Return Period (R) and Existing Record (ER) for Various Precipitation Amounts and Intensity During Specified Time Periods at Hanford (Based on Extreme Value Analysis of 1947 Through 1969 Records)

R (YEARS)	AMOUNT (INCHES)							INTENSITY (INCHES PER HOUR)						
	TIME PERIOD							TIME PERIOD						
	20 MIN	60 MIN	2 HRS	3 HRS	6 HRS	12 HRS	24 HRS	20 MIN	60 MIN	2 HRS	3 HRS	6 HRS	12 HRS	24 HRS
2	0.16	0.26	0.30	0.36	0.48	0.62	0.72	0.49	0.26	0.15	0.12	0.08	0.052	0.030
5	0.24	0.40	0.48	0.55	0.77	0.95	1.06	0.72	0.40	0.24	0.18	0.13	0.079	0.044
10	0.37	0.50	0.59	0.67	0.96	1.17	1.28	1.1	0.50	0.30	0.22	0.16	0.098	0.053
25	0.47	0.62	0.74	0.83	1.21	1.45	1.56	1.4	0.62	0.37	0.28	0.20	0.121	0.065
50	0.53	0.72	0.85	0.96	1.40	1.66	1.77	1.6	0.72	0.42	0.32	0.23	0.138	0.074
100	0.60	0.81	0.96	1.07	1.59	1.87	1.99	1.8	0.81	0.48	0.36	0.27	0.156	0.083
250	0.68	0.93	1.11	1.22	1.82	2.13	2.26	2.0	0.93	0.55	0.41	0.30	0.177	0.094
500	0.73	1.02	1.22	1.33	2.00	2.34	2.47	2.2	1.02	0.61	0.44	0.33	0.195	0.103
1000	0.80	1.11	1.33	1.45	2.20	2.55	2.68	2.4	1.11	0.67	0.48	0.37	0.212	0.112
ER	*	0.59	0.88	1.08	1.68	1.88	1.91	*	0.59	0.44	0.36	0.28	0.157	0.080
		6/12	10/1	10/1	10/1-2	10/1-2	10/1-2		6/12	10/1	10/1	10/1-2	10/1-2	10/1-2
DATE	--	1969	1957	1957	1957	1957	1957	--	1969	1957	1957	1957	1957	1957

* NO RECORDS HAVE BEEN KEPT FOR TIME PERIODS OF LESS THAN 60 MINUTES. HOWEVER, THE RAIN GAGE CHART FOR 6-12-69 SHOWS THAT 0.55 INCH OCCURRED DURING A 20-MINUTE PERIOD FROM 1835 TO 1855 PST. AN ADDITIONAL 0.04 INCH OCCURRED BETWEEN 1855 AND 1910 TO ACCOUNT FOR THE RECORD 60-MINUTE AMOUNT OF 0.59 INCH.

PROBABILITY THAT THE GREATEST DEPTH OF SNOW ON THE GROUND WILL EXCEED
A GIVEN AMOUNT

Refer to Section IV, page 14.

PROBABILITY THAT TOTAL ANNUAL PRECIPITATION WILL EXCEED A GIVEN AMOUNT

Figure 37 shows total annual precipitation for the years 1912 through 1980 plotted on arithmetic probability paper, and a straight line fitted to these data.

FIGURE 37. Hanford Meteorology Station Total Annual Precipitation 1913 Through 1980 (1943 Through 1946 Missing)

XII. METEOROLOGICAL INSTRUMENTATION

XII. METEOROLOGICAL INSTRUMENTATION

The locations and types of meteorological sensors used at the HMS and on the Hanford Meteorology Tower (HMT), are shown below:

Instruments	<u>Instrument Height Locations</u>									
	<u>Surface</u> <u>(Feet)</u>		<u>Tower Levels (Feet)</u>							
	<u>3</u>	<u>7</u>	<u>20</u>	<u>50</u>	<u>100</u>	<u>150</u>	<u>200</u>	<u>250</u>	<u>300</u>	<u>350</u> <u>400</u>
Thermohms	X		X	X	X		X	X	X	X
Aerovanes		X		X	X		X		X	X
Dewcel	X									

TEMPERATURE

The temperature sensors for the HMT and subsoil are Leeds & Northrup^(a) copper thermohms. Temperatures are recorded on Leeds & Northrup Speedomax, Type G recorders. The accuracies of the thermohms and recorders are about $\pm 0.2^{\circ}\text{F}$. The Quality Assurance Program specifies calibration on an annual basis except for the subsoil thermohms which are calibrated only when the data are questionable. A standard instrument shelter houses the Taylor maximum and minimum thermometers.

SOLAR RADIATION

Solar radiation is measured with an Eppley^(b) Model PSP Pyranometer. The sensor is calibrated by the Solar Radiation Calibration Facility at Boulder, Colorado. The data are recorded on a Leeds & Northrup Type H, Model S Speedomax. The Quality Assurance Program specifies an annual calibration.

WIND

Wind speed and direction are measured by Bendix-Friez^(c) Aerovane, Model 120 sensors, and recorded on Aerovane, Model 141-7

(a) Leeds & Northrup Company, North Wales, Pennsylvania

(b) Eppley Laboratories, Inc., Newport, Rhode Island

(c) Bendix Aviation Corporation, Friez Instrument Division, Baltimore, Maryland

recorders. The low speed threshold of the sensors is about 2.5 mph. The Quality Assurance Program specifies an annual calibration of the sensors and recorders. On rare occasions, during low wind speeds and icing conditions the sensors have become inoperative.

ATMOSPHERIC PRESSURE

A Fortin-type mercurial barometer and a Bendix Friez^(a) Model 790 Microbarograph are used to measure atmospheric pressure. The mercurial barometer is calibrated by the National Weather Service at their convenience. The microbarograph is calibrated every 6 hours by comparison with the reading taken from the mercurial barometer.

PRECIPITATION

Precipitation is measured with a Bendix-Friez, Model 405 tipping bucket automatic rain gage and a standard 8-inch rain gage. A Casella^(b) No. 3032 recorder is used with the automatic gage. The standard 8-inch gage is used to check the accuracy of the automatic gage, especially during periods of snow.

TEMPERATURE OF THE DEW POINT

Measurements are made with a Foxboro^(c) Dew Point Measuring System consisting of a Dewcel (humidity-sensing cell), a power unit, and a Leeds & Northrup^(d) Speedomax, Type G recorder. The Dewcel is not accurate when the temperature is high and the humidity is below 11%, or when the humidity is below 30% and the temperature is low. (See next page.)

(a) Bendix Aviation Corporation, Friez Instrument Division, Baltimore, Maryland

(b) Casella

(c) Foxboro Company, Foxboro, Massachusetts

(d) Leeds & Northrup Company, North Wales, Pennsylvania

Dew points cannot be measured when
relative humidity is below:

<u>Ambient Temperature</u>	<u>by International Critical Tables</u>	<u>by Blue Hill Calibration</u>
(°F)	(%)	(%)
120	10	10
100	11	11
80	11	11
60	11	8
40	14	9
20	21	10
0	26	13 ^(a)
-20	41	20 ^(a)
-40	100	30 ^(a)

(a) Calibration curve extrapolated

Whenever the dew point values are questionable, the Dewcel readings are checked with a sling psychrometer.

The Dewcel response time varies as the dew point rises or falls. With a rise of 20°F at an air temperature of 65°F, the response time is about 1.5 minutes to reach 98% of the new value. With an equal amount of fall, the time lag was about 3.5 minutes at 80% relative humidity and the lag increases as the relative humidity decreases.

XIII. ACKNOWLEDGMENTS

XIII. ACKNOWLEDGEMENTS

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XIV. REFERENCES

XIV. REFERENCES

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APPENDIX I
NOTABLE COLD PERIODS

APPENDIX I

NOTABLE COLD PERIODS

Table A.1-1 presents periods of 5 or more consecutive winter days (with the average period temperature less than 20°F) when the mean daily temperature was 10°F or more below normal.

TABLE A.I-1. Notable Cold Periods

<u>Season</u>	<u>Date</u>	<u>Mean Temp. (°F)</u>	<u>Season</u>	<u>Date</u>	<u>Mean Temp. (°F)</u>
1944-1945	None		1948-1949	30	15
1945-1946	None		Cont'd	31	18
1946-1947	1 - 2	20		2 - 1	18
	3	16		2	14
	4	10		3	20
	5	12		16 days	13
	6	16	1949-1950	1 - 2	12
	5 days	15		3	7
1947-1948	None			4	5
1948-1949	12 - 23	18		5	2
	24	14		6	14
	25	17		5 days	8
	26	10		1 - 13	4
	27	8		14	- 2
	28	14		15	0
	6 days	14		16	0
	1 - 9	15		17	- 3
	10	8		18	6
	11	5		19	10
	12	6		20	11
	13	7		8 days	3
	14	10		1 - 24	12
	15	17		25	2
	16	12		26	6
	8 days	9		27	6
	1 - 19	18		28	3
	20	7		29	- 8
	21	16		30	0
	22	18		31	-12
	23	12		2 - 1	-13
	24	4		2	-10
	25	0		3	-11
	26	10		4	8
	27	14		5	21
	28	7		13 days	0
	29	10			

