

---

---

**Candidate Wind Turbine  
Generator Site Summarized  
Meteorological Data  
for the Period December 1976  
Through December 1981**

**W. F. Sandusky  
D. S. Renné  
D. L. Hadley**

---

**September 1982**

**Prepared for the U.S. Department of Energy  
under Contract DE-AC06-76RLO 1830**

**Pacific Northwest Laboratory  
Operated for the U.S. Department of Energy  
by Battelle Memorial Institute**



## DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

PACIFIC NORTHWEST LABORATORY  
*operated by*  
BATTELLE  
*for the*  
UNITED STATES DEPARTMENT OF ENERGY  
*under Contract DE-AC06-76RLO 7830*

Printed in the United States of America  
Available from  
National Technical Information Service  
United States Department of Commerce  
5285 Port Royal Road  
Springfield, Virginia 22151

NTIS Price Codes  
Microfiche A01

Printed Copy

Pages	Price Codes
001-025	A02
026-050	A03
051-075	A04
076-100	A05
101-125	A06
126-150	A07
151-175	A08
176-200	A09
201-225	A010
226-250	A011
251-275	A012
276-300	A013

3 3679 00059 0903

PNL-4407  
UC-60

CANDIDATE WIND TURBINE  
GENERATOR SITE SUMMARIZED  
METEOROLOGICAL DATA FOR THE PERIOD  
DECEMBER 1976 THROUGH DECEMBER 1981

W. F. Sandusky  
D. S. Renne  
D. L. Hadley

September 1982

Prepared for  
the U.S. Department of Energy  
under Contract DE-AC06-76RLO 1830

Pacific Northwest Laboratory  
Richland, Washington 99352

## SUMMARY

Summarized hourly meteorological data for 16 of the original 17 candidate and wind turbine generator sites collected during the period from December 1976 through December 1981 are presented in this report. The data collection program at some individual sites may not span this entire period, but will be contained within the reporting period. The purpose of providing the summarized data is to document the data collection program and provide data that could be considered representative of long-term meteorological conditions at each site. For each site, data are given in eight tables and a topographic map showing the location of the meteorological tower and turbine, if applicable. Use of information from these tables, along with information about specific wind turbines, should allow the user to estimate the potential for long-term average wind energy production at each site.

CONTENTS

SUMMARY . . . . .	iii
INTRODUCTION . . . . .	1
SUMMARY TABLES . . . . .	3
AUGSPURGER MOUNTAIN, WASHINGTON . . . . .	AG-01
AMARILLO, TEXAS . . . . .	TX-01
BLOCK ISLAND, RHODE ISLAND . . . . .	RI-01
BOARDMAN, OREGON . . . . .	OR-01
BOONE, NORTH CAROLINA . . . . .	NC-01
CLAYTON, NEW MEXICO . . . . .	NM-01
COLD BAY, ALASKA . . . . .	AK-01
CULEBRA, PUERTO RICO . . . . .	PR-01
HOLYoke, MASSACHUSETTS . . . . .	MA-01
HURON, SOUTH DAKOTA . . . . .	SD-01
KINGSLEY DAM, NEBRASKA . . . . .	NB-01
LUDINGTON, MICHIGAN . . . . .	MI-01
MONTAUK POINT, NEW YORK . . . . .	NY-01
POINT ARENA, CALIFORNIA . . . . .	CA-01
RUSSELL, KANSAS . . . . .	KS-01
SAN GORGONIO PASS, CALIFORNIA . . . . .	SG-01
APPENDIX A (PROGRAM LISTING) . . . . .	A.I

## INTRODUCTION

This report presents summarized hourly meteorological data for 16 of the "original" 17 candidate and wind turbine generator **installation** sites listed in Table 1, and geographically located in Figure 1. A second group of sites was selected in early 1980 as part of the expanded candidate site program. These sites are referred to as the "new sites". Data on the "new" sites is not provided in this report. The period of record of the data is from the start of the collection program at each site, either late 1976 or early 1977, through December 1981. This period of record was chosen so the summarized data could represent typical long-term climatological conditions at the sites and also document the data collection program. The last 3 years of data have been summarized on an annual basis, and are reported elsewhere (Sandusky and Renné 1980 and 1980a; Sandusky et al. 1981). In addition, information on the history of the program, including information on meteorological sensors, data recording techniques, and editing procedures is available in other reports (Renné and Sandusky 1979 and Sandusky et al. 1982).

Of the 17 original sites chosen by the Department of Energy (DOE) for evaluating wind energy potential, the data for the Kaena Point, Hawaii site is not included in this report. The data collection program and data analysis for that site were directed by the Department of Meteorology at the University of Hawaii. Summarized data for that site were prepared in a different format than reported herein and thus are not included.

The collection program at all but 6 of the 16 sites was terminated prior to December 1981 for various reasons. At the Augspurger Mountain, Washington site the data collection program was terminated after the tower collapsed in January 1978. The collection program at the Ludington, Michigan site was terminated at the request of the participating utility in November 1979. The collection programs at Kingsley Dam, Nebraska, and Russell, Kansas were terminated in August 1981 due to budgetary constraints of the Department of Energy. For the same reason the collection programs at the Amarillo, Texas; Boardman,

TABLE 1. Site Identification and location

Site	Identification Code	Date Collection Began	Date Collection Terminated	Latitude	Longitude	Elevation (meters)
Augspurger Mt., WA	AG	12/10/76	01/31/78	45° 45' N	121° 41' W	853
Amarillo, TX	TX	03/01/77	10/01/81	35° 17' N	101° 45' W	1091
Block Island, RI	RI	12/11/76	Continuing	41° 10' N	71° 34' W	14
Boardman, OR	OR	01/01/77	10/01/81	45° 41' N	119° 50' W	212
Boone, NC	NC	12/14/76	05/31/81	36° 15' N	81° 40' W	1347
Clayton, NM	NM	05/01/77	Continuing	36° 26' N	103° 12' W	1536
Cold Bay, AK	AK	08/01/77	10/01/81	55° 12' N	162° 43' W	29
Culebra, PR	PR	03/01/77	Continuing	18° 20' N	65° 18' W	80
Holyoke, MA	MA	12/16/76	10/01/81	42° 15' N	72° 38' W	372
Huron, SD	SD	12/10/76	Continuing	44° 24' N	98° 08' W	396
Kingsley, NB	NB	12/05/76	09/31/81	41° 10' N	101° 39' W	1024
Ludington, MI	MI	04/01/77	11/03/79	43° 53' N	86° 26' W	213
Montauk, NY	NY	12/30/76	Continuing	41° 03' N	71° 53' W	2
Point Arena, CA	CA	01/07/77	10/01/81	38° 56' N	123° 43' W	21
Russell, KS	KS	12/02/76	09/31/81	38° 50' N	98° 51' W	564
Son Gorronio, CA	SG	12/03/76	Continuing	33° 56' N	116° 34' W	329

## WTG CANDIDATE AND INSTALLATION SITES

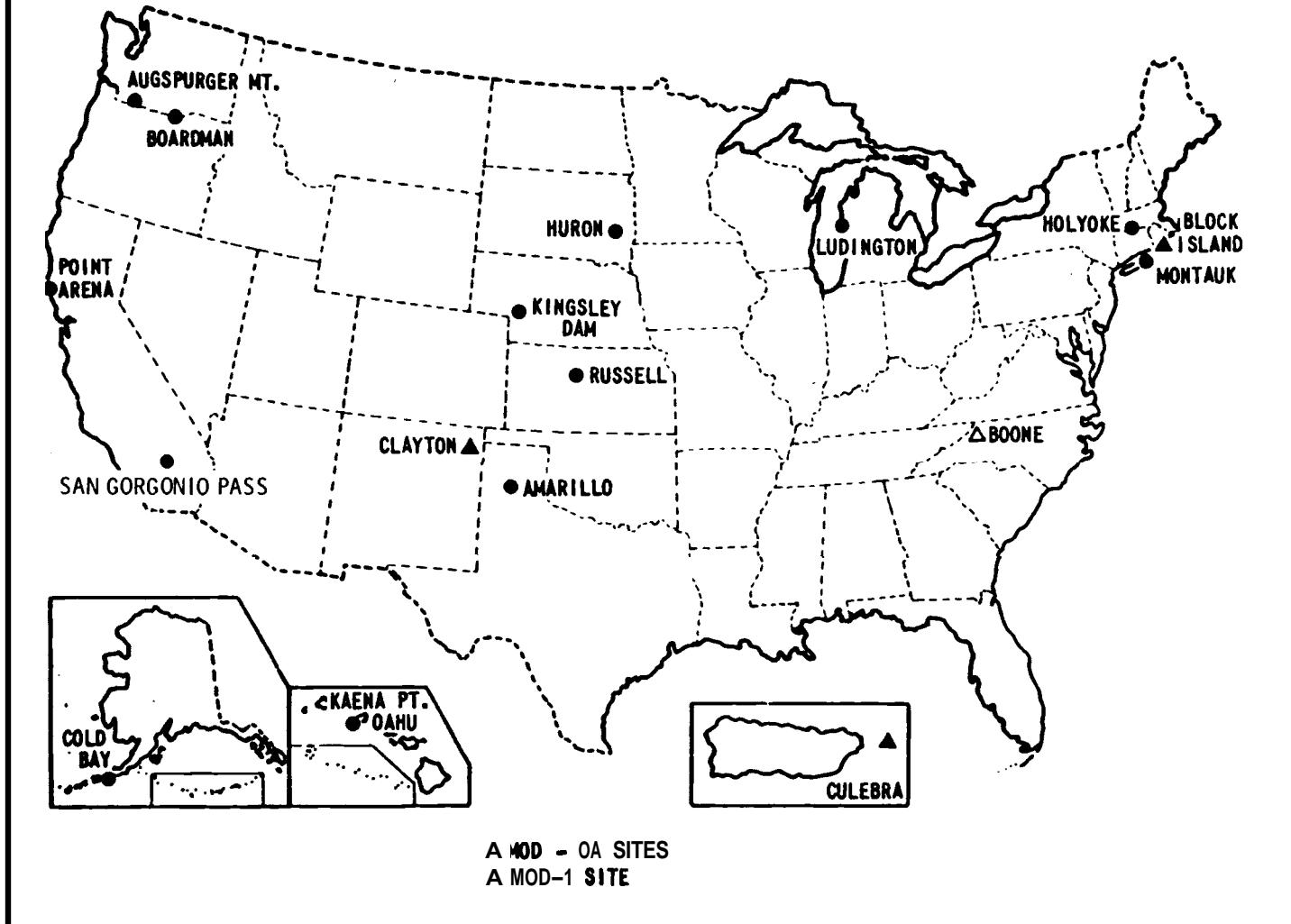


FIGURE 1. Location of the "Original" Candidate Sites

Oregon; Cold Bay, Alaska; Holyoke, Massachusetts; and Point Arena, California were terminated on October 1, 1981. The data collection program at Boone, North Carolina was terminated in May 1981 so onsite equipment could be used in a research field program involving the MOD-1 turbine at the site. The sites where data collection continued after December 1981 was done to support the testing of MOD-0A sites or private wind turbine programs.

The heights of the sensors at each site are given in Table 2. In that table and in later summary tables, the upper sensor is noted by the letter "A", the mid-level is noted by the letter "B" and the lower level is noted by the letter "C". Note that only five sites (Block Island, Rhode Island; Boone, North Carolina; Clayton, New Mexico; Boardman, Oregon; and San Gorgonio, California) have mid-level sensors. It should be noted that of the five sites with a mid-level sensor, only the system at Boardman, Oregon had an operational mid-level sensor the entire period of record that is reported. At three sites, the mid-level sensor was added after the collection program had begun (e.g., June 1979 for Block Island and Rhode Island; March 1978 for Clayton, New Mexico; and November 1980 for San Gorgonio). At the Boone, North Carolina site the tower was originally 48.7 meters in height and data was collected at 18.2 and 45.7 meters above ground level. In July 1978 the tower was extended and a new sensor installed at 76.2 meters above the ground. Therefore, what was the upper level sensor level became the mid-level sensor level.

In some cases, circumstances dictated the height of the sensor levels. The height of the sensor levels at Boone was increased to accommodate the MOD1 turbine installed at the site. This turbine has a larger blade diameter and taller tower than the MOD-0A turbine. At the Boardman site the levels reported are based on an ongoing monitoring program for the construction and operation of a nearby coal plant. The upper-level sensor at the Cold Bay, Alaska site is at 21.8 m since an existing FAA beacon tower is used to support the sensors. Four sites have the lower sensors at 18.2 m above ground level to measure wind data above trees or buildings near the sites.

TABLE 2. Sensor Heights

<u>Site Location</u>	<u>C-Lower Level(a)</u>	<u>B-Middle Level(a)</u>	<u>A-Upper Level(a)</u>
Augspurger Mt., WA	9.1	(b)	45.7
Amarillo, TX	9.1	(b)	45.7
Block Island, RI	9.1	30.0	45.7
Boardman, OR	9.1	39.6	70.1
Boone, NC	18.2	45.7	76.2
Clayton, NM	9.1	30.0	45.7
Cold Bay, AK	9.1	(b)	21.8
Culebra, PR	9.1	(b)	45.7
Holyoke, MA	18.2	(b)	45.7
Huron, SD	9.1	(b)	45.7
Kingsley Dam, NB	9.1	(b)	45.7
Ludington, MI	18.2	(b)	45.7
Montauk, NY	18.2	(b)	45.7
Point Arena, CA	9.1	(b)	45.7
Russell, KS	9.1	(b)	45.7
San Gorgonio, CA	9.1	30.0	45.7

(a) Meters above ground level  
 (b) No data collected

Table 3 provides an all-site summary of data recovery rates and wind characteristics for the reporting period. Data under the column "Maximum" represent maximum hourly average values. Data under the column "Power" represents the average available power.