Season	Date	Mean Temp. (°F)	Season	Date	Mean Temp. (°F)
1950-1951	1 - 27	19	1955-1956	2 - 1	2
	28	14	Cont'd	2	0
	29	14		3	8
	30	14		4	12
	31	14		5	20
	2 - 1	20		6	17
	6 days	16		7	18
1951-1952	12 - 31	14		8	20
	1 - 1	11		9	22
	2	12		13 days	13
	3	12	1956-1957	1 - 15	16
	4	16		16	11
	5	18		17	8
	6 days	14		18	3
1952-1953	None			19	6
1953-1954	1 - 16	16		20	18
	17	16		21	14
	18	16		22	18
	19	10		23	16
	20	2		24	6
	21	7		25	0
	22	18		26	-10
	23	12		27	-10
	24	14		28	-4
	25	12		29	-3
	10 days	12		30	2
1954-1955	None			31	11
1955-1956	11 - 11	28		17 days	8
	12	13	1957-1958	None	
	13	10	1958-1959	1 - 2	18
	14	9		3	8
	15	10		4	6
	16	14		5	14
	17	19		6	16
	18	18		5 days	12
	19	24	1959-1960	1 - 9	18
	20	22		10	18
	21	24		11	19
	22	20		12	14
	12 days	18		13	20
	1 - 28	18		14	18
	29	18		15	18
	30	11		16	24
	31	5		17	18
				18	9
				19	13
				20	18
				12 days	17

Season	Date	Mean Temp. (°F)	Season	Date	Mean Temp. (°F)
1960-1961	None		1968-1969	1 - 21	15
1961-1962	1 - 18	18	Cont'd	22	9
	19	10		23	1
	20	12		24	10
	21	14		25	10
	22	9		<u>5 days</u>	<u>9</u>
	23	14		1 - 27	12
	<u>6 days</u>	<u>13</u>		28	2
1962-1963	1 - 10	14		29	2
	11	5		30	6
	12	6		31	7
	13	14		2 - 1	16
	14	20(-9)		<u>6 days</u>	<u>8</u>
	<u>5 days</u>	<u>12</u>	1969-1970	None	
	1 - 29	16	1970-1971	12 - 21	23
	30	12		22	19
	31	19		23	18
	2 - 1	19		24	14
	2	18		25	18
	<u>5 days</u>	<u>17</u>		<u>5 days</u>	<u>18</u>
1963-1964	None		1971-1972	1 - 25	16
1964-1965	12 - 15	20		26	6
	16	- 4		27	8
	17	- 4		28	10
	18	8		29	12
	19	15		30	11
	20	19		31	18
	<u>6 days</u>	<u>9</u>		2 - 1	14
1965-1966	None			2	9
1966-1967	None			3	7
1967-1968	12 - 13	23		4	12
	14	22		5	22
	15	18		<u>12 days</u>	<u>12</u>
	16	16	1972-1973	12 - 3	24
	17	18		4	12
	<u>5 days</u>	<u>19</u>		5	14
1968-1969	12 - 28	6		6	18
	29	- 6		7	11
	30	- 8		8	6
	31	0		9	4
	1 - 1	6		10	2
	2	10		11	4
	3	16		12	8
	4	20		13	4
	<u>8 days</u>	<u>6</u>		14	6
				15	9
				16	21
				<u>14 days</u>	<u>10</u>

<u>Season</u>	<u>Date</u>	<u>Mean Temp. (°F)</u>	<u>Season</u>	<u>Date</u>	<u>Mean Temp. (°F)</u>
1972-1973	1 - 4	18	1978-1979	1 - 1	- 1
Cont'd	5	16	Cont'd	2	12
	6	10		3	12
	7	12		4	15
	8	10		5	8
	9	15		6	2
	10	16		7	1
	<u>7 days</u>	<u>14</u>		8	6
1973-1974	1 - 1	15		9	16
	2	17		10	18
	3	14		<u>14 days</u>	<u>8</u>
	4	7		1 - 22	17
	5	7		23	12
	6	1		24	20
	7	2		25	14
	8	- 2		26	10
	9	- 4		27	9
	10	2		28	10
	11	6		29	10
	12	12		30	10
	<u>12 days</u>	<u>6</u>		31	3
1974-1975	None			2 - 1	0
1975-1976	None			2	0
1976-1977	1 - 5	17		3	9
	6	12		4	12
	7	13		<u>14 days</u>	<u>8</u>
	8	14	1979-1980	1 - 26	18
	9	14		27	11
	10	14		28	12
	11	18		29	12
	<u>7 days</u>	<u>15</u>		30	12
1977-1978	None			31	20
1978-1979	12 - 28	14		<u>6 days</u>	<u>14</u>
	29	10			
	30	0			
	31	0			

() Exceptions to the 10°F or more below normal criteria.

APPENDIX II
THUNDERSTORM STATISTICS

APPENDIX II

HANFORD CLIMATOLOGICAL DATA PERTAINING TO THUNDERSTORMS

Thunderstorm Days: 1945-1980

	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>O</u>	<u>N</u>	<u>D</u>	<u>Sum</u>
Total	0	2	7	25	64	91	73	79	31	8	0	1	381
Average	0	+	+	1	2	2	2	2	1	+	0	+	10
% of Total	0	#	2	7	17	24	19	21	8	2	0	#	100

= less than 0.5%

+ = less than 0.5/day

Precipitation measurements were not taken during 1945 and 1946, however 26 thunderstorm days were recorded. For the period 1947-1980, 355 thunderstorm days were recorded and the daily precipitation distribution for these days are tabulated below:

<u>Amount - Inches</u>	<u>Number of Cases</u>	<u>% of Total</u>
None or trace	158	44
0.01 - 0.10	129	36
0.11 - 0.25	42	12
0.26 - 0.50	20	6
>0.50	<u>6</u>	<u>2</u>
	355	100

The Federal Meteorological Handbook No. 1, Surface Observations, dated January 1, 1970, defines rainfall intensities as follows:

Very Light: surface not wet
 Light: trace to 0.10 inch/hour
 Moderate: 0.11 to 0.30 inch/hour
 Heavy: more than 0.30 inch/hour, or 0.03 inch
 in 6 minutes.

The HMS record for rainfall intensity during a thunderstorm is 0.55 inch in 20 minutes (1.65 inches per hour) on June 2, 1969. Hailstones of 1/4-inch diameter were observed during this storm.

Hail was observed on 16 (5%) of the thunderstorm days. The distribution of hail by month is as follows:

	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>O</u>	<u>N</u>	<u>D</u>	<u>Sum</u>
Number	0	1	1	5	3	1	2	2	1	0	0	0	16
% of Total	0	6	6	31	19	6	13	13	6	0	0	0	100

When size was reported, all except two occurrences were in the 0.2-0.3-inch range. The exception occurred on May 26, 1954 and July 1, 1955 when the size recorded was 0.4 inch.

Peak wind gust records for the 50-, 200- and 400-foot tower levels began in 1952. Speed categories of peak gusts for the 294 thunderstorm days recorded from 1952-1980 are tabulated below:

<u>MPH</u>	<u>Number of Cases</u>			<u>% of Total</u>		
	<u>50 ft</u>	<u>200 ft</u>	<u>400 ft</u>	<u>50 ft</u>	<u>200 ft</u>	<u>400 ft</u>
<21	33	16	12	11	6	4
21-30	120	81	69	41	28	23
31-40	98	127	124	33	43	42
41-50	33	48	61	11	16	21
51-60	6	14	19	2	5	7
61-70	2	4	5	1	1	2
>70	<u>2</u>	<u>4</u>	<u>4</u>	<u>1</u>	<u>1</u>	<u>1</u>
	294	294	294	100	100	100