The mean wind speed values from the lower level at the candidate site can be compared to available long-term values from the nearest National Weather Service (NWS) first order station. This data is given in Table 4. For some sites that are near NWS stations these values are in reasonable agreement (e.g., Amarillo, Block Island, Boardman, Cold Bay, Holyoke, Huron, Ludington,

**TABLE 3.** Summary of Hourly Data for the Period  
December 1976 Through December 1981

<u>Site Code</u>	<u>Sensor Level (M)</u>	<u>% Sample Recovery</u>	<u>Wind Mean</u>	<u>Speed (M/S) Maximum</u>	<u>Available Power (Watts/M<sup>2</sup>)</u>
AG (C)	9.1	53.8	6.9	22.6	323.33
TX (C)	9.1	87.7	6.3	23.6	228.67
RI (C) (1)	9.1	83.2	5.0	20.1	134.30
OR (C)	9.1	82.9	3.8	36.7	102.55
NC (C) (2)	18.2	74.5	6.1	28.8	315.04
NM (C) (1)	9.1	84.6	5.4	21.3	160.78
AK (C)	9.1	58.4	6.5	23.0	353.28
PR (C) (1)	9.1	82.1	6.2	29.1	212.05
MA (C)	18.2	75.6	4.7	22.7	119.22
SD (C)	9.1	79.4	4.7	20.6	131.99
NB (C)	9.1	90.9	5.3	22.4	161.03
MI (C)	18.2	79.0	5.2	23.7	181.84
NY (C)	18.2	80.3	6.2	24.0	307.97
CA (C)	9.1	80.7	4.7	17.9	130.54
KS (C)	9.1	87.6	5.3	20.8	173.66
SG (C)	9.1	81.1	6.2	23.9	344.82
<hr/>					
RI (B) (1)	30.0	38.7	6.4	19.5	254.62
OR (B)	39.6	94.5	5.0	39.8	206.58
NC (B) (2)	45.7	42.4	7.3	29.9	423.05
NM (B) (1)	30.0	70.0	6.7	25.0	264.97
SG (B)	30.0	9.1	6.9	20.5	460.81
<hr/>					
AG (A)	45.7	69.9	8.7	27.3	631.48
TX (A)	45.7	87.7	8.1	23.7	464.74
RI (A) (1)	45.7	91.0	7.7	21.3	437.90
OR (A)	70.1	90.3	5.5	42.9	279.14
NC (A) (2)	76.2	78.3	8.0	34.6	562.77
NM (A) (1)	45.7	81.3	7.3	27.3	333.41
AK (A)	21.8	57.5	7.3	26.3	497.03
PR (A) (1)	45.7	75.6	7.0	31.7	291.07
MA (A)	45.7	78.8	6.9	27.7	391.05
SD (A)	45.7	83.2	6.8	24.6	333.60
NB (A)	45.7	90.1	6.5	27.2	286.31
MI (A)	45.7	91.2	7.5	28.2	466.74
NY (A)	45.7	76.7	7.2	26.0	436.65
CA (A)	45.7	77.1	6.5	22.4	322.81
KS (A)	45.7	86.8	7.3	23.3	373.73
SG (A)	45.7	80.4	7.8	27.0	723.24
<hr/>					

Note: A = Upper Level  
 B = Mid-Level  
 C = Lower Level  
 (1) = MOD-OA Turbine Site  
 (2) = MOD-1 Turbine Site

TABLE 4. Comparison of Site and Nearby NWS Data

<u>Site</u>	<u>Mean Wind Speed (M/S)</u>	<u>NWS Station</u>	<u>Mean Wind Speed (MIS)</u>
Augspurger Mt., WA	6.9	Portland, OR	3.5
Amarillo, TX	6.3	Amarillo, TX	6.1
Block Island, RI	5.0	Providence, RI	4.8
Boardman, OR	3.8	Portland, OR	3.5
Boone, NC	6.1	Charlotte, NC	3.4
Clayton, NM	5.4	Amarillo, TX	6.1
Cold Bay, AK <sup>(a)</sup>	7.3	Cold Bay, AK	7.6
Culebra, PR	6.2	San Juan, PR	3.9
Holyoke, MA	4.7	Worchester, MA	4.7
Huron, SD	4.7	Huron, SD	5.3
Kingsley Dam, NE	5.3	North Platte, NE	4.6
Ludington, MI	5.2	Muskegon, MI	4.8
Montauk, NY	6.2	JFK Airport, NY	5.4
Point Arena, CA	4.7	Eureka, CA	3.0
Russell, KS	5.3	Concordia, KS	5.4
San Gorgonio, CA	6.2	Los Angeles, CA	2.8

(a) The measured at 21.8 meters above ground

and Russell). For some sites, the data from the nearest NWS station would not be representative of site conditions (Augspurger, Boone, Culebra, Point Arena, and San Gorgonio). For the other sites the difference between the mean wind speeds is either 0.7 or 0.8 meters per second. Only two sites (Huron and Russell) have mean values that are less than values for the NWS stations. Data from the upper level at Cold Bay was used for comparison because that level is not influenced by nearby buildings.

The data for each site are presented in summary tables; the format of these tables is described in the next section. Information in the summary

tables is provided on data recovery rates, available power, maximum values observed, annual mean values, diurnal mean values, frequency distribution of wind speed, wind speed persistence, and power law exponent as a function of wind direction. The information from the summary tables combined with information about specific wind turbines should allow the user to estimate the potential for wind energy production at each site.

Provided in Appendix A is the software program used in generating the summary tables. This program is presently installed on a Digital Company VAX 11/780 computer at the Pacific Northwest Laboratory. However, it should be readily converted to other computer systems.

## SUMMARY TABLES

Discussion of data represented in each table and the method of calculation is given below. The notation "W/S" refers to wind speed, which is reported in meters per second. The notation "W/D" refers to wind direction, which is reported in degrees. Information on site elevation is reported in meters.

A value reported as -999.99 indicates missing data. At several sites no mid-level sensors exist. This condition is noted at the bottom of Table 1.3. The values for the mid-level wind speed in Table 1.3 under the column "Other Levels" are therefore indicated as missing, -999.99. If no mid-level sensors exist, the values reported for Level B in Tables 1.4, 1.5 and 1.6 are zero. Also, no information for Level B is provided in Tables 1.1 and 1.2.

### TITLE AND FUNCTION

Table 1.1

Sensor Performance. Sensor performance identifies the percentage of time the recording system was operating and the percentage of time acceptable data were acquired by the meteorological sensors. The values given under the label "% Online" are obtained by dividing the total number of data scans collected by the total possible number of data scans. The values given under the label "% Recovered" are obtained by dividing the total number of acceptable data scans collected by the total possible number of data scans.

Table 1.2

Annual Means and Available Power. This table provides the mean wind speed, wind direction, and available power from the wind for each available sensor level during the reporting period. The value for wind direction indicates the direction from which the wind blows with  $0^\circ$  and  $360^\circ$  being north,  $90^\circ$  being east,  $180^\circ$  being south and  $270^\circ$  being west. Thus, a mean wind direction of  $220^\circ$  indicates winds that blow primarily from the southwest. In computing a mean wind direction a unit vector approach was used. That is,

for each hourly value of wind direction U and V wind direction component values were determined and summed. Once all hourly values were read, average U and V components, based on the total number of valid observations, were computed and then used to compute a mean wind direction. Thus, the reported mean wind direction is not weighted by wind speed. The available wind power is given in units of watts per square meter. These values for each sensor level are computed by the following relationship:

$$P = \frac{1}{2n} \rho \sum_{i=1}^n v_i^3$$

where:

$P$  = average power ( $\text{watts}/\text{m}^2$ )

$\rho$  = density of air at each sensor level ( $\text{kg}/\text{m}^3$ )

$v_i$  = the wind speed (in  $\text{m}/\text{s}$ ) at the  $i$ th observation line

$n$  = number of valid wind speed observations in the averaging period.

The air density was computed by adjusting the air density at sea level,  $1.225 \text{ kg}/\text{m}^3$ , for the elevation of the site (in meters), assuming a standard atmosphere density profile and the height of the sensor above ground level (in meters). In all cases the air density was less than air density at sea level.

#### Table 1.3

Maximum Wind Speed. The highest calculated hourly value for each available sensor level is given along with date and time of occurrence. For this maximum hourly wind speed value, the mean hourly wind direction is given along with the hourly wind speeds that occurred at the other levels.

#### Table 1.4

Wind Speed and Direction Versus Time-of-Day. Mean hourly wind speed and direction values are reported for each hour of the day for the reporting period. Data reported for each hour represent the average of all hourly

values calculated for that hour. Data are provided for each level of instrumentation. If the site has no sensor at the mid-level (B), the values for wind speed and wind direction are reported as 0.0.

Table 1.5

Frequency Distribution of Wind Speed. For each sensor level, the total number of observations and percentage of occurrences are given for a number of classes of wind speed. The first class, 0.0 to 0.5, represents winds from 0.0 up to and including 0.5 m/s. For the rest of the classes, except the last, the number under the "Count" column indicates the number of occurrences of hourly wind speeds greater than the lower limit and less than or equal to the upper limit. Thus, the class 0.5 to 1.0 indicates the condition  $0.5 < \text{wind speed (m/s)} \leq 1.0$ . In this table the wind speed classes are broken up into 0.5 m/s classes up to wind speed of 10 m/s. For higher wind speeds 1.0 m/s classes are used. The recovery rate, in percent, for each wind speed sensor is given at the bottom of the table. If no mid-level sensor is available, all values under Level B and the recovery rate for Level B will be 0 and 0.0 respectively.

Table 1.6

Cumulative Frequency Distribution of Wind Speed. Both the cumulative number of observations and percentage of cumulative frequency distribution of hourly wind speed values are given for various wind speed intervals. The value of 2.0 under the column "Wind Speed" represents wind speed occurrences up to and including 2.0 m/s. The corresponding number of cumulative hourly wind speed values is noted under the column "CFD" for each sensor level. If the site has no mid-level sensor, the values for Level B under the columns "CFD(ABS)" and "CFD(%)" will be 0 and 0.0, respectively.

Table 1.7

Wind Speed Persistence Frequency. Information presented in this table indicates the length of time the wind speed at the upper sensor level (A) occurs within a specified wind speed interval. For example, if in the "Hours" row of 2.0 and under the wind speed column of 4 to 5 m/s a value of 3 was

reported, this indicates that during the reporting period there were three occurrences of wind speeds between 4 and 5 m/s that lasted for 2 hours.

Table 1.8

Power Law Exponent. A power law exponent, expressed as "ALPHA," between sensor levels is computed as indicated in the notes at the bottom of the table for each hour of data. These values are summed according to the wind direction occurring at the upper sensor level. After all data have been analyzed for the reporting period, mean values of "ALPHA" are computed according to the total number of values of "ALPHA" summed for each directional sector. The purpose of this type of data representation is to investigate how the topographical features surrounding the site may influence general wind flow characteristics.'

The value under the column ALPHA(A,B,C) represents a least squares best **fit** of the values for ALPHA(A,B), ALPHA(B,C) and ALPHA(A,C). These values are only computed for sites with three levels of sensors. If the site has two levels of instrumentation, i.e., no Level B sensor, no best **fit** value will be calculated and information on ALPHA will be found under the column "ALPHA(A,C)."

The percentage of occurrence of wind direction for each sensor is also given in this table. That information is provided under the columns "%A", "%B", "%C" for the upper, mid-, and lower sensor levels, respectively.

AUGSPURGER MOUNTAIN, WASHINGTON

SITE ID: AG  
SITE LOCATION: AUGSPURGER MT., WA.  
DATA : DECEMBER 1976 THROUGH JANUARY 1978

1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 10248

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	69.9
WD(A)	100.0	57.5
WS(C)	100.0	53.8
WD(C)	100.0	70.2

1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	(A) 45.7 (C) 9.1	HEIGHT	MEAN	MEAN	POWER
		(KETERS)	WS	WD	WATTS/M**2
		8.7	262.8	631.48	
		6.9	269.2	323.33	

1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	27.3	241.0	12/01/77	13:00	(B)-999.9 (C) 22.6
(C) 9.1	22.6	241.5	12/01/77	13:00	(A) 27.3 (B)-999.9

NOTES:

1. SITE ELEVATION: 853 METERS ABOVE SEA LEVEL.
3. SENSOR LEVEL B NOT AVAILABLE AT SITE AG.

SITE ID: AG  
SITE LOCATION: AUGSPURGER MT., WA.  
DATA : DECEMBER 1976 THROUGH JANUARY 1978

1.4 KIND SPEED AND DIRECTION VERSUS TIME-OF-DAY

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	9.0	267.4	0.0	0.0	7.2	273.7
01:00	8.9	266.8	0.0	0.0	7.1	273.8
02:00	8.9	267.9	0.0	0.0	7.1	274.1
03:00	8.6	270.5	0.0	0.0	6.9	274.4
04:00	8.6	270.2	0.0	0.0	7.0	271.5
05:00	8.6	272.1	0.0	0.0	6.9	274.7
06:00	8.3	277.2	0.0	0.0	6.8	276.0
07:00	8.2	276.7	0.0	0.0	6.7	276.0
08:00	8.2	274.8	0.0	0.0	6.7	274.4
09:00	8.2	269.8	0.0	0.0	6.7	271.7
10:00	8.3	259.0	0.0	0.0	6.7	266.9
11:00	8.3	260.1	0.0	0.0	6.7	265.8
12:00	8.3	254.8	0.0	0.0	6.6	260.4
13:00	8.5	253.8	0.0	0.0	6.7	262.4
14:00	8.8	251.4	0.0	0.0	6.9	260.8
15:00	9.1	250.5	0.0	0.0	7.0	261.7
16:00	9.2	253.6	0.0	0.0	7.0	264.1
17:00	9.2	255.0	0.0	0.0	7.1	265.2
18:00	9.2	257.1	0.0	0.0	7.0	267.1
19:00	9.2	258.8	0.0	0.0	7.0	268.1
20:00	9.0	258.9	0.0	0.0	6.9	268.9
21:00	8.9	263.1	0.0	0.0	7.0	271.0
22:00	8.9	265.3	0.0	0.0	7.0	269.5
23:00	8.9	264.8	0.0	0.0	7.1	270.7

SITE ID: AG  
 SITE LOCATION: AUGSPURGER MT., WA.  
 DATA : DECEMBER 1976 THROUGH JANUARY 1978

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL A %	LEVEL B COUNT	LEVEL B %	LEVEL C COUNT	LEVEL C %
------------	---------------	-----------	---------------	-----------	---------------	-----------