APPENDIX III
SUNRISE AND SUNSET TABLE FOR THE HMS

APPENDIX III

SUNRISE AND SUNSET AT THE HANFORD METEOROLOGY STATION

TABLE A.III-1. Sunrise and Sunset at the Hanford Meteorology Station

PACIFIC STANDARD TIME (PST)
HMS LOCATION: 46° 33' 47.86" N 119° 36' 17.46" W

DAY	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV		DEC	
	RISE	SET	RISE	SET	RISE	SET	RISE	SET	RISE	SET	RISE	SET	RISE	SET	RISE	SET	RISE	SET	RISE	SET	RISE	SET	RISE	SET
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
1	0742	1621	0722	1702	0639	1743	0538	1827	0444	1907	0409	1943	0408	1955	0438	1930	0517	1838	0557	1738	0640	1643	0721	1613
2	0742	1622	0722	1703	0637	1745	0537	1828	0443	1908	0408	1944	0409	1954	0439	1929	0519	1836	0558	1736	0641	1642	0722	1612
3	0742	1623	0719	1705	0635	1746	0534	1830	0440	1910	0408	1945	0410	1954	0440	1927	0520	1834	0600	1734	0643	1640	0723	1612
4	0742	1624	0719	1706	0532	1748	0532	1831	0439	1911	0407	1946	0411	1954	0442	1926	0521	1832	0501	1732	0643	1639	0725	1612
5	0742	1625	0717	1708	0531	1749	0530	1832	0439	1912	0407	1946	0411	1953	0443	1924	0522	1830	0502	1730	0646	1637	0726	1611
6	0742	1626	0716	1709	0529	1750	0528	1834	0436	1914	0406	1947	0412	1953	0444	1923	0523	1829	0502	1729	0647	1636	0727	1611
7	0742	1627	0714	1711	0528	1752	0526	1835	0435	1915	0406	1948	0413	1953	0446	1921	0525	1827	0604	1727	0648	1635	0728	1611
8	0741	1629	0714	1712	0626	1753	0524	1836	0434	1916	0406	1949	0414	1952	0446	1920	0526	1825	0505	1725	0650	1633	0729	1611
9	0741	1630	0711	1714	0623	1755	0522	1838	0432	1918	0405	1949	0414	1952	0449	1918	0527	1823	0507	1723	0652	1632	0730	1611
10	0741	1631	0710	1715	0622	1756	0521	1839	0431	1919	0405	1950	0415	1951	0449	1917	0528	1821	0509	1721	0652	1631	0731	1611
11	0740	1632	0708	1717	0619	1758	0519	1840	0429	1920	0404	1951	0416	1950	0451	1915	0530	1819	0510	1719	0653	1630	0732	1611
12	0740	1633	0707	1718	0617	1759	0517	1842	0428	1922	0404	1951	0417	1950	0452	1913	0531	1817	0511	1717	0656	1628	0733	1611
13	0739	1635	0705	1720	0616	1800	0515	1843	0427	1923	0404	1952	0418	1949	0453	1912	0532	1815	0513	1715	0657	1627	0733	1611
14	0739	1636	0704	1721	0613	1802	0513	1844	0425	1924	0404	1952	0419	1948	0455	1910	0533	1813	0514	1713	0659	1626	0734	1611
15	0738	1637	0702	1723	0611	1803	0511	1846	0424	1925	0405	1953	0420	1948	0456	1908	0535	1811	0515	1712	0700	1625	0735	1611
16	0738	1638	0701	1724	0610	1805	0510	1847	0423	1926	0405	1953	0420	1947	0457	1907	0536	1809	0517	1710	0702	1624	0735	1611
17	0737	1640	0659	1726	0608	1805	0508	1848	0422	1927	0405	1953	0421	1946	0458	1905	0538	1806	0518	1708	0703	1623	0736	1612
18	0735	1641	0657	1727	0605	1803	0506	1850	0421	1929	0405	1954	0422	1945	0500	1903	0538	1805	0519	1705	0704	1622	0737	1612
19	0736	1642	0656	1729	0604	1809	0504	1851	0420	1930	0405	1954	0423	1944	0501	1901	0541	1802	0521	1705	0706	1621	0738	1612
20	0735	1644	0654	1730	0602	1810	0503	1852	0419	1931	0405	1954	0424	1944	0502	1900	0542	1800	0522	1703	0707	1620	0739	1613
21	0734	1645	0652	1732	0600	1812	0501	1854	0418	1932	0405	1954	0426	1943	0503	1858	0543	1758	0524	1701	0708	1619	0739	1613
22	0733	1647	0651	1733	0558	1813	0459	1855	0417	1933	0405	1955	0427	1942	0505	1856	0544	1756	0525	1659	0710	1618	0739	1613
23	0732	1648	0649	1735	0555	1815	0457	1856	0416	1934	0405	1955	0428	1941	0505	1854	0546	1754	0526	1658	0711	1617	0740	1614
24	0731	1649	0647	1736	0554	1816	0455	1858	0415	1935	0405	1955	0429	1939	0507	1853	0547	1752	0528	1656	0712	1617	0740	1615
25	0730	1651	0646	1737	0552	1817	0454	1859	0414	1936	0406	1955	0430	1938	0508	1851	0548	1750	0529	1654	0714	1616	0741	1616
26	0730	1652	0644	1739	0549	1819	0452	1900	0413	1937	0405	1955	0431	1937	0510	1849	0551	1748	0531	1653	0715	1615	0741	1616
27	0728	1654	0642	1740	0548	1820	0450	1902	0412	1938	0407	1955	0432	1936	0511	1847	0551	1746	0632	1651	0716	1615	0741	1617
28	0727	1655	0640	1742	0546	1821	0449	1903	0412	1939	0407	1955	0433	1935	0512	1845	0553	1744	0633	1650	0718	1614	0742	1618
29	0726	1657	0639	1743	0543	1823	0448	1904	0411	1940	0408	1955	0434	1934	0513	1844	0554	1742	0535	1648	0719	1614	0742	1618
30	0725	1658			0542	1824	0445	1905	0410	1941	0408	1955	0436	1932	0515	1842	0556	1740	0635	1647	0720	1613	0742	1619
31	0724	1700			0540	1826			0410	1942			0437	1931	0516	1840		0638	1645			0742	1620	

APPENDIX IV
HANFORD WIND TELEMETRY NETWORK

APPENDIX IV

HANFORD WIND TELEMETRY NETWORK

DESCRIPTION

At the present time the Hanford Wind Telemetry Network consists of 20 wind stations. The stations are located in and around the Hanford Area at locations where, because of the terrain, the wind flow may be unique. Figure A.IV-1 shows station locations and wind roses for 13 of the stations. The wind sensors are mounted 30 feet (9.14 m) above the ground on triangular steel towers. A computerized central station at the HMS interrogates each station in sequence every 5 minutes. At the end of each hour, the average wind direction and wind speed as well as the maximum and minimum 5-minute average wind speed are recorded by a Teletype 43 Teleprinter on paper and also archived on magnetic tape. While only wind speed and direction are presently measured, the units can be modified to measure other meteorological parameters, such as atmospheric pressure, temperature and psychrometric data.

PURPOSE

The Wind Telemetry Network was designed to provide real-time air flow patterns across the Hanford Area and its environs. Telemetry wind information combined with wind forecasts are utilized by the MESOI Diffusion Model (Athey et al., Ramsdell and Athey 1981) to provide transport trajectories of contaminants. This information is essential to the Hanford Area emergency response programs in the event of a release of radioactive material to the atmosphere.

COMPUTER DATA ANALYSIS

Tables A.IV-1 shows wind speed classes versus wind direction for each station. Figure A.IV-1 presents wind roses for the same locations. Note that there are differences in the periods of record.

FIGURE A.IV-1. Wind Roses for the Hanford Telemetry Network

TABLE A.IV-1. Percent Frequency Distribution of Wind Direction and Average Wind Speeds (mph) for the Hanford Telemetry Network

STATION 1 (PROSSER BARRICADE) ELEV. 480 FT., 146 M. MSL
PERIOD OF RECORD: FEB. 27, 1979 TO APR. 15, 1982

SPEED MPH	DIRECTION																CALM	TOTAL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
CALM																	2.0	2.0
1-3	2.2	1.4	1.9	.8	.9	1.3	1.2	1.5	1.8	1.6	1.3	1.6	1.4	.9	1.5	2.2	.0	23.5
4-7	4.4	2.1	1.1	.7	.9	.9	1.7	3.1	3.8	3.4	2.4	1.0	1.7	1.0	2.5	6.2	.0	36.8
8-12	2.1	.7	.2	.1	.1	.2	.2	.8	2.0	4.5	2.9	.9	1.0	.4	2.4	5.9	.0	24.3
13-18	.4	.2	.1	.0	.0	.0	.0	.1	.5	2.2	2.0	.9	.4	.2	1.6	1.7	.0	10.3
19-24	.1	.0	.0	.0	.0	.0	.0	.0	.1	.3	.8	.3	.1	.1	.2	.2	.0	2.3
25-31	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.4	.0	.0	.0	.0	.0	.0	.6
32-38	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.2
39-46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
47-54	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
TOTAL	9.1	4.5	3.3	1.6	1.9	2.4	3.1	5.4	8.2	12.0	10.0	4.8	4.6	2.5	8.2	16.2	2.0	100.0
AV. SPEED	6.1	5.5	3.8	4.2	4.0	3.7	4.3	5.1	6.5	9.0	10.9	8.4	6.8	5.9	8.5	7.8		

STATION 2 (EOC) ELEV. 1240 FT., 378 M. MSL
PERIOD OF RECORD: FEB. 9, 1979 TO APR. 15, 1982

SPEED MPH	DIRECTION																CALM	TOTAL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
CALM																	3.4	3.4
1-3	1.5	1.1	.8	.8	.8	.6	.7	.8	1.2	1.2	1.1	1.2	1.6	2.1	2.1	1.9	.0	19.3
4-7	2.2	.9	.5	.5	.7	.7	.9	1.0	1.9	2.1	1.4	1.3	2.3	3.9	4.6	3.2	.0	28.1
8-12	.9	.2	.1	.0	.0	.0	.1	.3	.9	2.4	2.5	1.9	1.4	3.9	6.4	3.1	.0	24.2
13-18	.2	.1	.0	.0	.0	.0	.0	.0	.1	1.0	2.9	2.2	1.1	.9	4.4	1.5	.0	14.6
19-24	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	2.0	2.1	.6	.5	.7	.2	.0	6.4
25-31	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	1.5	1.3	.3	.1	.1	.0	.0	3.2
32-38	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.2	.0	.0	.0	.0	.0	.8
39-46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.1
47-54	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
TOTAL	4.7	2.3	1.4	1.4	1.4	1.3	1.7	2.2	4.3	7.1	12.0	10.1	7.4	11.1	18.3	9.8	3.4	100.0
AV. SPEED	5.4	4.6	3.6	3.4	3.5	3.9	4.2	4.9	5.9	8.8	15.5	14.8	9.2	7.6	9.7	7.9		

A.IV-3

TABLE A.IV-1. Continued

STATION 3 (ARMY LOOP ROAD) ELEV. 565 FT., 172 M, MSL
PERIOD OF RECORD: FEB. 3, 1979 TO APR. 15, 1982

SPEED MPH	DIRECTION																CALM	TOTAL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
CALM																	.8	.8
1-3	1.9	1.8	2.0	2.2	3.1	2.1	1.7	1.0	.8	.7	.7	1.0	2.4	4.0	3.9	2.7	.0	32.2
4-7	1.9	1.3	1.2	1.5	1.9	2.4	1.6	1.0	.7	.6	.9	1.0	3.0	8.6	7.2	3.4	.0	37.9
8-12	.6	.4	.1	.2	.3	.5	.8	.7	.7	.6	1.0	1.3	2.3	4.3	3.1	1.0	.0	17.7
13-18	.1	.1	.1	.0	.0	.1	.1	.2	.3	.4	.9	1.4	1.0	1.0	1.2	.2	.0	7.1
19-24	.0	.0	.0	.0	.0	.0	.0	.0	.1	.2	1.0	.7	.3	.2	.4	.0	.0	2.9
25-31	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.5	.2	.1	.0	.1	.0	.0	1.1
32-38	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.2
39-46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
GT 46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
TOTAL	4.4	3.6	3.4	3.9	5.3	5.2	4.3	3.0	2.6	2.5	5.2	5.7	9.0	18.2	15.9	7.2	.8	100.0
AV. SPEED	4.5	4.3	3.6	3.6	3.6	4.6	5.1	5.9	7.5	9.6	13.8	11.4	7.4	6.5	6.8	4.9		

STATION 4 (RATTLESNAKE SPRINGS) ELEV. 680 FT., 207 M, MSL
PERIOD OF RECORD: MAR. 12, 1979 TO DEC. 31, 1981

SPEED MPH	DIRECTION																CALM	TOTAL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
CALM																	4.1	4.1
1-3	1.6	2.2	2.5	3.4	2.2	1.9	.9	.6	.7	1.1	2.7	4.2	3.5	.8	1.0	1.4	.0	30.8
4-7	2.2	1.3	1.0	.7	1.3	1.0	.4	.3	.5	.7	3.7	9.3	7.4	2.1	2.2	2.3	.0	36.3
8-12	.2	.2	.0	.0	.1	.1	.0	.0	.3	.6	2.9	8.4	5.2	1.4	1.2	.7	.0	21.3
13-18	.0	.0	.0	.0	.0	.0	.0	.0	.1	.4	1.0	.9	2.1	.5	.6	.1	.0	5.8
19-24	.0	.0	.0	.0	.0	.0	.0	.0	.1	.3	.6	.2	.2	.0	.1	.0	.0	1.5
25-31	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.1	.0	.0	.0	.0	.0	.0	.3
32-38	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
39-46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
GT 46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
TOTAL	3.9	3.8	3.5	4.2	3.6	2.9	1.4	.9	1.7	3.2	10.9	23.0	18.5	4.8	5.1	4.6	4.1	100.0
AV. SPEED	3.9	3.5	2.9	2.4	3.5	3.1	2.8	3.2	6.0	8.6	7.5	6.8	7.2	7.2	7.2	5.2		

TABLE A.IV-1. Continued

STATION 5 (EDNA) ELEV. 400 FT., 122 M, MSL
PERIOD OF RECORD: FEB. 3, 1979 TO APR. 15, 1982

SPEED MPH	DIRECTION																CALM	TOTAL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
CALM																	2.2	2.2
1-3	.6	.6	.5	.6	1.5	2.1	4.0	3.9	2.8	2.0	2.0	2.3	3.5	3.8	3.2	1.7	.0	35.4
4-7	1.0	.8	.6	.5	2.3	4.2	6.1	2.9	1.5	.7	.8	.8	2.2	3.7	6.1	3.4	.0	37.5
8-12	.5	.3	.2	.1	.6	1.2	1.0	1.0	1.1	.7	.9	1.0	1.6	1.7	1.8	1.4	.0	15.1
13-18	.2	.2	.2	.1	.0	.1	.2	.4	.6	.5	.7	.8	.9	1.6	.6	.1	.0	7.2
19-24	.0	.0	.1	.0	.0	.0	.0	.0	.1	.1	.3	.2	.7	.2	.0	.0	.0	2.0
25-31	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.1	.1	.3	.0	.0	.0	.5
32-36	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
37-46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
GT 46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
TOTAL	2.5	1.9	1.6	1.3	4.4	7.7	11.4	8.2	6.1	4.1	4.7	5.4	8.5	11.7	11.8	6.7	2.2	100.0
AV. SPEED	5.6	6.3	6.6	5.3	4.8	5.2	4.6	4.7	5.8	6.3	7.2	7.3	6.3	7.6	5.9	5.7		

STATION 6 (200-E AREA) ELEV. 670 FT., 204 M, MSL
PERIOD OF RECORD: FEB. 3, 1979 TO APR. 15, 1982

SPEED MPH	DIRECTION																CALM	TOTAL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
CALM																	.3	.3
1-3	2.0	2.6	3.7	2.0	1.7	1.7	1.7	1.4	1.1	.7	.8	1.1	1.5	2.3	2.5	2.2	.0	24.9
4-7	1.5	1.1	.6	.8	1.3	1.8	2.2	2.0	1.1	1.0	1.5	2.4	4.3	8.6	5.3	2.0	.0	37.4
8-12	.7	.5	.2	.1	.2	.3	.4	.9	.6	.6	1.0	1.8	3.3	8.1	2.1	.5	.0	21.3
13-18	.2	.2	.1	.0	.0	.0	.0	.2	.2	.4	1.0	1.5	.9	3.0	1.0	.1	.0	8.9
19-24	.0	.1	.0	.0	.0	.0	.0	.0	.0	.1	.6	.5	.1	.8	.3	.0	.0	2.7
25-31	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.2	.1	.1	.1	.1	.0	.0	.6
32-36	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
37-46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
GT 46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
TOTAL	4.4	4.5	4.5	2.8	3.2	3.8	4.4	4.5	3.1	2.8	5.1	7.5	10.2	22.9	11.3	4.7	.3	100.0
AV. SPEED	5.5	4.3	2.4	3.0	3.8	4.1	4.5	5.7	5.9	7.9	10.5	9.6	7.4	8.6	6.9	4.4		

A.IV-5

TABLE A.IV-1. Continued

STATION 8 (NW WAHLUKE SLOPE) ELEV. 845 FT., 258 M, MSL
PERIOD OF RECORD: MAR. 12, 1979 TO APR. 15, 1982

SPEED MPH	DIRECTION																CALM	TOTAL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
CALM																	.6	.6
1-3	1.3	1.4	1.7	2.2	2.4	1.9	1.6	1.2	1.1	1.0	1.2	1.5	1.9	2.2	1.9	1.6	.0	26.1
4-7	1.3	1.9	2.0	4.0	6.2	3.3	2.1	1.1	1.0	1.2	1.4	1.7	4.0	5.3	2.6	1.5	.0	40.6
8-12	.8	1.6	.8	1.0	1.7	.3	.3	.2	.3	.6	.8	1.8	2.5	4.0	1.5	.5	.0	18.6
13-16	.5	.8	.3	.2	.1	.0	.1	.1	.1	.3	.8	.7	1.3	3.4	1.2	.1	.0	9.9
19-24	.1	.1	.1	.0	.0	.0	.0	.0	.0	.1	.4	.3	.4	1.2	.4	.0	.0	3.1
25-31	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.2	.1	.3	.2	.0	.0	.9
32-35	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1
39-46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
GT 46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
TOTAL	4.0	5.8	4.9	7.4	10.4	5.6	4.0	2.6	2.6	3.2	4.7	6.1	10.2	16.4	7.8	3.8	.6	100.0
AV. SPEED	7.4	7.4	5.8	5.1	5.4	4.4	4.4	4.3	5.3	6.5	9.4	8.4	7.8	9.6	8.3	5.0		

STATION 9 (FFTF) ELEV. 550 FT., 168 M, MSL
PERIOD OF RECORD: APR. 5, 1979 TO APR. 15, 1982

SPEED MPH	DIRECTION																CALM	TOTAL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
CALM																	.2	.2
1-3	.9	.7	.7	.8	2.6	4.4	2.2	1.7	1.7	2.4	3.3	7.3	3.6	1.4	1.2	1.0	.0	35.7
4-7	1.3	.7	.4	.3	1.7	.7	.8	2.3	2.4	2.5	1.8	2.0	9.0	2.3	2.9	2.0	.0	32.9
8-12	.4	.2	.1	.1	.4	.1	.1	1.7	2.2	3.0	1.4	.7	4.4	2.0	2.6	1.1	.0	20.5
13-18	.2	.1	.0	.0	.1	.0	.0	.2	.6	1.8	1.3	.3	1.6	.7	.5	.3	.0	7.9
19-24	.0	.0	.0	.0	.0	.0	.0	.0	.1	.5	.6	.2	.3	.2	.1	.0	.0	2.1
25-31	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.3	.0	.0	.0	.1	.0	.0	.6
32-35	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.1
39-46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
GT 46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
TOTAL	2.8	1.8	1.2	1.1	4.7	5.2	3.2	5.9	6.9	10.4	8.8	10.5	18.9	6.6	7.4	4.4	.2	100.0
AV. SPEED	5.4	5.5	4.5	3.2	4.0	2.5	3.0	5.9	6.9	8.7	8.3	4.0	6.8	7.6	7.6	6.4		