0.0- 0.5	18	0.3	0	0.0	29	0.5
0.5- 1.0	60	0.8	0	0.0	78	1.4
1.0- 1.5	69	1.0	0	0.0	81	1.5
1.5- 2.0	113	1.6	0	0.0	120	2.2
2.0- 2.5	130	1.8	0	0.0	180	3.3
2.5- 3.0	174	2.4	0	0.0	167	3.0
3.0- 3.5	139	1.9	0	0.0	176	3.2
3.5- 4.0	171	2.4	0	0.0	209	3.8
4.0- 4.5	369	5.2	0	0.0	413	7.5
4.5- 5.0	170	2.4	0	0.0	209	3.8
5.0- 5.5	272	3.8	0	0.0	287	5.2
5.5- 6.0	214	3.0	0	0.0	250	4.5
6.0- 6.5	353	4.9	0	0.0	424	7.7
6.5- 7.0	248	3.5	0	0.0	284	5.2
7.0- 7.5	369	5.2	0	0.0	359	6.5
7.5- 8.0	278	3.9	0	0.0	238	4.3
8.0- 8.5	542	7.6	0	0.0	495	9.0
8.5- 9.0	368	5.1	0	0.0	292	5.3
9.0- 9.5	209	2.9	0	0.0	135	2.4
9.5-10.0	304	4.2	0	0.0	192	3.5
10.0-11.0	633	8.8	0	0.0	318	5.8
11.0-12.0	485	6.8	0	0.0	178	3.2
12.0-13.0	456	6.4	0	0.0	180	3.3
13.0-14.0	315	4.4	0	0.0	89	1.6
14.0-15.0	206	2.9	0	0.0	43	0.8
15.0-16.0	154	2.1	0	0.0	29	0.5
16.0-17.0	127	1.8	0	0.0	24	0.4
17.0-18.0	96	1.3	0	0.0	11	0.2
18.0-19.0	44	0.6	0	0.0	3	0.1
19.0-20.0	32	0.4	0	0.0	9	0.2
20.0-21.0	15	0.2	0	0.0	5	0.1
>21.0	30	0.4	0	0.0	6	0.1

RECOVERY RATES  
 LEVEL A LEVEL B LEVEL C  
 69.9 0.0 53.8

SITE ID: AG  
 SITE LOCATION: AUGSPURGER MT. , WA.  
 DATA : DECEMBER 1976 THROUGH JANUARY 1978

-----  
1.6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED  
-----

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)
0.5	18	0.25	0	0.00	29	0.53
1.0	78	1.09	0	0.00	107	1.94
1.5	147	2.05	0	0.00	188	3.41
2.0	260	3.63	0	0.00	308	5.59
2.5	390	5.44	0	0.00	488	8.85
3.0	564	7.87	0	0.00	655	11.88
3.5	703	9.81	0	0.00	831	15.07
4.0	874	12.20	0	0.00	1040	18.86
4.5	1243	17.35	0	0.00	1453	26.36
5.0	1413	19.73	0	0.00	1662	30.15
5.5	1685	23.52	0	0.00	1949	35.35
6.0	1899	26.51	0	0.00	2199	39.89
6.5	2252	31.44	0	0.00	2623	47.58
7.0	2500	34.90	0	0.00	2907	52.73
7.5	2869	40.05	0	0.00	3266	59.24
8.0	3147	43.93	0	0.00	3504	63.56
8.5	3689	51.50	0	0.00	3999	72.54
9.0	4057	56.64	0	0.00	4291	77.83
9.5	4266	59.56	0	0.00	4426	80.28
10.0	4570	63.80	0	0.00	4618	83.77
11.0	5203	72.64	0	0.00	4936	89.53
12.0	5688	79.41	0	0.00	5114	92.76
13.0	6144	85.77	0	0.00	5294	96.03
14.0	6459	90.17	0	0.00	5383	97.64
15.0	6665	93.05	0	0.00	5426	98.42
16.0	6819	95.20	0	0.00	5455	98.95
17.0	6946	96.97	0	0.00	5479	99.38
18.0	7042	98.31	0	0.00	5490	99.58
19.0	7086	98.93	0	0.00	5493	99.64
20.0	7118	99.37	0	0.00	5502	99.80
21.0	7133	99.58	0	0.00	5507	99.89
>21.0	7163	100.00	0	0.00	5513	100.00

SITE ID: AG  
SITE LOCATION: AUGSPURGER MT., WA.  
DATA : DECEMBER 1976 THROUGH JANUARY 1978

1.7 WIND SPEED PERSISTENCE FREQUENCY (LEVEL A)

HOURS	NUMBER OF OCCURENCES								
	WIND SPEED CLASS, METERS/SEC								
	< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20	
1	68	158	194	210	262	243	128	10	
2	44	40	64	54	75	71	40	2	
3	23	8	34	22	27	49	21	0	
4	15	6	9	6	9	35	17	1	
5	11	1	3	2	5	26	11	0	
6	6	2	1	4	1	26	7	1	
7	0	0	0	2	1	26	5	0	
8	4	0	0	0	0	15	11	0	
9	1	0	2	0	0	18	2	0	
10	1	0	1	0	0	6	3	0	
11	0	0	0	0	1	7	0	0	
12	1	0	0	0	0	5	1	0	
13	0	0	0	0	0	2	1	0	
14	0	0	0	0	0	2	1	0	
15	0	0	0	0	0	3	1	0	
16	0	0	0	0	0	2	1	0	
17	0	0	0	0	0	1	0	0	
18	0	0	0	0	0	0	1	0	
19	0	0	0	0	0	1	0	0	
20	0	0	0	0	0	1	0	0	
21	0	0	0	0	0	0	0	0	
22	0	0	0	0	0	0	1	0	
23	0	0	0	0	0	0	0	0	
>23	0	0	0	0	0	0	0	0	

SITE ID: AG  
 SITE LOCATION: AUGSPURGER MT., WA.  
 DATA : DECEMBER 1976 THROUGH JANUARY 1978

-----  
 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR

(ELEV A)	ALPHA (A, B)	ALPHA (B, C)	ALPHA (A, C)	ALPHA (A, B, C)	%A	%B	%C
N	0.00	0.00	0.38	0.00	0.14	0.00	0.18
NNE	0.00	0.00	0.07	0.00	2.46	0.00	3.16
NE	0.00	0.00	0.08	0.00	12.16	0.00	15.13
ENE	0.00	0.00	0.13	0.00	6.53	0.00	8.60
E	0.00	0.00	0.34	0.00	1.10	0.00	0.54
ESE	0.00	0.00	0.44	0.00	0.47	0.00	0.25
SE	0.00	0.00	0.20	0.00	0.25	0.00	0.18
SSE	0.00	0.00	0.59	0.00	0.10	0.00	0.09
S	0.00	0.00	0.56	0.00	0.20	0.00	0.04
SSW	0.00	0.00	0.16	0.00	0.25	0.00	0.15
SW	0.00	0.00	-0.03	0.00	2.83	0.00	2.45
WSW	0.00	0.00	0.15	0.00	37.85	0.00	44.15
W	0.00	0.00	0.28	0.00	15.19	0.00	12.55
WNF	0.00	0.00	0.44	0.00	0.98	0.00	0.93
NW	0.00	0.00	0.61	0.00	0.10	0.00	0.22
NNW	0.00	0.00	0.19	0.00	0.08	0.00	0.05

NOTES:

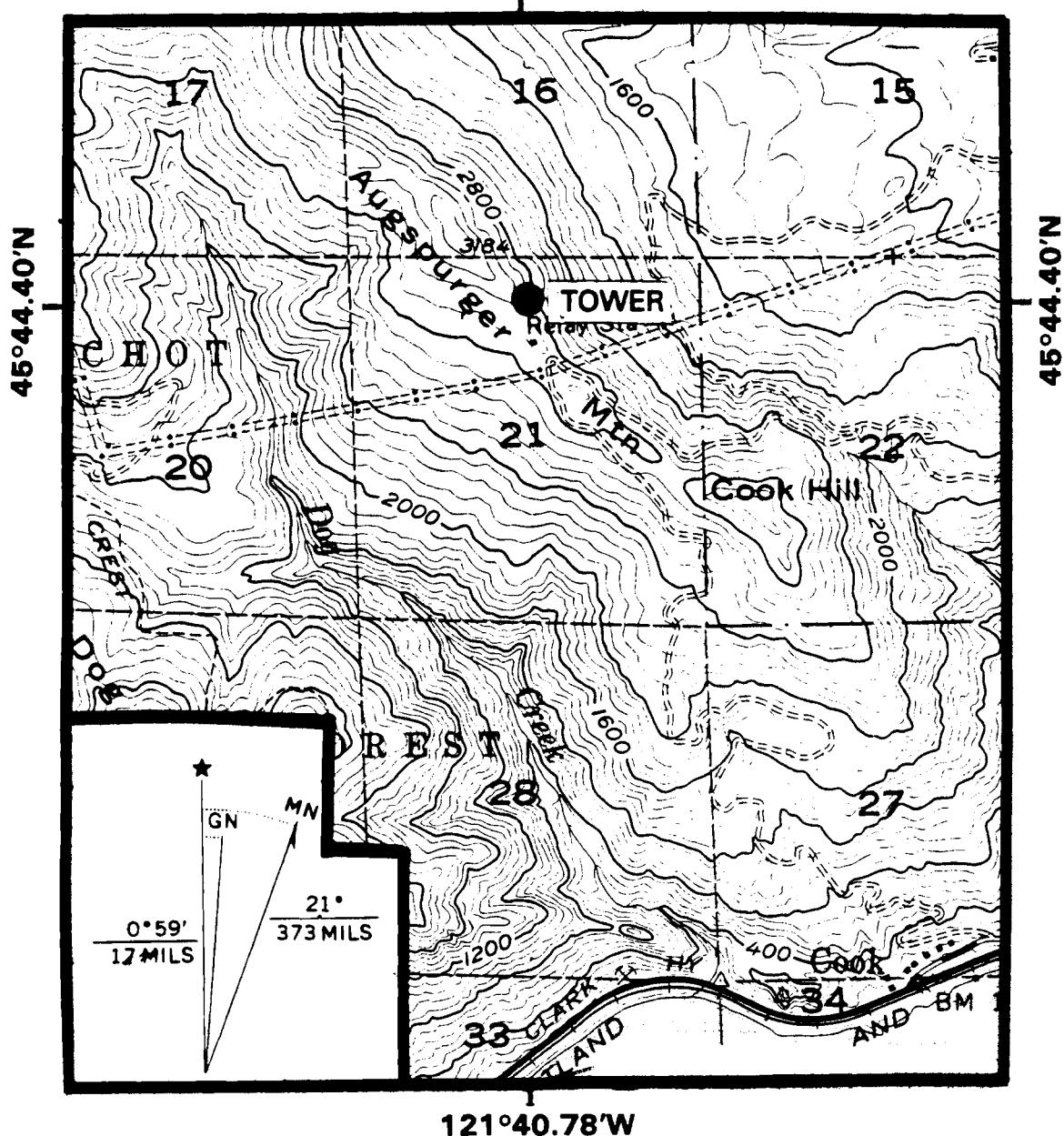
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

$$2. \text{ ALPHA} = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))}$$

WHERE; Z=ELEVATION  
WS=WIND SPEED

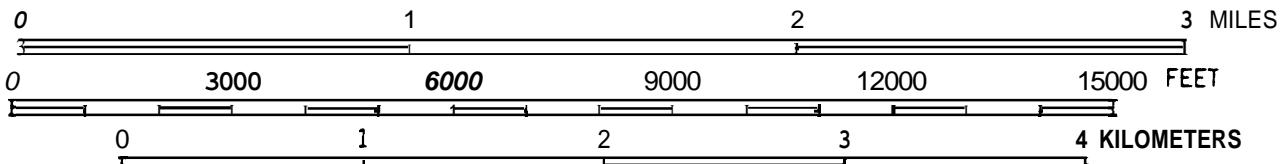
# AUGSPURGER MT., WA.

121°40.78W



121°40.78'W

SCALE 1:62500



CONTOUR INTERVAL 80 FEET

DOTTED LINES REPRESENT 40-FOOT CONTOURS

DATUM IS MEAN SEA LEVEL

AG-07

AMARILLO, TEXAS

SITE ID: TX  
SITE LOCATION: AMARILLO, TX.  
DATA : MARCH 1977 THROUGH SEPTEMBER 1961

1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 40200

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	89.1
WD(A)	100.0	89.7
WS(C)	100.0	87.7
WD(C)	100.0	85.7

1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	(A) 45.7 (C) 9.1	HEIGHT	MEAN	MEAN	POWER
		(METERS)	WS	WD	WATTS/M**2
		8.7	191.0	464.74	
		6.3	188.8	228.67	

1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	23.7	242.0	04/01/77	16:00	(B)-999.9 (C) 18.8
(C) 9.1	23.6	12.8	10/23/80	11:00	(A) 21.0 (B)-999.9

NOTES:

1. SITE ELEVATION: 1091 METERS ABOVE SEA LEVEL.
3. SENSOR LEVEL B NOT AVAILABLE AT SITE TX.

SITE ID: TX  
SITE LOCATION: AKARILLO, TX.  
DATA : MARCH 1977 THROUGH SEPTEMBER 1981

1.4 WIND SPEED AND DIRECTION VERSUS TIME-OF-DAY

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	9.0	171.2	0.0	0.0	6.4	170.2
01:00	8.8	180.7	0.0	0.0	6.3	179.0
02:00	8.7	188.7	0.0	0.0	6.2	186.4
03:00	8.5	197.6	0.0	0.0	6.1	194.8
04:00	8.2	206.5	0.0	0.0	5.9	202.7
05:00	8.1	214.9	0.0	0.0	5.8	209.1
06:00	7.9	222.3	0.0	0.0	5.6	216.3
07:00	7.6	228.4	0.0	0.0	5.7	224.2
08:00	7.6	233.5	0.0	0.0	6.0	231.0
09:00	7.6	236.5	0.0	0.0	6.4	237.6
10:00	7.6	237.5	0.0	0.0	6.5	239.2
11:00	7.6	231.9	0.0	0.0	6.6	232.6
12:00	7.6	222.4	0.0	0.0	6.6	222.9
13:00	7.6	210.1	0.0	0.0	6.6	210.9
14:00	7.7	201.8	0.0	0.0	6.7	201.9
15:00	7.8	195.6	0.0	0.0	6.7	195.4
16:00	7.9	182.6	0.0	0.0	6.7	182.4
17:00	7.9	171.7	0.0	0.0	6.6	172.7
18:00	8.0	159.8	0.0	0.0	6.4	160.7
19:00	8.2	153.6	0.0	0.0	6.1	154.8
20:00	8.4	151.0	0.0	0.0	6.1	152.2
21:00	8.7	154.1	0.0	0.0	6.2	154.9
22:00	8.9	159.1	0.0	0.0	6.3	159.1
23:00	9.0	163.9	0.0	0.0	6.3	163.7