TABLE A.IV-1. Continued

STATION 10 (YAKIMA BARRICADE) ELEV. 795 FT., 242 M, MSL
PERIOD OF RECORD: DEC. 29, 1980 TO APR. 15, 1982

SPEED MPH	DIRECTION																CALM	TOTAL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
CALM																	.1	.1
1-3	1.2	1.1	.8	.6	.5	.6	.7	.8	.9	1.1	1.5	2.7	3.5	2.9	2.2	1.8	.0	22.9
4-7	2.8	1.4	.6	.3	.3	.4	.7	.7	.6	.7	1.5	4.3	8.9	5.5	5.9	3.7	.0	38.2
8-12	.6	.3	.1	.0	.0	.0	.1	.1	.3	.6	1.3	3.4	5.2	3.1	7.6	2.0	.0	24.8
13-18	.0	.1	.0	.0	.0	.0	.0	.1	.1	.4	1.5	2.2	.8	.7	3.5	.4	.0	10.0
19-24	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	1.0	.6	.2	.2	1.0	.0	.0	3.1
25-31	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	.1	.0	.0	.2	.0	.0	.9
32-38	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.1
39-46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
GT 46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
TOTAL	4.6	2.9	1.6	1.0	.8	1.0	1.5	1.7	2.1	3.0	7.3	13.3	18.7	12.3	20.4	7.9	.1	100.0
AV. SPEED	5.1	4.9	3.9	3.5	3.3	3.8	4.1	4.4	5.6	8.0	11.1	8.5	6.6	6.4	9.4	6.2		

STATION 11 (300 AREA) ELEV. 400 FT., 122 M, MSL
PERIOD OF RECORD: OCT. 12, 1979 TO APR. 15, 1982

SPEED MPH	DIRECTION																CALM	TOTAL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
CALM																	.1	.1
1-3	.9	.4	.4	.5	.7	.8	1.8	1.8	1.8	2.0	2.5	2.7	2.5	2.6	3.9	2.6	.0	28.0
4-7	2.1	1.0	.7	.8	1.4	2.7	4.7	3.0	2.5	2.6	3.1	2.0	1.0	1.4	3.6	4.6	.0	37.2
8-12	2.2	.7	.2	.2	.3	.8	1.0	.6	1.2	3.0	3.8	1.8	.4	.4	1.6	3.4	.0	21.3
13-18	.5	.1	.1	.1	.0	.0	.1	.1	.2	1.5	2.9	1.4	.3	.3	.9	1.0	.0	9.4
19-24	.1	.0	.0	.0	.0	.0	.0	.0	.1	.4	1.0	.7	.1	.1	.3	.2	.0	3.0
25-31	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.3	.2	.0	.0	.1	.0	.0	.8
32-38	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.2
39-46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
GT 46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
TOTAL	5.7	2.3	1.4	1.5	2.3	4.4	7.6	5.5	5.8	9.6	13.6	8.8	4.4	4.7	10.4	11.7	.1	100.0
AV. SPEED	7.2	7.0	6.1	5.1	5.2	5.6	5.3	4.9	5.8	8.4	10.0	8.5	5.1	4.8	6.4	7.0		

TABLE A.IV-1. Continued

STATION 12 (WYE BARRICADE) ELEV. 550 FT., 168 M, MSL
PERIOD OF RECORD: OCT. 19, 1979 TO APR. 15, 1982

SPEED MPH	DIRECTION																CALM	TOTAL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
CALM																	.0	.0
1-3	.2	.2	.1	.3	.2	.4	.5	.4	.8	1.1	1.9	1.7	1.8	1.1	.7	.3	.0	11.8
4-7	.4	.3	.1	.2	.2	.3	.4	.7	1.9	3.7	6.9	6.8	7.2	6.1	3.2	1.1	.0	39.4
8-12	.5	.2	.1	.0	.0	.1	.0	.2	1.4	4.1	5.8	3.2	4.6	8.0	2.6	.8	.0	31.6
13-18	.0	.1	.0	.0	.0	.0	.0	.0	.3	1.8	2.7	1.5	1.7	2.7	.7	.1	.0	11.7
19-24	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	1.4	.9	.4	.6	.4	.0	.0	4.0
25-31	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.6	.2	.1	.2	.2	.0	.0	1.4
32-38	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.2
39-45	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
GT 46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
TOTAL	1.0	.7	.3	.5	.4	.7	.9	1.3	4.4	11.2	19.4	14.4	15.8	18.6	7.9	2.4	.0	100.0
AV. SPEED	6.5	6.5	5.0	4.0	4.1	3.9	3.7	5.1	6.9	8.9	9.8	8.3	7.9	9.3	8.8	7.0		

STATION 13 (100-N AREA) ELEV. 480 FT. 146 M, MSL
PERIOD OF RECORD: NOV. 17, 1979 TO APR. 15, 1982

SPEED MPH	DIRECTION																CALM	TOTAL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
CALM																	.1	.1
1-3	1.1	.9	1.3	1.3	1.9	2.2	2.4	2.2	2.0	2.7	5.3	9.3	4.2	3.0	2.5	1.7	.0	44.0
4-7	1.1	.9	.8	1.0	1.5	1.6	2.1	1.2	1.1	1.3	3.0	6.3	4.7	3.0	2.0	1.2	.0	32.7
8-12	.2	.5	.3	.0	.1	.3	.7	.5	.4	.7	1.6	3.2	3.4	1.7	.3	.3	.0	14.3
13-18	.1	.3	.2	.0	.0	.0	.1	.1	.2	.4	1.2	1.1	1.4	1.1	.3	.1	.0	6.5
19-24	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.5	.4	.2	.5	.1	.0	.0	1.9
25-31	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.1	.0	.0	.2	.0	.0	.0	.4
32-38	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
39-46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
GT 46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
TOTAL	2.6	2.6	2.5	2.3	3.5	4.1	5.3	4.0	3.8	5.3	11.7	20.3	13.9	9.5	5.3	3.3	.1	100.0
AV. SPEED	5.2	6.0	4.9	3.7	3.7	4.0	4.6	4.2	4.6	5.7	6.1	5.1	6.7	7.5	5.0	4.2		

A.IV-8

TABLE A.IV-1. Continued

STATION 14 (WPPSS) ELEV. 450 FT., 137 M, MSL
 PERIOD OF RECORD: OCT. 24, 1979 TO APR. 15, 1982

SPEED MPH	DIRECTION																CALM	TOTAL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
CALM																	.1	.1
1-4	2.1	1.8	1.8	1.3	1.0	1.2	2.0	2.6	2.9	2.2	1.8	1.3	1.2	1.6	2.4	2.5	.0	29.6
4-7	2.9	2.0	1.5	1.1	.8	1.1	2.4	4.7	6.0	3.9	2.5	1.4	1.0	1.8	3.9	3.9	.0	40.9
8-12	.9	.5	.3	.1	.1	.2	.5	2.0	3.3	2.8	1.9	1.2	.8	1.4	2.0	1.5	.0	19.5
13-16	.2	.1	.1	.0	.0	.0	.0	.2	1.0	1.3	1.2	.8	.4	.6	.6	.5	.0	7.3
17-24	.0	.0	.0	.0	.0	.0	.0	.0	.1	.4	.6	.3	.1	.2	.3	.0	.0	2.0
25-31	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.2	.0	.0	.0	.0	.0	.0	.5
32-38	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.1
39-46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
GT 46	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
TOTAL	6.2	4.4	3.6	2.5	1.9	2.5	5.0	9.5	13.4	11.1	8.2	5.1	3.5	5.6	9.1	8.4	.1	100.0
AV. SPEED	5.0	4.7	4.2	3.6	3.6	4.0	4.6	5.5	6.6	8.3	8.7	8.2	7.0	7.2	6.7	5.7		

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APPENDIX V
ARID LANDS ECOLOGY RESERVE PRECIPITATION

APPENDIX V

PRECIPITATION CLIMATOLOGY OF THE ARID LANDS ECOLOGY RESERVE

The southwestern portion of the Hanford Reservation was set aside in 1968 as the Arid Lands Ecology (ALE) Reserve (Figure A.V-1). This ecological study area contains the most diverse topography of the Hanford region. Elevations range from ~3500 ft MSL in the southern part of the ALE Reserve, which includes the crest and northeast face of Rattlesnake Mountain, to about 450 ft MSL at the northern boundary near the Cold Creek valley (Figure A.V-2).

To provide microclimatological data for research projects conducted on the ALE Reserve a network of 26 temperature and precipitation measuring stations was established in 1968-1969 (Thorp and Hinds 1977) at points along existing roads on the Reserve (Figure A.V-2).

Precipitation amounts and extreme temperatures were measured monthly at the 26 sites from autumn 1968 to the end of 1981. The monthly and annual average precipitation amounts for each of the sites, and the HMS annual average for the same period, are shown in inches (Table A.V-1) and centimeters (Table A.V-2) of water. The annual average distribution of precipitation (in cm of water) for the ALE Reserve is shown in Figure A.V-3. This figure shows a precipitation maximum greater than 25 cm (9.8 in.) just north of the Rattlesnake Mountain crest, and an apparent rapid reduction in annual amount of precipitation on and south of the crest. This gradient on the south is partially explained by the probability that precipitation borne by strong southwest winds over the mountain crest never enters the collection gage. The nearest precipitation recording stations south of the crest are 4 miles northeast of Prosser and at Sunnyside (respectively about 15 mi south and southwest at 900 ft MSL and 745 ft MSL). Normally, Prosser receives 20.0 cm (7.9 in.) annual precipitation and Sunnyside 17.3 cm (6.8 in.). These values indicate that the variation in annual average precipitation on the gentle southwest slope of Rattlesnake Mountain away from the crest is less than that on the northeast slope.

FIGURE A.V-1. Location of the Arid Lands Ecology Reserve

FIGURE A.V-2. Locations of Temperature and Precipitation Measuring Stations in the Arid Lands Ecology Reserve

TABLE A.V-1. Arid Lands Ecology Reserve--Average Monthly
Precipitation (in.) for Years 1969 Through 1980

STATION	ELEV. (M)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1. UPPER COLD CR	(204)	1.21	0.61	0.45	0.36	0.55	0.20	0.12	0.47	0.23	0.34	0.80	1.10	6.45
2. RATTLESNAKE SPC	(210)	1.31	0.65	0.43	0.39	0.51	0.21	0.12	0.37	0.26	0.34	0.83	1.17	6.60
3. LOWER SNIVELY	(323)	1.60	0.93	0.64	0.47	0.62	0.27	0.14	0.44	0.33	0.47	1.05	1.61	8.58
4. UPPER SNIVELY	(533)	1.79	1.17	0.89	0.59	0.77	0.41	0.21	0.48	0.38	0.60	1.15	1.79	10.23
5. BENSON RANCH	(189)	1.31	0.68	0.45	0.36	0.56	0.27	0.14	0.42	0.29	0.33	0.82	1.21	6.87
6. UPPER BENSON	(234)	1.48	0.75	0.54	0.40	0.54	0.26	0.17	0.41	0.26	0.40	0.87	1.38	7.46
7. ALLUVIAL FAN	(347)	1.66	1.00	0.72	0.50	0.67	0.25	0.17	0.47	0.30	0.48	1.00	1.72	8.96
8. LWR LARK SPUR *	(488)	1.67	1.13	0.86	0.51	0.72	0.29	0.21	0.64	0.31	0.51	1.02	1.74	9.60
9. LARK SPUR	(588)	1.76	1.22	0.93	0.62	0.74	0.34	0.20	0.56	0.38	0.53	1.26	1.81	10.36
10. BENSON BASIN	(744)	1.88	1.28	0.98	0.69	0.88	0.45	0.30	0.62	0.46	0.57	1.38	1.83	11.36
11. ANDERSON RIM	(884)	1.77	1.22	0.89	0.67	0.91	0.50	0.30	0.67	0.49	0.62	1.27	1.78	11.09
12. ANDERSON FIELD	(939)	1.70	0.93	0.69	0.56	0.85	0.44	0.28	0.61	0.42	0.55	1.22	1.51	9.74
13. HOPSAGE	(158)	1.28	0.66	0.47	0.37	0.53	0.25	0.13	0.51	0.20	0.37	0.75	1.13	6.66
14. TELEMETER	(366)	1.84	1.20	0.91	0.54	0.61	0.32	0.16	0.44	0.30	0.55	1.17	1.76	9.81
15. R MT CREST NE	(1020)	1.89	1.04	0.77	0.63	0.91	0.58	0.28	0.69	0.42	0.46	1.03	1.48	10.18
16. R MT CREST *	(1079)	1.39	0.75	0.53	0.38	0.72	0.41	0.26	0.65	0.31	0.42	0.98	1.17	7.96
17. R MT CREST SW	(1067)	1.23	0.61	0.49	0.45	0.70	0.44	0.22	0.57	0.31	0.35	0.91	1.02	7.30
18. WINTERFAT	(206)	1.44	0.77	0.61	0.35	0.54	0.27	0.17	0.42	0.26	0.40	1.00	1.37	7.60
19. CALOCHORTUS	(381)	1.76	1.12	0.93	0.59	0.65	0.37	0.19	0.47	0.33	0.53	1.17	1.68	9.79
20. BEETLE PLOT 7	(954)	1.63	0.88	0.81	0.62	0.93	0.52	0.25	0.68	0.41	0.52	1.20	1.53	9.97
21. LOWER COLD CR	(134)	1.39	0.71	0.53	0.41	0.58	0.32	0.20	0.45	0.29	0.36	0.88	1.25	7.36
22. BEETLE PLOT 3	(192)	1.40	0.77	0.57	0.46	0.56	0.39	0.17	0.43	0.27	0.41	1.02	1.33	7.78
23. BEETLE PLOT 4	(286)	1.56	0.81	0.71	0.46	0.58	0.36	0.19	0.45	0.30	0.44	1.03	1.39	8.28
24. ERC WYE	(329)	1.51	0.87	0.71	0.46	0.60	0.41	0.18	0.47	0.32	0.43	1.08	1.47	8.53
25. BEETLE PLOT 5	(448)	1.62	0.84	0.83	0.53	0.77	0.41	0.23	0.52	0.41	0.47	1.05	1.40	9.08
26. BEETLE PLOT 6	(756)	1.59	0.81	0.72	0.53	0.81	0.48	0.23	0.61	0.38	0.46	1.08	1.40	9.11
27. H.M.S.	(223)	0.99	0.58	0.38	0.41	0.63	0.33	0.18	0.46	0.29	0.38	0.76	1.07	6.47

*1970-1980 DATA

TABLE A.V-2. Arid Lands Ecology Reserve--Average Monthly
Precipitation (cm) for Years 1969 Through 1980

STATION	ELEV. (M)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1. UPPER COLD CR	(204)	3.09	1.55	1.14	0.90	1.40	0.51	0.31	1.20	0.60	0.87	2.04	2.79	16.40
2. RATTLESNAKE SPG	(210)	3.34	1.64	1.09	0.99	1.30	0.54	0.31	0.94	0.65	0.86	2.12	2.97	16.77
3. LOWER SNIVELY	(323)	4.06	2.37	1.62	1.19	1.58	0.70	0.36	1.12	0.83	1.19	2.67	4.09	21.78
4. UPPER SNIVELY	(533)	4.55	2.98	2.27	1.50	1.96	1.04	0.52	1.22	0.96	1.53	2.93	4.54	25.98
5. BENSON RANCH	(189)	3.34	1.72	1.14	0.93	1.42	0.69	0.37	1.08	0.73	0.85	2.09	3.08	17.44
6. UPPER BENSON	(234)	3.77	1.90	1.37	1.01	1.36	0.67	0.42	1.05	0.67	1.01	2.20	3.52	18.96
7. ALLUVIAL FAN	(347)	4.22	2.54	1.84	1.28	1.71	0.65	0.42	1.19	0.77	1.23	2.55	4.38	22.77
8. LWR LARK SPUR *	(488)	4.25	2.87	2.18	1.29	1.83	0.75	0.52	1.63	0.78	1.29	2.58	4.42	24.38
9. LARK SPUR	(588)	4.47	3.11	2.37	1.58	1.87	0.86	0.51	1.43	0.97	1.34	3.21	4.61	26.32
10. BENSON BASIN	(744)	4.79	3.26	2.49	1.77	2.25	1.16	0.76	1.59	1.17	1.45	3.52	4.66	28.85
11. ANDERSON RIM	(884)	4.49	3.09	2.26	1.69	2.32	1.27	0.77	1.71	1.24	1.57	3.23	4.52	28.17
12. ANDERSON FIELD	(939)	4.33	2.35	1.75	1.41	2.15	1.13	0.70	1.54	1.07	1.39	3.09	3.83	24.75
13. HOPSAGE	(158)	3.26	1.68	1.21	0.94	1.34	0.65	0.34	1.29	0.51	0.93	1.91	2.88	16.92
14. TELEMETER	(366)	4.68	3.04	2.30	1.38	1.56	0.81	0.42	1.13	0.77	1.40	2.96	4.46	24.92
15. R MT CREST NE	(1020)	4.80	2.65	1.95	1.59	2.32	1.47	0.72	1.77	1.06	1.16	2.61	3.77	25.87
16. R MT CREST *	(1079)	3.53	1.91	1.35	0.97	1.82	1.04	0.65	1.64	0.79	1.07	2.48	2.97	20.22
17. R MT CREST SW	(1067)	3.12	1.55	1.26	1.16	1.77	1.12	0.55	1.44	0.78	0.89	2.32	2.59	18.55
18. WINTERFAT	(206)	3.65	1.96	1.56	0.88	1.36	0.68	0.43	1.07	0.66	1.01	2.55	3.49	19.31
19. CALOCHORTUS	(381)	4.47	2.83	2.36	1.49	1.66	0.93	0.50	1.19	0.84	1.36	2.97	4.27	24.88
20. BEETLE PLOT 7	(954)	4.13	2.25	2.05	1.58	2.35	1.31	0.64	1.72	1.04	1.33	3.05	3.89	25.33
21. LOWER COLD CR	(134)	3.52	1.81	1.34	1.05	1.48	0.81	0.52	1.13	0.73	0.91	2.23	3.18	18.70
22. BEETLE PLOT 3	(192)	3.55	1.95	1.44	1.18	1.42	0.98	0.43	1.09	0.69	1.05	2.60	3.39	19.75
23. BEETLE PLOT 4	(286)	3.96	2.07	1.80	1.17	1.47	0.92	0.47	1.15	0.76	1.11	2.62	3.53	21.04
24. ERC WYE	(329)	3.84	2.22	1.81	1.18	1.54	1.04	0.46	1.18	0.81	1.10	2.74	3.74	21.66
25. BEETLE PLOT 5	(448)	4.11	2.12	2.10	1.36	1.95	1.05	0.57	1.33	1.05	1.20	2.67	3.55	23.07
26. BEETLE PLOT 6	(756)	4.04	2.05	1.83	1.35	2.06	1.23	0.59	1.56	0.96	1.18	2.74	3.56	23.14
27. H.M.S.	(223)	2.51	1.47	0.97	1.05	1.60	0.83	0.45	1.17	0.75	0.96	1.94	2.73	16.43

*1970-1980 DATA

FIGURE A.V-3. Annual Average Distribution of Precipitation for the ALE Reserve

Annual and annual average precipitation (inches and centimeters of water) for the ALE sites and the HMS are given in Tables A.V-3 and A.V-4.