SITE ID: TX  
SITE LOCATION: AMARILLO, TX.  
DATA : MARCH 1977 THROUGH SEPTEMBER 1981

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL A %	LEVEL B COUNT	LEVEL B %	LEVEL C COUNT	LEVEL C %
------------	------------------	--------------	------------------	--------------	------------------	--------------

0.0- 0.5	23	0.1	0	0.0	31	0.1
0.5- 1.0	100	0.3	0	0.0	178	0.5
1.0- 1.5	256	0.7	0	0.0	452	1.3
1.5- 2.0	462	1.3	0	0.0	936	2.7
2.0- 2.5	732	2.0	0	0.0	1409	4.0
2.5- 3.0	888	2.5	0	0.0	1618	4.6
3.0- 3.5	979	2.7	0	0.0	1698	4.8
3.5- 4.0	1187	3.3	0	0.0	1969	5.6
4.0- 4.5	1555	4.3	0	0.0	2550	7.2
4.5- 5.0	1372	3.8	0	0.0	2098	6.0
5.0- 5.5	1597	4.5	0	0.0	2285	6.5
5.5- 6.0	1498	4.2	0	0.0	2055	5.8
6.0- 6.5	1929	5.4	0	0.0	2615	7.4
6.5- 7.0	1688	4.7	0	0.0	2005	5.7
7.0- 7.5	1849	5.2	0	0.0	2164	6.1
7.5- 8.0	1618	4.5	0	0.0	1656	4.7
8.0- 8.5	2127	5.9	0	0.0	2092	5.9
8.5- 9.0	1891	5.3	0	0.0	1525	4.3
9.0- 9.5	1634	4.6	0	0.0	1091	3.1
9.5-10.0	1751	4.9	0	0.0	1137	3.2
10.0-11.0	3170	8.8	0	0.0	1625	4.6
11.0-12.0	2529	7.1	0	0.0	873	2.5
12.0-13.0	1984	5.5	0	0.0	549	1.6
13.0-14.0	1123	3.1	0	0.0	305	0.9
14.0-15.0	785	2.2	0	0.0	149	0.4
15.0-16.0	446	1.2	0	0.0	89	0.3
16.0-17.0	334	0.9	0	0.0	46	0.1
17.0-18.0	145	0.4	0	0.0	26	0.1
18.0-19.0	82	0.2	0	0.0	17	0.0
19.0-20.0	48	0.1	0	0.0	7	0.0
20.0-21.0	28	0.1	0	0.0	4	0.0
>21.0	22	0.1	0	0.0	6	0.0

RECOVERY RATES

LEVEL A	LEVEL B	LEVEL C
89.1	0.0	87.7

SITE ID: TX  
 SITE LOCATION: AMARILLO, TX.  
 DATA : NARCH 1977 THROUGH SEPTEMBER 1981

-----  
 1.6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED  
 -----

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)
0.5	23	0.06	0	0.00	31	0.09
1.0	123	0.34	0	0.00	209	0.59
1.5	379	1.06	0	0.00	661	1.87
2.0	841	2.35	0	0.00	1597	4.53
2.5	1573	4.39	0	0.00	3006	8.53
3.0	2461	6.87	0	0.00	4624	13.11
3.5	3440	9.60	0	0.00	6322	17.93
4.0	4627	12.91	0	0.00	8291	23.51
4.5	6182	17.25	0	0.00	10841	30.75
5.0	7554	21.08	0	0.00	12939	36.70
5.5	9151	25.54	0	0.00	15224	43.18
6.0	10649	29.72	0	0.00	17279	49.00
6.5	12578	35.10	0	0.00	19894	56.42
7.0	14266	39.81	0	0.00	21899	62.11
7.5	16115	44.97	0	0.00	24063	68.24
8.0	17733	49.49	0	0.00	25719	72.94
8.5	19860	55.43	0	0.00	27811	78.87
9.0	21751	60.70	0	0.00	29336	83.20
9.5	23385	65.26	0	0.00	30427	86.29
10.0	25136	70.15	0	0.00	31564	89.52
11.0	28306	79.00	0	0.00	33189	94.13
12.0	30835	86.05	0	0.00	34062	96.60
13.0	32819	91.59	0	0.00	34611	98.16
14.0	33942	94.73	0	0.00	34916	99.02
15.0	34727	96.92	0	0.00	35065	99.45
16.0	35173	98.16	0	0.00	35154	99.70
17.0	35507	99.09	0	0.00	35200	99.83
18.0	35652	99.50	0	0.00	35226	99.90
19.0	35734	99.73	0	0.00	35243	99.95
20.0	35782	99.86	0	0.00	35250	99.97
21.0	35810	99.94	0	0.00	35254	99.98
>21.0	35832	100.00	0	0.00	35260	100.00

SITE ID: TX  
SITE LOCATION: AMARILLO, TX.  
DATA : MARCH 1977 THROUGH SEPTEMBER 1981

1.7 WIND SPEED PERSISTENCE FREQUENCY (LEVEL A)

HOURS	NUMBER OF OCCURENCES								
	WIND SPEED CLASS, METERS/SEC								
< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20		
1	4	3	7	1	6	1	3	9	7
2	177	289	361	362	469	453	206	6	
3	112	89	107	137	125	349	128	5	
4	82	38	50	35	48	254	74	2	
5	40	10	23	16	19	178	45	0	
6	30	6	2	5	8	109	36	0	
7	16	2	5	1	3	97	26	0	
8	9	0	1	0	1	62	19	0	
9	9	0	0	1	1	60	12	0	
10	10	1	1	0	0	45	11	0	
11	4	0	0	2	0	30	2	0	
12	2	0	0	0	0	32	6	0	
13	0	0	0	0	0	18	6	0	
14	1	0	0	0	0	17	2	0	
15	0	0	0	0	0	7	2	0	
16	0	0	0	0	0	5	1	0	
17	0	0	0	0	0	6	3	0	
18	0	0	0	0	0	2	0	0	
19	0	0	0	0	0	1	0	0	
20	0	0	0	0	0	2	0	0	
21	0	0	0	0	0	2	0	0	
22	0	0	0	0	0	1	0	0	
23	0	0	0	0	0	0	0	0	
>23	0	0	0	0	0	0	0	0	

SITE ID: TX  
 SITE LOCATION: AMARILLO, TX.  
 DATA : KARCH 1977 THROUGH SEPTEMBER 1981

-----  
 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR

(ELEV A)	ALPHA (A,B)	ALPHA (B,C)	ALPHA (A,C)	ALPHA (A,B,C)	%A	%B	%C
N	0.00	0.00	0.13	0.00	4.65	0.00	3.63
NNE	0.00	0.00	0.09	0.00	6.13	0.00	6.27
NE	0.00	0.00	0.11	0.00	3.58	0.00	3.91
ENE	0.00	0.00	0.16	0.00	2.64	0.00	2.72
E	0.00	0.00	0.19	0.00	2.99	0.00	2.80
ESE	0.00	0.00	0.20	0.00	3.22	0.00	3.10
SE	0.00	0.00	0.20	0.00	6.71	0.00	7.12
SSE	0.00	0.00	0.20	0.00	10.70	0.00	10.96
S	0.00	0.00	0.16	0.00	14.00	0.00	13.09
SSW	0.00	0.00	0.14	0.00	13.16	0.00	12.75
SW	0.00	0.00	0.16	0.00	9.23	0.00	9.12
WSW	0.00	0.00	0.18	0.00	5.76	0.00	5.64
W	0.00	0.00	0.17	0.00	3.99	0.00	3.96
WNW	0.00	0.00	0.16	0.00	3.94	0.00	3.45
NW	0.00	0.00	0.16	0.00	3.45	0.00	3.23
NNW	0.00	0.00	0.10	0.00	3.47	0.00	3.03

NOTES:

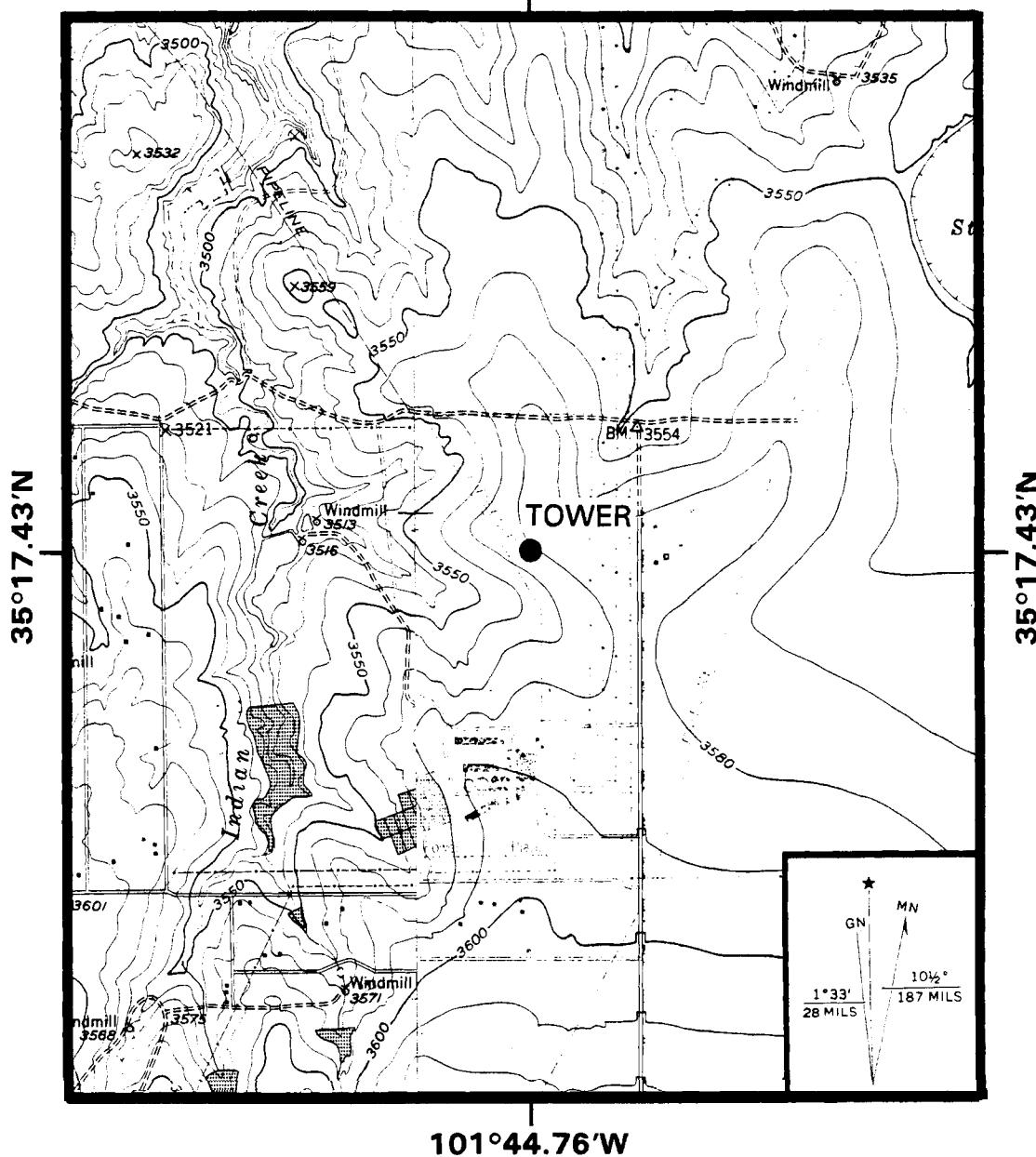
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

$$2. \text{ ALPHA} = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))}$$

WHERE; Z=ELEVATION  
WS=WIND SPEED

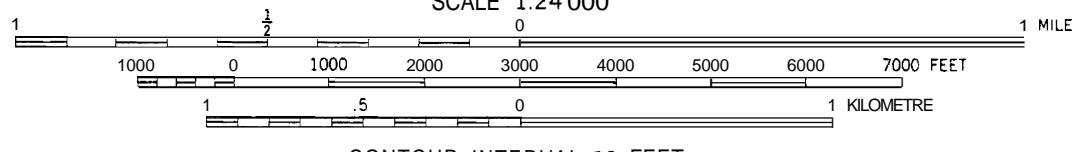
# AMARILLO, TX

101°44.76'W



101°44.76'W

SCALE 1:24 000



CONTOUR INTERVAL 10 FEET

TX-07

BLOCK ISLAND, RHODE ISLAND

SITE ID: R I  
SITE LOCATION: BLOCK ISLAND, R.I.  
DATA : DECEMBER 1976 THROUGH DECEMBER 1981

1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 44568

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	82.2
WD(A)	100.0	75.8
WS(B)	100.0	38.7
WD(B)	100.0	36.6
WS(C)	100.0	83.2
WD(C)	100.0	79.3

1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	(METERS)	HEIGHT	MEAN	NEAN	POWER
		WS	WD	WATTS/M**2	
(A)	45.7	7.4	279.8	410.37	
(B)	30.0	6.4	278.0	254.62	
(C)	9.1	5.0	271.5	134.30	

1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	29.5	65.0	02/06/78	19:00	(B)-999.9 (C) 20.1
(B) 30.0	19.5	54.1	03/22/80	05:00	(A) 21.3 (C) 14.9
(C) 9.1	20.1	61.0	02/06/78	19:00	(A) 29.5 (B)-999.9

NOTES:

1. SITE ELEVATION: 14 METERS ABOVE SEA LEVEL.

SITE ID: RI  
SITE LOCATION: BLOCK ISLAND, RI.  
DATA : DECEMBER 1976 THROUGH DECEMBER 1981

-----  
1 4 WIND SPEED AND DIRECTION VERSUS TIME-OF-DAY  
-----

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	7.6	290.6	6.4	284.2	4.7	278.9
01:00	7.5	296.4	6.3	288.4	4.7	282.7
02:00	7.4	299.7	6.3	291.1	4.7	284.1
03:00	7.3	301.3	6.2	294.8	4.6	286.7
04:00	7.4	303.8	6.2	297.0	4.6	289.3
05:00	7.3	306.8	6.2	299.5	4.6	291.8
06:00	7.2	308.1	6.1	300.0	4.7	294.9
07:00	7.1	308.6	6.1	303.1	4.9	300.5
08:00	7.1	311.1	6.2	307.0	5.1	307.2
09:00	7.0	309.1	6.2	306.7	5.2	306.4
10:00	7.0	298.5	6.3	302.4	5.3	296.7
11:00	7.1	280.2	6.3	287.7	5.3	279.1
12:00	7.2	263.4	6.4	270.7	5.4	263.3
13:00	7.3	252.6	6.5	256.2	5.4	253.2
14:00	7.4	247.8	6.6	248.0	5.4	247.8
15:00	7.5	246.1	6.6	245.2	5.3	245.2
16:00	7.6	245.5	6.6	245.4	5.2	244.2
17:00	7.7	248.4	6.6	248.4	5.1	245.1
18:00	7.8	252.6	6.5	252.7	5.0	246.9
19:00	7.8	256.5	6.5	255.7	4.9	249.8
20:00	7.8	263.8	6.5	262.3	4.9	254.9
21:00	7.7	271.4	6.4	268.5	4.8	261.7
22:00	7.6	279.1	6.4	274.1	4.7	265.9
23:00	7.6	284.6	6.4	278.6	4.7	272.4

SITE ID: R I  
SITE LOCATION: BLOCK ISLAND, RI.  
DATA : DECEMBER 1976 THROUGH DECEMBER 1981

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	%	LEVEL B COUNT	%	LEVEL C COUNT	%
------------	------------------	---	------------------	---	------------------	---

0.0- 0.5	69	0.2	39	0.2	271	0.7
0.5- 1.0	159	0.4	48	0.3	622	1.7
1.0- 1.5	312	0.9	139	0.8	975	2.6
1.5- 2.0	525	1.4	270	1.6	1561	4.2
2.0- 2.5	830	2.3	483	2.8	2155	5.8
2.5- 3.0	978	2.7	702	4.1	2375	6.4
3.0- 3.5	1155	3.2	861	5.0	2520	6.8
3.5- 4.0	1408	3.8	988	5.7	3204	8.6
4.0- 4.5	1976	5.4	1024	5.9	3821	10.3
4.5- 5.0	1652	4.5	1213	7.0	2880	7.8
5.0- 5.5	1859	5.1	1293	7.5	2955	8.0
5.5- 6.0	1880	5.1	1336	7.7	2401	6.5
6.0- 6.5	2434	6.6	1299	7.5	2719	7.3
6.5- 7.0	2209	6.0	1188	6.9	1815	4.9
7.0- 7.5	2286	6.2	1123	6.5	1572	4.2
7.5- 8.0	2068	5.6	971	5.6	1157	3.1
8.0- 8.5	2642	7.2	818	4.7	1118	3.0
8.5- 9.0	1907	5.2	716	4.2	672	1.8
9.0- 9.5	1558	4.3	577	3.3	518	1.4
9.5-10.0	1479	4.0	459	2.7	457	1.2
10.0-11.0	2476	6.8	644	3.7	636	1.7
11.0-12.0	1589	4.3	413	2.4	327	0.9
12.0-13.0	1130	3.1	267	1.5	190	0.5
13.0-14.0	704	1.9	162	0.9	92	0.2
14.0-15.0	472	1.3	103	0.6	23	0.1
15.0-16.0	283	0.8	70	0.4	11	0.0
16.0-17.0	222	0.6	29	0.2	7	0.0
17.0-18.0	165	0.5	8	0.0	1	0.0
18.0-19.0	106	0.3	4	0.0	6	0.0
19.0-20.0	43	0.1	2	0.0	3	0.0
20.0-21.0	16	0.0	0	0.0	1	0.0
>21.0	28	0.1	0	0.0	0	0.0

RECOVERY RATES  
LEVEL A LEVEL B LEVEL C  
82.2 38.7 83.2

SITE ID: RI  
 SITE LOCATION: BLOCK ISLAND, RI.  
 DATA : DECEMBER 1976 THROUGH DECEMBER 1981

-----  
1.6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED  
-----

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)
0.5	69	0.19	39	0.23	271	0.73
1.0	228	0.62	87	0.50	893	2.41
1.5	540	1.47	226	1.31	1868	5.04
2.0	1065	2.91	496	2.88	3429	9.25
2.5	1895	5.17	979	5.68	5584	15.07
3.0	2873	7.85	1681	9.75	7959	21.47
3.5	4028	11.00	2542	14.74	10479	28.27
4.0	5436	14.84	3530	20.46	13683	36.92
4.5	7412	20.24	4554	26.40	17504	47.23
5.0	9064	24.75	5767	33.43	20384	55.00
5.5	10923	29.83	7060	40.93	23339	62.97
6.0	12803	34.96	8396	48.68	25740	69.45
6.5	15237	41.61	9695	56.21	28459	76.78
7.0	17446	47.64	10883	63.09	30274	81.68
7.5	19732	53.88	12006	69.60	31846	85.92
8.0	21800	59.53	12977	75.23	33003	89.04
8.5	24442	66.74	13795	79.98	34121	92.06
9.0	26349	71.95	14511	84.13	34793	93.87
9.5	27907	76.21	15088	87.47	35311	95.27
10.0	29386	80.25	15547	90.13	35768	96.50
11.0	31862	87.01	16191	93.87	36404	98.22
12.0	33451	91.35	16604	96.26	36731	99.10
13.0	34581	94.43	16871	97.81	36921	99.61
14.0	35285	96.35	17033	98.75	37013	99.86
15.0	35757	97.64	17136	99.34	37036	99.92
16.0	36040	98.42	17206	99.75	37047	99.95
17.0	36262	99.02	17235	99.92	37054	99.97
18.0	36427	99.47	17243	99.97	37055	99.97
19.0	36533	99.76	17247	99.99	37061	99.99
20.0	36576	99.88	17249	100.00	37064	100.00
21.0	36592	99.92	17249	100.00	37065	100.00
>21.0	36620	100.00	17249	100.00	37065	100.00

SITE ID: RI  
SITE LOCATION: BLOCK ISLAND, RI.  
DATA : DECEMBER 1976 THROUGH DECEMBER 1981

1.7 IND SPEED PERSISTENCE FREQUENCY (LEVEL A)

a

HOURS	NUMBER OF OCCURENCES								
	WIND SPEED CLASS, METERS/SEC								
	< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20	
1	375	951	1306	1477	1723	1212	337	8	
2	149	319	447	480	530	308	87	3	
3	88	122	146	155	232	206	44	1	
4 <sup>W</sup>	66	66	84	76	87	148	37	0	
5	43	24	36	36	45	147	23	0	
6	35	6	19	14	25	94	21	0	
7	22	6	6	7	11	88	10	0	
8	21	1	5	3	1	39	5	0	
9	11	2	2	1	2	46	12	0	
10	6	0	2	1	2	39	7	1	
11	5	0	0	0	0	26	7	0	
12	1	0	0	0	0	24	7	0	
13	3	0	0	0	0	21	3	1	
14	2	0	0	0	0	15	1	0	
15	0	0	0	0	0	18	0	0	
16	2	0	0	0	0	7	3	0	
17	0	0	0	0	0	7	0	0	
18	0	0	0	0	0	6	1	0	
19	0	0	0	0	0	7	3	0	
20	0	0	0	0	0	2	0	0	
21	0	0	0	0	0	1	1	0	
22	0	0	0	0	0	2	0	0	
23	0	0	0	0	0	0	0	0	
>23	0	0	0	0	0	0	0	0	

SITE ID: RI  
 SITE LOCATION: BLOCK ISLAND, RI.  
 DATA : DECEMBER 1976 THROUGH DECEMBER 1981

-----  
 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR

(ELEV A)	ALPHA (A, B)	ALPHA (B, C)	ALPHA (A, C)	ALPHA (A, B, C)	%A	%B	%C
N	0.63	0.01	0.17	0.13	3.75	3.95	3.36
NNE	0.20	0.23	0.22	0.23	4.41	5.26	3.98
NE	0.16	0.26	0.23	0.24	4.70	5.14	4.56
ENE	0.51	0.18	0.26	0.24	3.91	3.25	3.89
E	0.71	0.10	0.26	0.23	3.77	2.43	3.18
ESE	0.35	0.12	0.18	0.17	2.97	2.52	3.01
SE	0.56	0.14	0.25	0.22	2.66	2.70	2.78
SSE	0.37	0.19	0.24	0.23	2.73	3.30	2.87
S	0.43	0.26	0.30	0.29	3.99	5.11	4.29
SSW	0.40	0.25	0.29	0.28	6.19	7.33	7.64
SW	0.39	0.29	0.31	0.31	9.34	9.83	9.92
WSW	0.40	0.28	0.31	0.30	8.13	8.66	9.86
W	0.42	0.25	0.29	0.28	7.64	7.19	8.41
WNW	0.30	0.23	0.25	0.24	7.94	8.78	9.25
NW	0.16	0.20	0.19	0.19	10.40	12.56	11.16
NNW	0.47	0.07	0.17	0.15	6.98	6.61	6.39

NOTES :

$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

$$2. \text{ ALPHA} = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))}$$

WHERE; Z=ELEVATION  
WS=WIND SPEED

# BLOCK ISLAND, R.I.

71°34.33'W



RI-07

BOARDMAN, OREGON

SITE ID: OR  
SITE LOCATION: BOARDMAN, OR  
DATA : OCTOBER 1978 THROUGH SEPTEMBER 1981

1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 26304

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	90.3
WD(A)	100.0	92.4
WS(B)	100.0	94.5
WD(B)	100.0	93.8
WS(C)	100.0	82.9
WD(C)	100.0	95.5

1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	(A) 70.1	HEIGHT	MEAN	MEAN	POWER
		(METERS)	WS	WD	WATTS/M**2
	(B) 39.6		5.5	252.9	279.14
	(C) 9.1		5.0	241.3	206.58
			3.8	238.3	102.55

1.3 MAXIMUM WIND SPEED

ELEVATION	WIND	WIND	DATE	TIME	OTHER	LEVELS
(METERS)	SPEED	DIR.				
(A) 70.1	42.9	103.0	12/27/78	17:00	(B) 32.2	
					(C) -999.9	
(B) 39.6	39.8	271.0	07/01/79	13:00	(A) -999.9	
					(C) 34.9	
(C) 9.1	36.7	260.0	12/24/78	10:00	(A) 36.7	
					(B) 37.5	

NOTES:

1. SITE ELEVATION: 212 METERS ABOVE SEA LEVEL.

SITE ID: OR  
SITE LOCATION: BOARDMAN, OR  
DATA : OCTOBER 1978 THROUGH SEPTEMBER 1981

1.4 WIND SPEED AND DIRECTION VERSUS TIME-OF-DAY

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	5.7	234.9	5.1	221.8	3.6	218.2
01:00	5.7	235.5	5.0	223.0	3.6	218.6
02:00	5.6	235.7	5.0	222.2	3.5	217.6
03:00	5.6	233.4	4.9	220.4	3.4	217.5
04:00	5.5	235.4	4.8	222.3	3.4	219.2
05:00	5.3	237.9	4.7	224.7	3.4	222.0
06:00	5.1	243.1	4.6	235.2	3.5	231.4
07:00	4.9	254.3	4.6	249.8	3.6	245.6
08:00	4.7	265.9	4.5	261.8	3.7	260.9
09:00	4.7	276.7	4.5	270.4	3.8	270.2
10:00	4.8	284.5	4.6	278.3	3.9	277.5
11:00	4.9	293.8	4.6	289.0	3.9	284.1
12:00	5.0	295.2	4.7	291.8	4.0	284.1
13:00	5.1	300.0	4.8	298.1	4.1	284.3
14:00	5.2	300.6	4.9	304.6	4.1	286.2
15:00	5.5	299.3	5.0	299.5	4.1	283.9
16:00	5.7	283.1	5.2	280.2	4.0	269.5
17:00	6.0	267.3	5.3	262.8	3.9	248.2
18:00	6.1	246.7	5.4	238.2	3.8	234.6
19:00	6.2	237.5	5.5	228.3	3.9	227.8
20:00	6.2	238.9	5.5	226.8	3.9	227.8
21:00	6.1	238.4	5.5	228.1	3.9	227.6
22:00	5.9	239.8	5.3	229.1	3.8	224.6
23:00	5.8	238.5	5.1	224.7	3.7	221.0

SITE ID: OR  
 SITE LOCATION: BOARDMAN, OR  
 DATA : OCTOBER 1978 THROUGH SEPTEMBER 1981

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	%	LEVEL B COUNT	%	LEVEL C COUNT	%
------------	---------------	---	---------------	---	---------------	---

0.0- 0.5	922	3.9	1020	4.1	993	4.6
0.5- 1.0	1335	5.6	1491	6.0	1699	7.8
1.0- 1.5	1596	6.7	1756	7.1	1939	8.9
1.5- 2.0	1636	6.9	1835	7.4	2068	9.5
2.0- 2.5	1565	6.6	1641	6.6	1912	8.8
2.5- 3.0	1294	5.4	1404	5.6	1642	7.5
3.0- 3.5	1114	4.7	1244	5.0	1669	7.7
3.5- 4.0	1005	4.2	1080	4.3	1638	7.5
4.0- 4.5	1680	7.1	2040	8.2	2099	9.6
4.5- 5.0	773	3.3	970	3.9	760	3.5
5.0- 5.5	771	3.2	927	3.7	672	3.1
5.5- 6.0	746	3.1	956	3.8	608	2.8
6.0- 6.5	741	3.1	893	3.6	565	2.6
6.5- 7.0	716	3.0	821	3.3	524	2.4
7.0- 7.5	686	2.9	738	3.0	441	2.0
7.5- 8.0	681	2.9	692	2.8	455	2.1
8.0- 8.5	1257	5.3	1346	5.4	728	3.3
8.5- 9.0	569	2.4	600	2.4	313	1.4
9.0- 9.5	563	2.4	513	2.1	225	1.0
9.5-10.0	526	2.2	494	2.0	205	0.9
10.0-11.0	965	4.1	763	3.1	252	1.2
11.0-12.0	812	3.4	589	2.4	160	0.7
12.0-13.0	853	3.6	552	2.2	103	0.5
13.0-14.0	372	1.6	212	0.9	34	0.2
14.0-15.0	230	1.0	120	0.5	23	0.1
15.0-16.0	145	0.6	68	0.3	22	0.1
16.0-17.0	102	0.4	53	0.2	14	0.1
17.0-18.0	41	0.2	14	0.1	10	0.0
18.0-19.0	21	0.1	4	0.0	7	0.0
19.0-20.0	14	0.1	1	0.0	2	0.0
20.0-21.0	10	0.0	3	0.0	1	0.0
>21.0	14	0.1	16	0.1	12	0.1