A frequently useful datum for ecological studies is the amount of precipitation which falls during the so-called bioyear (the period of greatest soil moisture accumulation). For the Lower Columbia Basin, which includes the Hanford area, we have defined the bioyear as October through May (see Figure 14, Section IV). Precipitation amounts for each bioyear from 1969 through 1980, and the bioyear average, for each of the stations are shown in Tables A.V-5 and A.V-6. Bioyear 1969 is defined as the period October 1968 through May 1969, etc.

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TABLE A.V-3. Arid Lands Ecology Reserve--Calendar Year
Precipitation (in.) for Years 1969 Through 1980

STATION	ELEV. (M)	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	AVG
1. UPPER COLD CR	(204)	5.31	6.45	6.76	5.30	7.27	5.46	7.39	2.93	5.93	8.05	6.47	10.14	6.45
2. RATTLESNAKE SPC	(210)	5.58	6.63	6.27	5.39	8.41	5.73	7.84	3.41	6.13	6.56	6.06	11.23	6.60
3. LOWER SNIVELY	(323)	6.81	8.26	8.43	7.24	10.81	7.51	10.94	4.82	8.05	8.25	8.69	13.10	8.58
4. UPPER SNIVELY	(533)	8.24	9.75	10.27	8.37	12.26	9.95	11.52	5.72	10.25	10.30	10.47	15.65	10.23
5. BENSON RANCH	(189)	5.91	7.23	6.50	5.40	8.15	6.06	8.37	3.54	6.45	6.97	6.60	11.22	6.87
6. UPPER BENSON	(234)	6.01	8.34	7.30	5.63	9.64	6.28	9.70	4.20	6.57	7.44	6.66	11.81	7.46
7. ALLUVIAL FAN	(347)	6.61	9.82	9.00	7.39	11.06	8.96	10.85	5.83	8.85	8.49	8.29	12.42	8.96
8. LWR LARK SPUR	(488)		9.84	9.99	7.71	10.73	9.42	11.40	6.63	8.69	9.11	9.30	14.03	9.71
9. LARK SPUR	(588)	7.91	10.91	9.82	8.52	11.82	10.22	12.31	7.08	10.02	11.26	10.75	13.73	10.36
10. BENSON BASIN	(744)	8.98	12.00	10.60	9.57	12.01	10.67	13.17	7.40	11.98	12.82	11.58	15.53	11.36
11. ANDERSON RIM	(884)	9.48	11.28	9.86	9.56	12.86	10.56	12.62	7.21	9.90	11.19	12.76	15.80	11.09
12. ANDERSON FIELD	(939)	7.70	9.28	8.52	7.49	10.76	8.44	11.13	5.87	9.05	12.31	11.70	14.68	9.74
13. HOPSAGE	(158)	6.39	8.08	5.97	5.26	8.25	5.96	8.32	4.09	5.90	6.71	5.22	9.81	6.66
14. TELEMETER	(366)	7.37	10.97	9.81	7.29	11.57	9.59	13.39	5.92	8.55	10.33	9.54	13.42	9.81
15. R MT CREST NE	(1020)	7.95	9.17	8.97	10.50	11.82	8.59	12.10	7.03	9.08	11.71	10.17	15.11	10.18
16. R MT CREST	(1079)		6.57	6.01	7.49	8.42	6.09	7.32	4.10	8.41	11.40	8.51	14.12	8.04
17. R MT CREST SW	(1067)	8.00	6.51	5.80	6.55	7.46	5.38	6.01	3.71	8.06	10.35	8.23	11.60	7.30
18. WINTERFAT	(206)	5.93	9.00	7.75	5.84	9.29	6.76	9.56	3.93	6.95	8.59	6.59	11.02	7.60
19. CALOCHORTUS	(381)	8.22	11.48	9.86	7.55	11.28	8.91	12.69	5.94	8.92	10.08	9.15	13.44	9.79
20. BEETLE PLOT 7	(954)	8.38	9.64	9.77	9.58	10.69	8.00	10.37	5.79	10.11	12.55	9.19	15.60	9.97
21. LOWER COLD CR	(134)	6.62	8.57	7.19	6.57	8.43	5.76	8.91	3.38	7.58	8.18	6.66	10.51	7.36
22. BEETLE PLOT 3	(192)	7.08	8.43	8.16	7.05	10.11	5.98	9.37	3.43	7.77	7.69	7.12	11.14	7.78
23. BEETLE PLOT 4	(286)	7.10	9.53	8.38	7.69	9.90	6.47	9.54	3.70	8.12	8.63	8.19	12.15	8.28
24. ERC WYE	(329)	7.79	8.34	8.75	7.16	10.48	6.91	10.14	4.07	8.78	8.64	8.57	12.71	8.53
25. BEETLE PLOT 5	(448)	8.52	9.55	9.86	8.26	10.14	7.62	9.67	5.07	8.14	9.90	8.49	13.78	9.08
26. BEETLE PLOT 6	(756)	8.31	8.78	8.29	8.83	9.71	7.48	9.58	5.62	8.98	11.27	8.38	14.11	9.11
27. H.M.S.	(223)	6.36	6.33	6.30	6.39	8.27	5.30	7.45	3.00	6.41	6.56	5.56	9.68	6.47

TABLE A.V-4. Arid Lands Ecology Reserve--Calendar Year
Precipitation (cm) for Years 1969 Through 1980

STATION	ELEV. (M)	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	AVG
1. UPPER COLD CR	(204)	13.49	16.38	17.17	13.46	18.47	13.87	18.77	7.44	15.06	20.45	16.43	25.76	16.40
2. RATTLESNAKE SPG	(210)	14.17	16.84	15.93	13.69	21.36	14.55	19.91	8.66	15.57	16.66	15.39	28.52	16.77
3. LOWER SNIVELY	(323)	17.30	20.98	21.41	18.39	27.46	19.08	27.79	12.24	20.45	20.95	22.07	33.27	21.78
4. UPPER SNIVELY	(533)	20.93	24.76	26.09	21.26	31.14	25.27	29.26	14.53	26.03	26.16	26.59	39.75	25.98
5. BENSON RANCH	(189)	15.01	18.36	16.51	13.72	20.70	15.39	21.26	8.99	16.38	17.70	16.76	28.50	17.44
6. UPPER BENSON	(234)	15.27	21.18	18.54	14.30	24.49	15.95	24.64	10.67	16.69	18.90	16.92	30.00	18.96
7. ALLUVIAL FAN	(347)	16.79	24.94	22.86	18.77	28.09	22.76	27.56	14.81	22.48	21.56	21.06	31.55	22.77
8. LWR LARK SPUR	(488)		24.99	25.37	19.58	27.25	23.93	28.96	16.84	22.07	23.14	23.62	35.64	24.66
9. LARK SPUR	(588)	20.09	27.71	24.94	21.64	30.02	25.96	31.27	17.98	25.45	28.60	27.30	34.87	26.32
10. BENSON BASIN	(744)	22.81	30.48	26.92	24.31	30.51	27.10	33.45	18.80	30.43	32.56	29.41	39.45	28.85
11. ANDERSON RIM	(884)	24.08	28.65	25.04	24.28	32.66	26.82	32.05	18.31	25.15	28.42	32.41	40.13	28.17
12. ANDERSON FIELD	(939)	19.56	23.57	21.64	19.02	27.33	21.44	28.27	14.91	22.99	31.27	29.72	37.29	24.75
13. HOPSAGE	(158)	16.23	20.52	15.16	13.36	20.95	15.14	21.13	10.39	14.99	17.04	13.26	24.92	16.92
14. TELEMETER	(366)	18.72	27.86	24.92	18.52	29.39	24.36	34.01	15.04	21.72	26.24	24.23	34.09	24.92
15. R MT CREST NE	(1020)	20.19	23.29	22.78	26.67	30.02	21.82	30.73	17.86	23.06	29.74	25.83	38.38	25.87
16. R MT CREST	(1079)		16.69	15.27	19.02	21.39	15.47	18.59	10.41	21.36	28.96	21.62	35.86	20.42
17. R MT CREST SW	(1067)	20.32	16.54	14.73	16.64	18.95	13.67	15.27	9.42	20.47	26.29	20.90	29.46	18.55
18. WINTERFAT	(206)	15.06	22.86	19.68	14.83	23.60	17.17	24.28	9.98	17.65	21.82	16.74	27.99	19.31
19. CALOCHORTUS	(381)	20.88	29.16	25.04	19.18	28.65	22.63	32.23	15.09	22.66	25.60	23.24	34.14	24.88
20. BEETLE PLOT 7	(954)	21.29	24.49	24.82	24.33	27.15	20.32	26.34	14.71	25.68	31.88	23.34	39.62	25.33
21. LOWER COLD CR	(134)	16.81	21.77	18.26	16.69	21.41	14.63	22.63	8.59	19.25	20.78	16.92	26.70	18.70
22. BEETLE PLOT 3	(192)	17.98	21.41	20.73	17.91	25.68	15.19	23.80	8.71	19.74	19.53	18.08	28.30	19.75
23. BEETLE PLOT 4	(286)	18.03	24.21	21.29	19.53	25.15	16.43	24.23	9.40	20.62	21.92	20.80	30.86	21.04
24. ERC WYE	(329)	19.79	21.18	22.22	18.19	26.62	17.55	25.76	10.34	22.30	21.95	21.77	32.28	21.66
25. BEETLE PLOT 5	(448)	21.64	24.26	25.04	20.98	25.76	19.35	24.56	12.88	20.68	25.15	21.56	35.00	23.07
26. BEETLE PLOT 6	(756)	21.11	22.30	21.06	22.43	24.66	19.00	24.33	14.27	28.63	21.29	21.29	35.84	23.14
27. H.M.S.	(223)	16.15	16.08	16.00	16.23	21.01	13.46	18.92	7.62	16.28	16.69	14.12	24.59	16.43