RECOVERY RATES

LEVEL A	LEVEL B	LEVEL C
90.3	94.5	82.9

SITE ID: OR  
 SITE LOCATION: BOARDMAN, OR  
 DATA : OCTOBER 1978 THROUGH SEPTEMBER 1981

-----  
 1.6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED  
 -----

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)
0.5	922	3.88	1020	4.10	993	4.56
1.0	2257	9.50	2511	10.10	2692	12.35
1.5	3853	16.22	4267	17.17	4631	21.25
2.0	5489	23.11	6102	24.55	6699	30.74
2.5	7054	29.69	7743	31.15	8611	39.51
3.0	8348	35.14	9147	36.80	10253	47.04
3.5	9462	39.83	10391	41.80	11922	54.70
4.0	10467	44.06	11471	46.15	13560	62.22
4.5	12147	51.13	13511	54.36	15659	71.85
5.0	12920	54.39	14481	58.26	16419	75.33
5.5	13691	57.63	15408	61.99	17091	78.42
6.0	14437	60.77	16364	65.84	17699	81.21
6.5	15178	63.89	17257	69.43	18264	83.80
7.0	15894	66.91	18078	72.73	18788	86.20
7.5	16580	69.80	18816	75.70	19229	88.23
8.0	17261	72.66	19508	78.48	19684	90.31
8.5	18518	77.95	20854	83.90	20412	93.65
9.0	19087	80.35	21454	86.31	20725	95.09
9.5	19650	82.72	21967	88.38	20950	96.12
10.0	20176	84.93	22461	90.36	21155	97.06
11.0	21141	89.00	23224	93.43	21407	98.22
12.0	21953	92.41	23813	95.80	21567	98.95
13.0	22806	96.01	24365	98.02	21670	99.43
14.0	23178	97.57	24577	98.88	21704	99.58
15.0	23408	98.54	24697	99.36	21727	99.69
16.0	23553	99.15	24765	99.63	21749	99.79
17.0	23655	99.58	24818	99.85	21763	99.85
18.0	23696	99.75	24832	99.90	21773	99.90
19.0	23717	99.84	24836	99.92	21780	99.93
20.0	23731	99.90	24837	99.92	21782	99.94
21.0	23741	99.94	24840	99.94	21783	99.94
>21.0	23755	100.00	24856	100.00	21795	100.00

SITE ID: OR  
SITE LOCATION: BOARDMAN, OR  
DATA : OCTOBER 1978 THROUGH SEPTEMBER 1981

1.7 WIND SPEED PERSISTENCE FREQUENCY (LEVEL A)

HOURS	NUMBER OF OCCURENCES							
	WIND SPEED CLASS, METERS/SEC							
	< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20
1	502	1013	904	828	794	680	223	14
2	175	263	300	169	169	219	103	3
3	113	85	123	49	52	152	52	1
4	85	40	49	23	19	82	39	0
5	61	12	20	5	4	68	38	0
6	53	5	13	1	0	43	13	0
7	40	1	4	2	0	33	7	0
8	47	1	4	0	0	18	11	0
9	27	0	1	0	0	15	1	0
10	32	0	2	0	0	14	7	0
11	20	0	0	0	0	6	1	0
12	19	0	0	0	0	4	0	0
13	7	0	0	0	0	5	5	0
14	13	0	0	0	0	3	1	0
15	13	0	0	0	0	4	1	0
16	3	0	0	0	0	4	2	0
17	2	0	0	0	0	2	0	0
18	3	0	0	0	0	2	1	0
19	1	0	0	0	0	0	0	0
20	1	0	0	0	0	0	0	0
21	1	0	0	0	0	0	1	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: OR  
 SITE LOCATION: BOARDMAN, OR  
 DATA : OCTOBER 1978 THROUGH SEPTEMBER 1981

-----  
 1.8 POWER LAM EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR (ELEV A)	ALPHA (A, B)	ALPHA (B, C)	ALPHA (A, C)	ALPHA (A, B, C)	%A	%B	%C
N	0.08	0.09	0.09	0.09	3.12	2.02	3.26
NNE	0.09	0.12	0.11	0.12	4.87	4.20	4.17
WE	0.28	0.08	0.14	0.13	6.36	5.82	4.52
ENE	0.35	0.04	0.13	0.11	5.42	5.30	4.29
E	0.19	0.13	0.15	0.15	3.95	3.59	2.73
ESE	0.22	0.13	0.15	0.15	2.29	2.86	2.02
SE	0.15	0.16	0.15	0.15	1.52	1.93	1.53
SSE	-0.03	0.14	0.09	0.10	1.08	1.58	1.72
S	-0.04	0.21	0.14	0.16	2.23	3.44	6.51
SSW	0.03	0.21	0.16	0.17	5.10	9.54	16.19
SW	0.22	0.20	0.20	0.20	15.64	15.48	12.48
WSW	0.15	0.16	0.15	0.15	26.83	23.01	19.11
W	0.03	0.13	0.10	0.11	12.45	12.15	11.61
WNW	-0.03	0.07	0.04	0.05	3.91	4.06	4.36
NU	-0.09	0.06	0.01	0.02	2.66	2.31	2.79
NNW	-0.13	0.13	0.06	0.07	2.38	1.44	2.45

.....  
 NOTES:

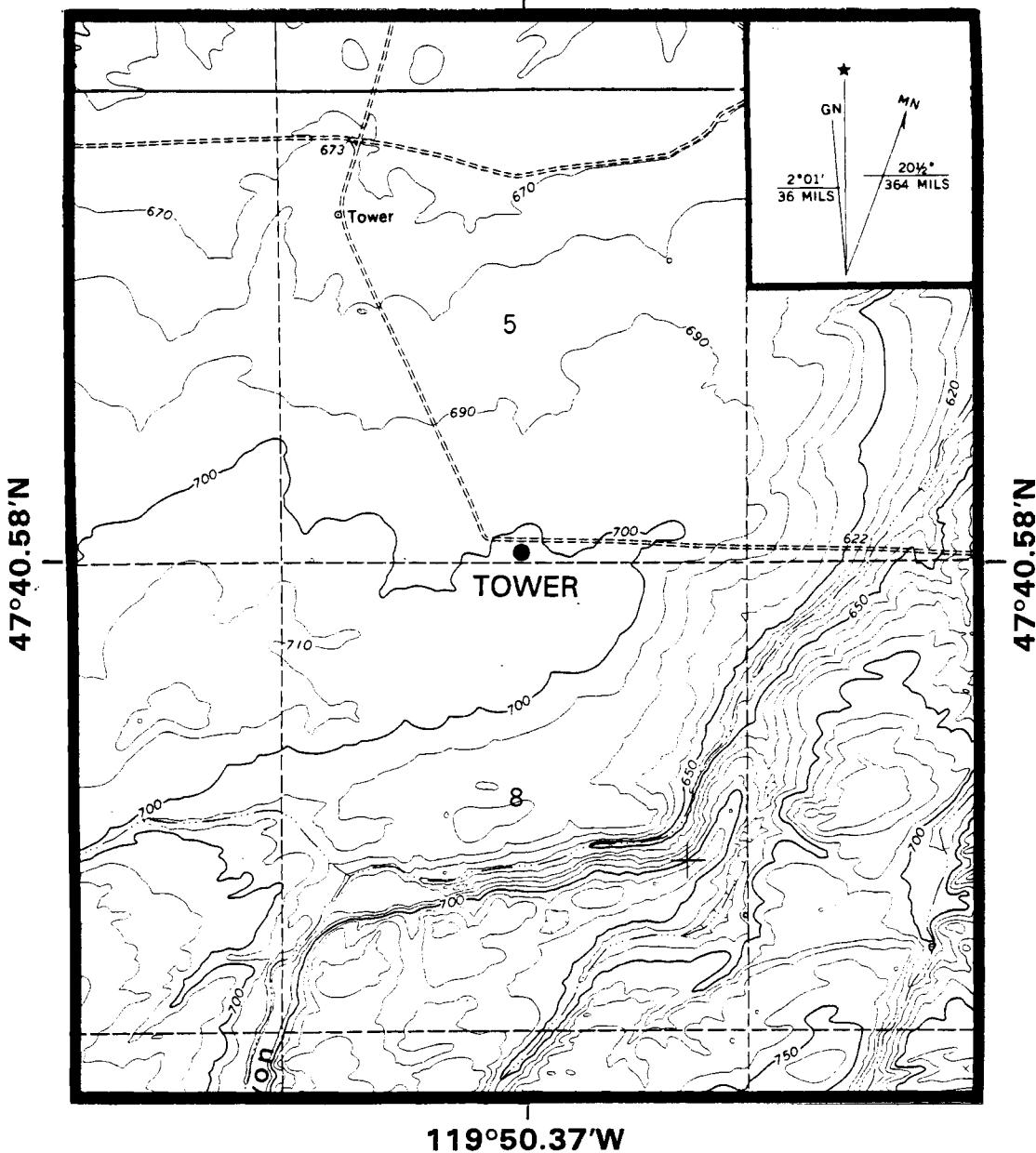
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

$$2. \text{ ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))}$$

WHERE; Z=ELEVATION  
 WS=WIND SPEED

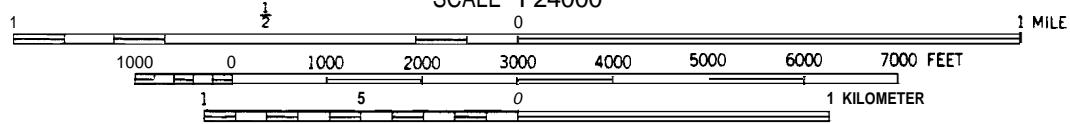
# BOARDMAN, OR

119°50.37'W



119°50.37'W

SCALE 1 24000



OR-07

BOONE, NORTH CAROLINA

SITE ID: NC  
SITE LOCATION: BOONE, NC.  
DATA : DECEMBER 1976 THROUGH WAY 1981

1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 39432

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	78.3
WD(A)	100.0	70.4
WS(B)	100.0	42.4
WD(B)	100.0	42.2
WS(C)	100.0	74.5
WD(C)	100.0	76.5

1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	(A) 76.2	HEIGHT	MEAN	MEAN	POWER
		(METERS)	WS	WD	WATTS/M**2
	(B) 45.7				
	(C) 18.2				

1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 76.2	34.6	322.3	01/25/79	22:00	(B)-999.9 (C) 26.2
(B) 45.7	29.9	337.1	12/25/79	20:00	(A) 31.0 (C) 24.3
(C) 18.2	28.8	337.8	01/25/79	18:00	(A) 29.1 (B)-999.9

NOTES:

1. SITE ELEVATION: 1347 METERS ABOVE SEA LEVEL.

SITE ID: NC  
SITE LOCATION: BOONE, NC.  
DATA : DECEMBER 1976 THROUGH MAY 1981

-----  
1.4 WIND SPEED AND DIRECTION VERSUS TIME-OF-DAY  
-----

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	8.7	276.0	7.8	286.7	6.6	274.5
01:00	8.8	277.3	7.8	286.7	6.6	276.0
02:00	8.8	279.1	7.9	288.6	6.7	277.8
03:00	8.9	281.2	7.9	290.8	6.8	280.2
04:00	8.9	283.6	8.0	294.1	6.8	283.0
05:00	8.8	285.7	8.0	296.5	6.8	284.8
06:00	8.7	288.5	7.9	299.1	6.7	287.1
07:00	8.5	290.8	7.7	302.5	6.4	288.5
08:00	8.0	291.9	7.3	304.7	6.2	286.9
09:00	7.6	289.4	7.0	300.6	5.8	281.9
10:00	7.3	286.8	6.7	298.1	5.6	279.4
11:00	7.2	280.8	6.6	293.0	5.5	274.7
12:00	7.1	278.1	6.5	290.3	5.4	272.0
13:00	7.0	273.5	6.5	284.1	5.3	267.5
14:00	7.0	271.4	6.5	282.0	5.3	266.8
15:00	7.1	272.2	6.6	283.3	5.4	266.4
16:00	7.2	273.6	6.7	285.3	5.4	267.6
17:00	7.3	275.4	6.7	287.4	5.6	269.8
18:00	7.6	274.0	7.0	286.0	5.8	271.5
19:00	7.8	274.0	7.1	286.0	6.0	272.8
20:00	8.2	275.4	7.4	286.3	6.2	273.4
21:00	8.4	275.8	7.5	287.0	6.4	272.3
22:00	8.5	275.4	7.6	287.0	6.4	272.0
23:00	8.6	275.9	7.7	286.0	6.5	272.1

-----

SITE ID: NC  
SITE LOCATION: BOONE, NC.  
DATA : DECEMBER 1976 THROUGH MAY 1981

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	%	LEVEL B COUNT	%	LEVEL C COUNT	%
------------	---------------	---	---------------	---	---------------	---

0.0- 0.5	23	0.1	15	0.1	145	0.5
0.5- 1.0	104	0.3	67	0.4	792	2.7
1.0- 1.5	243	0.8	171	1.0	1160	4.0
1.5- 2.0	461	1.5	296	1.8	1606	5.5
2.0- 2.5	729	2.4	580	3.5	1432	4.9
2.5- 3.0	970	3.1	689	4.1	1426	4.9
3.0- 3.5	976	3.2	717	4.3	1485	5.1
3.5- 4.0	1339	4.3	776	4.6	1782	6.1
4.0- 4.5	1911	6.2	1014	6.1	2199	7.5
4.5- 5.0	1467	4.8	984	5.9	1587	5.4
5.0- 5.5	1674	5.4	985	5.9	1768	6.0
5.5- 6.0	1506	4.9	1041	6.2	1485	5.1
6.0- 6.5	2023	6.6	1001	6.0	1724	5.9
6.5- 7.0	1517	4.9	923	5.5	1165	4.0
7.0- 7.5	1662	5.4	873	5.2	1241	4.2
7.5- 8.0	1270	4.1	749	4.5	942	3.2
8.0- 8.5	1634	5.3	752	4.5	1155	3.9
8.5- 9.0	1248	4.0	621	3.7	886	3.0
9.0- 9.5	1010	3.3	579	3.5	589	2.0
9.5-10.0	1006	3.3	503	3.0	626	2.1
10.0-11.0	1758	5.7	797	4.8	969	3.3
11.0-12.0	1322	4.3	648	3.9	694	2.4
12.0-13.0	1130	3.7	496	3.0	600	2.0
13.0-14.0	837	2.7	348	2.1	455	1.5
14.0-15.0	662	2.1	289	1.7	327	1.1
15.0-16.0	532	1.7	209	1.2	242	0.8
16.0-17.0	458	1.5	149	0.9	259	0.9
17.0-18.0	321	1.0	112	0.7	192	0.7
18.0-19.0	247	0.8	114	0.7	133	0.5
19.0-20.0	217	0.7	68	0.4	104	0.4
20.0-21.0	163	0.5	62	0.4	56	0.2
>21.0	438	1.4	107	0.6	138	0.5

RECOVERY RATES  
LEVEL A LEVEL B LEVEL C  
78.3 42.4 74.5

SITE ID: NC  
 SITE LOCATION: BOONE, NC.  
 DATA : DECEMBER 1976 THROUGH MAY 1981

1.6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)
0.5	23	0.07	15	0.09	145	0.49
1.0	127	0.41	82	0.49	937	3.19
1.5	370	1.20	253	1.51	2097	7.14
2.0	831	2.69	549	3.28	3703	12.61
2.5	1560	5.06	1129	6.75	5135	17.49
3.0	2530	8.20	1818	10.86	6561	22.34
3.5	3506	11.36	2535	15.15	8046	27.40
4.0	4845	15.70	3311	19.78	9828	33.47
4.5	6756	21.89	4325	25.84	12027	40.96
5.0	8223	26.65	5309	31.72	13614	46.36
5.5	9897	32.07	6294	37.61	15382	52.38
6.0	11403	36.95	7335	43.83	16867	57.44
6.5	13426	43.51	8336	49.81	18591	63.31
7.0	14943	48.43	9259	55.33	19756	67.28
7.5	16605	53.81	10132	60.54	20997	71.51
8.0	17875	57.93	10881	65.02	21939	74.71
8.5	19509	63.22	11633	69.51	23094	78.65
9.0	20757	67.27	12254	73.22	23980	81.66
9.5	21767	70.54	12833	76.68	24569	83.67
10.0	22773	73.80	13336	79.69	25195	85.80
11.0	24531	79.50	14133	84.45	26164	89.10
12.0	25853	83.78	14781	88.32	26858	91.47
13.0	26983	87.44	15277	91.29	27458	93.51
14.0	27820	90.15	15625	93.37	27913	95.06
15.0	28482	92.30	15914	95.09	28240	96.17
16.0	29014	94.02	16123	96.34	28482	97.00
17.0	29472	95.51	16272	97.23	28741	97.88
18.0	29793	96.55	16384	97.90	28933	98.53
19.0	30040	97.35	16498	98.58	29066	98.99
20.0	30257	98.05	16566	98.99	29170	99.34
21.0	30420	98.58	16628	99.36	29226	99.53
>21.0	30858	100.00	16735	100.00	29364	100.00

SITE ID: NC  
SITE LOCATION: BOONE, NC.  
DATA : DECEMBER 1976 THROUGH MAY 1981

1.7 WIND SPEED PERSISTENCE FREQUENCY (LEVEL A)

HOURS	NUMBER OF OCCURENCES							
	WIND SPEED CLASS, METERS/SEC							
< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20	
1	388	1000	1292	1508	1620	1183	533	97
2	198	307	440	405	447	430	152	25
3	103	101	153	143	148	267	95	17
4	66	42	66	46	58	200	79	11
5	37	17	27	15	15	140	41	6
6	33	9	13	3	5	83	31	3
7	12	1	4	2	1	64	37	3
8	11	0	2	1	4	52	14	2
9	11	0	2	0	0	36	17	1
10	9	0	1	0	0	32	6	2
11	5	0	1	0	0	24	10	0
12	4	0	0	0	0	16	6	0
13	4	0	0	0	0	8	4	0
14	0	0	0	0	0	7	1	0
15	1	0	0	0	0	4	2	0
16	1	0	0	0	0	2	1	0
17	0	0	0	0	0	1	2	0
18	1	0	0	0	0	1	2	0
19	0	0	0	0	0	1	0	0
20	0	0	0	0	0	2	0	0
21	0	0	0	0	0	0	1	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	1	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: NC  
 SITE LOCATION: BOONE, NC.  
 DATA : DECEMBER 1976 THROUGH MAY 1981

-----  
 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR (ELEV A)	ALPHA (A, B)	ALPHA (B, C)	ALPHA (A, C)	ALPHA (A, B, C)	%A	%B	%C
N	0.06	0.30	0.21	0.22	2.78	3.67	2.64
NNE	0.73	0.20	0.39	0.37	1.02	2.49	1.86
NE	-0.05	0.50	0.31	0.33	0.87	1.27	1.31
ENE	-0.11	0.68	0.40	0.43	1.06	1.51	1.55
E	0.26	0.72	0.56	0.58	1.43	1.45	1.62
ESE	0.16	0.91	0.64	0.67	2.95	2.33	1.37
SE	0.24	0.72	0.55	0.57	4.28	5.14	2.42
SSE	0.25	0.53	0.43	0.44	3.96	4.16	4.30
S	0.20	0.44	0.35	0.36	5.21	4.82	7.47
SSW	0.17	0.35	0.29	0.29	6.68	6.86	8.01
SW	-0.03	0.32	0.19	0.21	5.78	7.25	6.55
WSW	0.28	0.01	0.11	0.10	4.45	4.53	5.33
W	0.50	-0.14	0.09	0.06	7.52	5.32	8.77
WNW	0.27	0.08	0.14	0.14	14.34	11.43	14.86
NW	0.11	0.17	0.15	0.15	16.67	18.66	17.81
NNW	0.17	0.20	0.19	0.19	9.36	12.89	9.26

-----  
 NOTES:

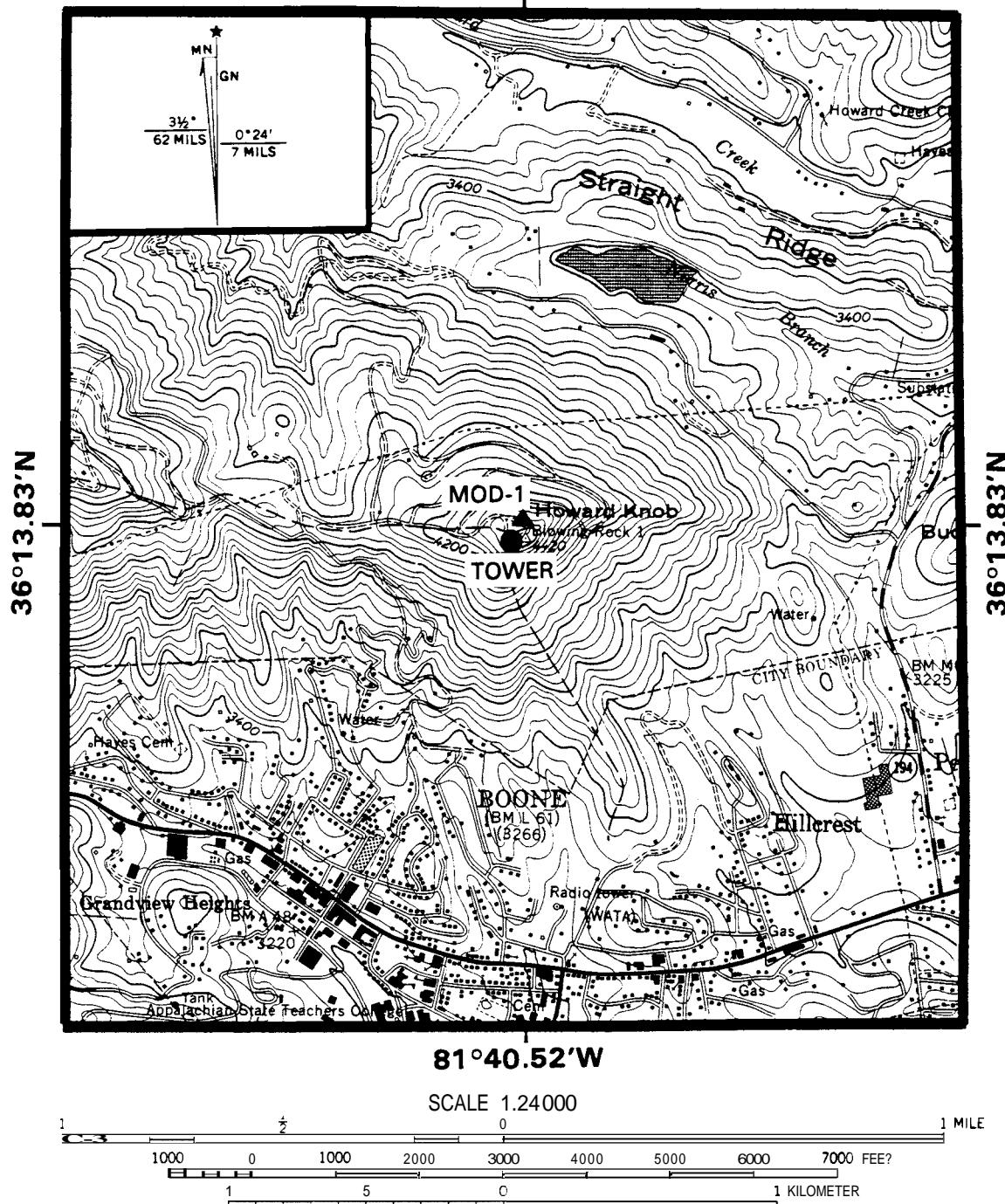
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

$$2. \text{ ALPHA} = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))}$$

WHERE; Z=ELEVATION  
WS=WIND SPEED

# BOONE, N.C.

81°40.52'W



NC-07

CLAYTON, NEW MEXICO

SITE ID: NM  
SITE LOCATION: CLAYTON, NM.  
DATA : MAY 1977 THROUGH DECEMBER 1981

1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 40944

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	81.3
WD(A)	100.0	81.5
WS(B)	100.0	70.0
WD(B)	100.0	72.9
WS(C)	100.0	84.6
WD(C)	100.0	83.9

1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	(A)	45.7	HEIGHT	MEAN	PIEAN	POWER
			(METERS)	WS	WD	WATTS/M**2
	(B)	30.0		6.7	227.2	264.97
	(C)	9.1		5.4	232.2	160.78

1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	27.3	-999.9	10/30/79	18:00	(B) 25.0 (C) 21.1
(B) 30.0	25.0	317.1	10/30/79	18:00	(A) 27.3 (C) 21.1
(C) 9.1	21.3	298.6	03/22/79	11:00	(A) 25.2 (B) 24.4

NOTES:

1. SITE ELEVATION: 1536 METERS ABOVE SEA LEVEL.

SITE ID: NM  
SITE LOCATION: CLAYTON, NM.  
DATA : MAY 1977 THROUGH DECEMBER 1981

1.4 WIND SPEED AND DIRECTION VERSUS TIME-OF-DAY

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	6.9	243.8	6.0	249.9	4.3	257.1
01:00	7.0	250.3	6.1	256.6	4.3	261.7
02:00	7.0	255.7	6.1	262.8	4.3	264.8
03:00	7.0	260.9	6.1	266.4	4.3	268.3
04:00	7.0	265.4	6.1	270.0	4.2	272.1
05:00	6.8	269.2	6.0	273.8	4.2	274.3
06:00	6.7	270.6	5.9	275.3	4.4	273.7
07:00	6.8	270.0	6.2	274.1	5.1	269.9
08:00	7.0	264.4	6.6	269.2	5.8	264.4
09:00	7.2	245.9	7.0	249.6	6.3	249.9
10:00	7.4	222.1	7.2	221.6	6.5	225.6
11:00	7.4	199.4	7.2	197.2	6.5	202.0
12:00	7.5	187.3	7.3	184.6	6.7	188.6
13:00	7.7	180.6	7.5	179.1	6.8	181.8
14:00	7.9	175.5	7.6	174.2	6.9	175.1
15:00	8.0	172.8	7.6	170.4	6.8	171.3
16:00	8.0	168.3	7.5	165.0	6.6	165.4
17:00	7.9	164.6	7.3	160.8	6.1	160.2
18:00	7.8	164.6	7.0	162.8	5.5	160.6
19:00	7.6	171.1	6.7	170.9	5.0	170.7
20:00	7.4	185.2	6.4	189.3	4.7	193.9
21:00	7.2	201.3	6.3	207.2	4.5	218.0
22:00	7.1	219.7	6.2	227.7	4.5	240.2
23:00	7.1	233.4	6.1	240.3	4.4	249.8

SITE ID: NM  
 SITE LOCATION: CLAYTON, NM.  
 DATA : MAY 1977 THROUGH DECEMBER 1981

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	%	LEVEL B COUNT	%	LEVEL C COUNT	%
------------	---------------	---	---------------	---	---------------	---

0.0- 0.5	26	0.1	17	0.1	87	0.3
0.5- 1.0	62	0.2	80	0.3	493	1.4
1.0- 1.5	172	0.5	151	0.5	1281	3.7
1.5- 2.0	424	1.3	449	1.6	1929	5.6
2.0- 2.5	684	2.1	760	2.6	1963	5.7
2.5- 3.0	993	3.0	1187	4.1	2179	6.3
3.0- 3.5	1127	3.4	1368	4.8	2122	6.1
3.5- 4.0	1423	4.3	1694	5.9	2492	7.2
4.0- 4.5	1940	5.8	2017	7.0	3033	8.8
4.5- 5.0	1675	5.0	1793	6.3	2275	6.6
5.0- 5.5	1976	5.9	1879	6.6	2389	6.9
5.5- 6.0	1935	5.8	1840	6.4	1871	5.4
6.0- 6.5	2266	6.8	2050	7.1	2010	5.8
6.5- 7.0	1923	5.8	1666	5.8	1502	4.3
7.0- 7.5	2004	6.0	1634	5.7	1520	4.4
7.5- 8.0	1751	5.3	1455	5.1	1166	3.4
8.0- 8.5	2131	6.4	1568	5.5	1404	4.1
8.5- 9.0	1695	5.1	1163	4.1	1015	2.9
9.0- 9.5	1415	4.2	1092	3.8	751	2.2
9.5-10.0	1399	4.2	861	3.0	696	2.0
10.0-11.0	2171	6.5	1441	5.0	980	2.8
11.0-12.0	4	4.2	901	3.1	629	1.8
12.0-13.0	1077	3.2	639	2.2	360	1.0
13.0-14.0	595	1.8	364	1.3	220	0.6
14.0-15.0	368	1.1	238	0.8	123	0.4
15.0-16.0	243	0.7	144	0.5	64	0.2
16.0-17.0	151	0.5	91	0.3	43	0.1
17.0-18.0	91	0.3	53	0.2	15	0.0
18.0-19.0	61	0.2	26	0.1	15	0.0
19.0-20.0	38	0.1	18	0.1	9	0.0
20.0-21.0	16	0.0	12	0.0	7	0.0
>21.0	49	0.1	29	0.1	2	0.0