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TABLE A.V-5. Arid Lands Ecology Reserve--Bioyear Precipitation (in.) for Years 1969 Through 1980

STATION	ELEV. (M)	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	AVG
1. UPPER COLD CR	(204)	6.69	6.10	4.96	4.39	3.27	8.58	6.08	3.92	1.80	6.81	4.61	8.76	5.50
2. RATTLESNAKE SPC	(210)	7.11	6.40	4.97	4.44	3.51	9.59	6.11	4.57	1.89	6.06	4.09	9.75	5.70
3. LOWER SNIVELY	(323)	8.53	7.59	6.80	6.44	4.54	12.36	9.04	6.69	2.40	7.99	5.72	11.68	7.48
4. UPPER SNIVELY	(533)	9.90	8.50	8.22	7.41	5.63	14.35	9.96	7.43	3.31	10.24	7.33	14.05	8.86
5. BENSON RANCH	(189)	6.99	6.83	4.89	4.80	3.30	9.15	6.57	4.49	1.91	6.24	4.83	9.71	5.81
6. UPPER BENSON	(234)	6.90	7.43	5.83	5.07	3.95	10.67	7.63	5.39	2.17	6.91	4.90	10.24	6.42
7. ALLUVIAL FAN	(347)	8.13	8.39	7.49	6.48	4.90	14.02	9.23	6.95	2.76	8.48	6.27	11.37	7.87
8. LWR LARK SPUR	(488)	*	8.44	7.73	7.10	5.15	13.59	9.60	7.17	2.68	8.79	6.55	12.47	8.12
9. LARK SPUR	(588)	9.69	9.57	7.85	7.08	5.70	14.87	10.37	8.58	3.35	10.36	7.80	12.87	9.00
10. BENSON BASIN	(744)	11.01	10.19	8.50	7.76	5.73	14.99	10.48	9.02	3.98	11.61	8.22	14.35	9.65
11. ANDERSON RIM	(884)	11.89	10.03	7.92	7.46	5.66	15.31	9.70	8.30	3.61	9.27	7.33	15.15	9.30
12. ANDERSON FIELD	(939)	9.93	7.85	6.52	6.06	4.65	12.22	9.01	6.27	2.93	9.47	8.24	13.87	8.09
13. HOPSAGE	(158)	6.95	7.78	4.61	4.56	3.18	9.90	6.73	4.16	1.73	6.33	3.25	8.45	5.64
14. TELEMETER	(366)	9.21	9.29	8.58	6.52	5.15	14.82	11.00	8.13	2.56	9.36	6.99	12.54	8.68
15. R MT CREST NE	(1020)	9.59	8.71	7.03	7.36	5.09	13.25	10.24	6.69	2.65	9.40	6.27	13.42	8.31
16. R MT CREST	(1079)	*	6.45	4.78	4.72	4.01	9.45	5.22	4.07	2.35	9.23	5.46	12.79	6.23
17. R MT CREST SW	(1067)	9.99	6.27	4.71	4.21	3.35	8.06	4.31	3.50	1.86	8.57	4.75	11.66	5.94
18. WINTERFAT	(206)	7.33	8.12	6.36	5.20	3.85	10.88	7.91	5.33	1.95	7.24	5.03	9.75	6.58
19. CALCOCHORTUS	(381)	9.63	9.85	8.44	6.84	5.06	14.25	9.78	8.06	2.37	8.99	6.63	12.18	8.51
20. BEETLE PLOT 7	(954)	10.32	8.73	7.25	7.57	4.85	11.94	8.03	6.61	2.90	9.99	7.15	13.13	8.21
21. LOWER COLD CR	(134)	8.02	7.95	5.35	5.46	3.69	9.61	6.60	5.37	1.90	6.18	5.03	9.08	6.19
22. BEETLE PLOT 3	(192)	8.60	7.67	5.82	6.26	3.89	11.26	6.78	5.76	1.93	6.68	5.24	9.56	6.62
23. BEETLE PLOT 4	(286)	8.89	8.54	6.31	6.59	4.28	11.14	7.07	5.74	2.03	7.78	5.97	10.46	7.06
24. ERC WYE	(329)	9.46	7.56	6.67	6.42	4.61	11.70	7.45	5.98	1.98	7.46	6.17	11.51	7.25
25. BEETLE PLOT 5	(448)	9.85	8.73	7.44	6.87	5.00	11.31	7.41	6.16	2.58	8.21	5.82	11.80	7.60
26. BEETLE PLOT 6	(756)	9.63	8.35	6.39	6.57	4.78	11.12	7.21	6.12	2.49	8.76	6.40	12.08	7.49
27. H.M.S.*	(223)	7.02	5.95	4.48	4.88	3.25	8.95	5.43	3.81	1.86	6.06	3.34	8.21	5.27

*NO MEASUREMENT IN BIOYEAR 1969

TABLE A.V-6. Arid Lands Ecology Reserve--Bioyear Precipitation (cm) for Years 1969 Through 1980

STATION	ELEV. (M)	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	AVG
1. UPPER COLD CR	(204)	16.99	15.49	12.60	11.15	8.31	21.79	15.44	9.96	4.57	17.30	11.71	22.25	13.96
2. RATTLESNAKE SPG	(210)	18.06	16.26	12.62	11.28	8.92	24.36	15.52	11.61	4.80	15.39	10.39	24.76	14.49
3. LOWER SNIVELY	(323)	21.67	19.28	17.27	16.36	11.53	31.39	22.96	16.99	6.10	20.29	14.53	29.67	18.99
4. UPPER SNIVELY	(533)	25.15	21.59	20.88	18.82	14.30	36.45	25.30	18.87	8.41	26.01	18.62	35.69	22.50
5. BENSON RANCH	(189)	17.75	17.35	12.42	12.19	8.38	23.24	16.69	11.40	4.85	15.85	12.27	24.66	14.75
6. UPPER BENSON	(234)	17.53	18.87	14.81	12.88	10.03	27.10	19.38	13.69	5.51	17.55	12.45	26.01	16.32
7. ALLUVIAL FAN	(347)	20.65	21.31	19.02	16.46	12.45	35.61	23.44	17.65	7.01	21.54	15.93	28.88	19.99
8. LWR LARK SPUR	(488)	*	21.44	19.63	18.03	13.08	34.52	24.38	18.21	6.81	22.33	16.64	31.67	20.62
9. LARK SPUR	(588)	24.61	24.31	19.94	17.98	14.48	37.77	26.34	21.79	8.51	26.31	19.81	32.69	22.87
10. BENSON BASIN	(744)	27.97	25.88	21.59	19.71	14.55	38.07	26.62	22.91	10.11	29.49	20.88	36.45	24.52
11. ANDERSON RIM	(884)	30.20	25.48	20.12	18.95	14.38	38.89	24.64	21.08	9.17	23.55	18.62	38.48	23.63
12. ANDERSON FIELD	(939)	25.22	19.94	16.56	15.39	11.81	31.04	22.89	15.93	7.44	24.05	20.93	35.23	20.54
13. HOPSAGE	(158)	17.65	19.76	11.71	11.58	8.08	25.15	17.09	10.57	4.39	16.08	8.25	21.46	14.33
14. TELEMETER	(366)	23.39	23.60	21.79	16.56	13.08	37.64	27.94	20.65	6.50	23.77	17.75	31.85	22.06
15. R MT CREST NE	(1020)	24.36	22.12	17.86	18.69	12.93	33.65	26.01	16.99	6.73	23.88	15.93	34.09	21.11
16. R MT CREST	(1079)	*	16.38	12.14	11.99	10.19	24.00	13.26	10.34	5.97	23.44	13.87	32.49	15.82
17. R MT CREST SW	(1067)	25.37	15.93	11.96	10.69	8.51	20.47	10.95	8.89	4.72	21.77	12.06	29.62	15.09
18. WINTERFAT	(206)	18.62	20.62	16.15	13.21	9.78	27.64	20.09	13.54	4.95	18.39	12.78	24.76	16.71
19. CALOCHORTUS	(381)	24.46	25.02	21.44	17.37	12.85	36.19	24.84	20.47	6.02	22.83	16.84	30.94	21.61
20. BEETLE PLOT 7	(954)	26.21	22.17	18.41	19.23	12.32	30.33	20.40	16.79	7.37	25.37	18.16	33.35	20.85
21. LOWER COLD CR	(134)	20.37	20.19	13.59	13.87	9.37	24.41	16.76	13.64	4.83	15.70	12.78	23.06	15.72
22. BEETLE PLOT 3	(192)	21.84	19.48	14.78	15.90	9.88	28.60	17.22	14.63	4.90	16.97	13.31	24.28	16.82
23. BEETLE PLOT 4	(286)	22.58	21.69	16.03	16.74	10.87	28.30	17.96	14.58	5.16	19.76	15.16	26.57	17.94
24. ERC WYE	(329)	24.03	19.20	16.94	16.31	11.71	29.72	18.92	15.19	5.03	18.95	15.67	29.24	18.41
25. BEETLE PLOT 5	(448)	25.02	22.17	18.90	17.45	12.70	28.73	18.82	15.65	6.55	20.85	14.78	29.97	19.30
26. BEETLE PLOT 6	(756)	24.46	21.21	16.23	16.69	12.14	28.24	18.31	15.54	6.32	22.25	16.26	30.68	19.02
27. H.M.S.	(223)	17.83	15.11	11.38	12.40	8.25	22.73	13.79	9.68	4.72	15.39	8.48	20.85	13.39

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