RECOVERY RATES  
 LEVEL A LEVEL B LEVEL C  
 81.3 70.0 84.6

SITE ID: NM  
 SITE LOCATION: CLAYTON, NM.  
 DATA : MAY 1977 THROUGH DECEMBER 1981

1.6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)
0.5	26	0.08	17	0.06	87	0.25
1.0	88	0.26	97	0.34	580	1.67
1.5	260	0.78	248	0.86	1861	5.37
2.0	684	2.05	697	2.43	3790	10.94
2.5	1368	4.11	1457	5.08	5753	16.61
3.0	2361	7.09	2644	9.22	7932	22.90
3.5	3488	10.48	4012	13.99	10054	29.02
4.0	4911	14.75	5706	19.90	12546	36.21
4.5	6851	20.58	7723	26.93	15579	44.97
5.0	8526	25.61	9516	33.18	17854	51.53
5.5	10502	31.54	11395	39.73	20243	58.43
6.0	12437	37.35	13235	46.15	22114	63.83
6.5	14703	44.16	15285	53.29	24124	69.63
7.0	16626	49.94	16951	59.10	25626	73.97
7.5	18630	55.95	18585	64.80	27146	78.35
8.0	20381	61.21	20040	69.87	28312	81.72
8.5	22512	67.61	21608	75.34	29716	85.77
9.0	24207	72.70	22771	79.40	30731	88.70
9.5	25622	76.95	23863	83.20	31482	90.87
10.0	27021	81.16	24724	86.21	32178	92.88
11.0	29192	87.68	26165	91.23	33158	95.71
12.0	30606	91.92	27066	94.37	33787	97.52
13.0	31683	95.16	27705	96.60	34147	98.56
14.0	32278	96.95	28069	97.87	34367	99.20
15.0	32646	98.05	28307	98.70	34490	99.55
16.0	32889	98.78	28451	99.20	34554	99.74
17.0	33040	99.23	28542	99.52	34597	99.86
18.0	33131	99.51	28595	99.70	34612	99.90
19.0	33192	99.69	28621	99.79	34627	99.95
20.0	33230	99.80	28639	99.86	34636	99.97
21.0	33246	99.85	28651	99.90	34643	99.99
>21.0	33295	100.00	28680	100.00	34645	100.00

SITE ID: NM  
SITE LOCATION: CLAYTON, NM.  
DATA : MAY 1977 THROUGH DECEMBER 1981

-----  
1.7 WIND SPEED PERSISTENCE FREQUENCY (LEVEL A)  
-----

HOURS	NUMBER OF OCCURENCES							
	WIND SPEED CLASS, METERS/SEC							
	< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20
1	503	1222	1727	1978	2066	1330	366	9
2	213	313	466	520	522	509	155	1
3	143	115	153	131	169	369	84	1
4	61	45	44	54	57	227	57	1
5	33	9	22	14	17	187	34	2
6	21	2	7	9	7	153	35	0
7	7	0	4	0	3	111	16	1
8	5	1	0	3	2	85	20	1
9	1	1	0	1	1	50	14	0
10	4	1	0	1	0	36	12	0
11	0	0	0	0	0	25	7	0
12	3	0	0	0	0	26	6	0
13	0	0	0	0	0	12	5	0
14	0	0	0	0	0	11	1	1
15	0	0	0	0	0	9	2	0
16	0	0	0	0	0	7	0	0
17	0	0	0	0	0	2	3	0
18	0	0	0	0	0	5	0	0
19	0	0	0	0	0	3	0	0
20	0	0	0	0	0	1	1	0
21	0	0	0	0	0	2	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: NM  
 SITE LOCATION: CLAYTON, NM.  
 DATA : WAY 1977 THROUGH DECEMBER 1981

-----  
 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR

(ELEV A)	ALPHA (A,B)	ALPHA (B,C)	ALPHA (A,C)	ALPHA (A,B,C)	% A	% B	% C
N	0.21	0.15	0.17	0.16	5.94	5.77	5.40
NN E	0.13	0.13	0.13	0.13	5.24	5.77	5.97
NE	0.13	0.15	0.14	0.14	4.32	4.56	4.25
ENE	0.13	0.17	0.16	0.16	3.19	3.13	2.89
E	0.18	0.15	0.16	0.15	2.96	2.90	2.82
ESE	0.22	0.19	0.20	0.20	2.90	2.91	2.94
SE	0.29	0.09	0.14	0.13	3.84	3.49	3.62
SSE	0.22	0.14	0.16	0.15	6.31	6.05	6.31
S	0.16	0.14	0.14	0.14	10.97	10.48	10.32
SSW	0.16	0.14	0.15	0.15	12.22	11.11	11.33
SW	0.18	0.18	0.18	0.18	11.09	10.22	10.35
WSW	0.30	0.24	0.26	0.25	9.13	9.89	8.96
W	0.34	0.31	0.32	0.32	6.00	7.55	7.47
WNW	0.41	0.34	0.35	0.35	3.99	5.12	5.14
NW	0.18	0.27	0.25	0.25	4.47	4.99	5.13
NNW	0.19	0.21	0.21	0.21	5.11	5.40	5.65

NOTES:

$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

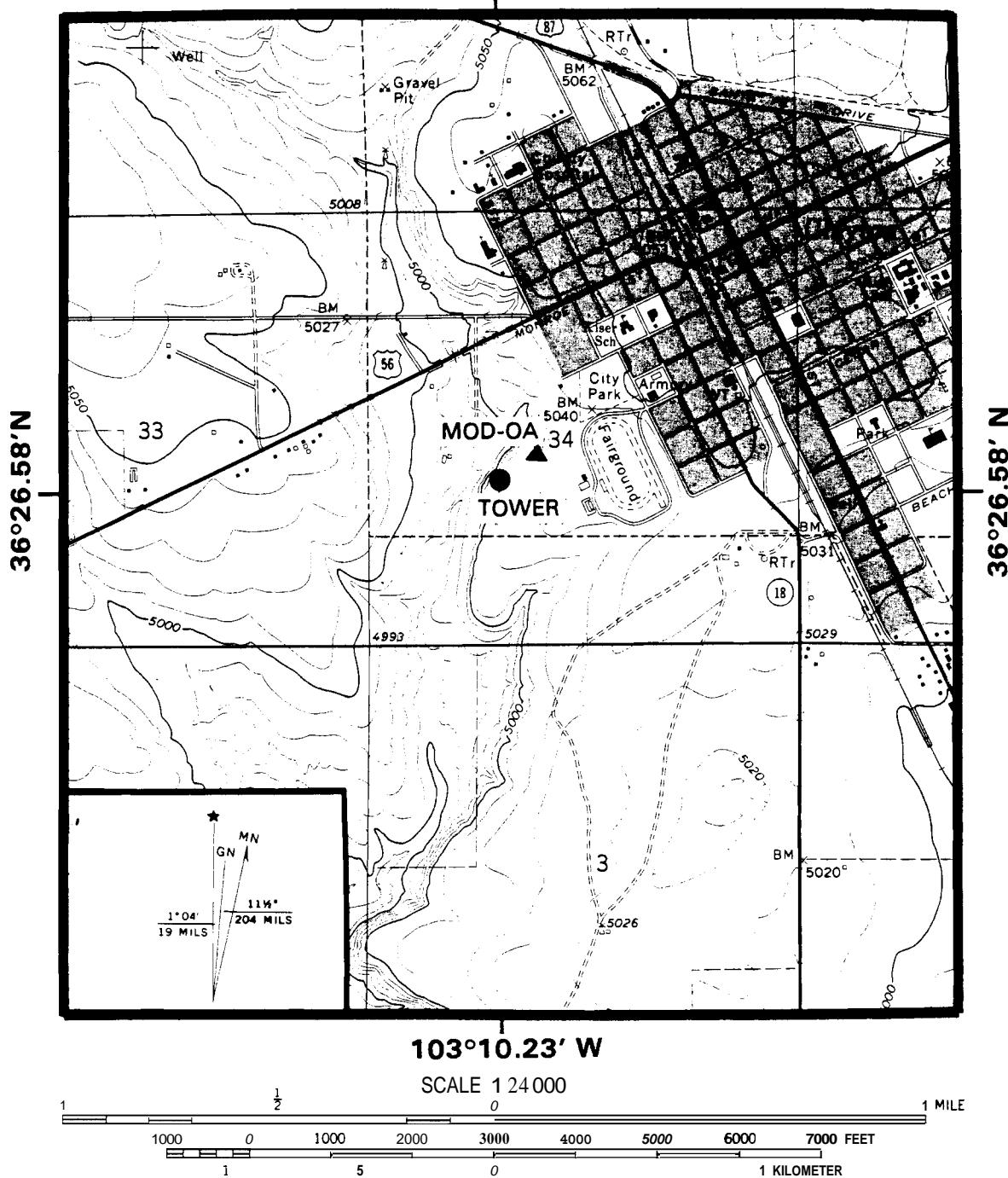
ALPHA

$$2. \text{ ALPHA} = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))}$$

WHERE; Z= ELEVATION  
 WS=WIND SPEED

# CLAYTON, N.M.

103°10.23' W



COLD BAY, ALASKA

SITE ID: AK  
SITE LOCATION: COLD BAY, AK.  
DATA : AUGUST 1977 THROUGH SEPTEMBER 1981

1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 36528

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	57.5
WD(A)	100.0	63.2
WS(C)	100.0	58.4
WD(C)	100.0	48.1

1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	(A) 21.8	HEIGHT	MEAN	MEAN	POWER
		(METERS)	WS	WD	WATTS/M**2
(C) 9.1		7.3	155.6	497.03	
		6.5	132.5	353.28	

1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 21.8	26.3	49.0	01/05/81	20:00	(B)-999.9
(C) 9.1	23.0	125.0	11/17/77	16:00	(C) 21.7
					(A) 23.7
					(B)-999.9

NOTES:

1. SITE ELEVATION: 29 METERS ABOVE SEA LEVEL.
3. SENSOR LEVEL B NOT AVAILABLE AT SITE AK.

SITE ID: AK  
SITE LOCATION: COLD BAY, AK.  
DATA : AUGUST 1977 THROUGH SEPTEMBER 1981

1.4 WIND SPEED AND DIRECTION VERSUS TIME-OF-DAY

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	7.1	151.9	0.0	0.0	6.2	134.2
01:00	7.1	154.4	0.0	0.0	6.2	135.9
02:00	7.0	152.9	0.0	0.0	6.2	130.3
03:00	6.9	160.9	0.0	0.0	6.2	138.0
04:00	7.0	157.6	0.0	0.0	6.2	129.9
05:00	6.9	153.8	0.0	0.0	6.1	141.1
06:00	6.9	155.9	0.0	0.0	6.2	145.0
07:00	6.9	153.4	0.0	0.0	6.2	142.7
08:00	7.1	147.3	0.0	0.0	6.4	124.7
09:00	7.2	149.6	0.0	0.0	6.6	124.5
10:00	7.3	147.5	0.0	0.0	6.7	119.2
11:00	7.6	155.3	0.0	0.0	7.0	121.1
12:00	7.7	149.3	0.0	0.0	7.1	105.8
13:00	7.7	149.0	0.0	0.0	7.1	108.4
14:00	7.8	161.8	0.0	0.0	7.1	140.3
15:00	7.8	171.8	0.0	0.0	7.1	133.8
16:00	7.8	162.2	0.0	0.0	7.0	135.4
17:00	7.6	167.7	0.0	0.0	6.8	156.3
18:00	7.4	161.5	0.0	0.0	6.6	146.8
19:00	7.2	157.8	0.0	0.0	6.5	133.3
20:00	7.1	157.5	0.0	0.0	6.3	116.3
21:00	7.1	158.3	0.0	0.0	6.2	137.1
22:00	7.0	152.4	0.0	0.0	6.2	130.2
23:00	7.0	156.4	0.0	0.0	6.1	140.5

SITE ID: AK  
 SITE LOCATION: COLD BAY, AK.  
 DATA : AUGUST 1977 THROUGH SEPTEMBER 1981

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	%	LEVEL B COUNT	%	LEVEL C COUNT	%
------------	---------------	---	---------------	---	---------------	---

0.0- 0.5	97	0.5	0	0.0	150	0.7
0.5- 1.0	331	1.6	0	0.0	471	2.2
1.0- 1.5	519	2.5	0	0.0	680	3.2
<b>1.5- 2.0</b>	<b>718</b>	<b>3.4</b>	0	0.0	882	4.1
2.0- 2.5	845	4.0	0	0.0	1002	4.7
2.5- 3.0	1027	4.9	0	0.0	1018	4.8
3.0- 3.5	881	4.2	0	0.0	1078	5.1
<b>3.5- 4.0</b>	<b>975</b>	<b>4.6</b>	0	0.0	1033	4.8
4.0- 4.5	1126	5.4	0	0.0	1166	5.5
<b>4.5- 5.0</b>	<b>903</b>	<b>4.3</b>	0	0.0	955	4.5
5.0- 5.5	961	4.6	0	0.0	1094	5.1
<b>5.5- 6.0</b>	<b>861</b>	<b>4.1</b>	<b>0</b>	<b>0.0</b>	<b>937</b>	<b>4.4</b>
6.0- 6.5	975	4.6	0	0.0	1106	5.2
6.5- 7.0	886	4.2	0	0.0	929	4.4
7.0- 7.5	832	4.0	0	0.0	909	4.3
<b>7.5- 8.0</b>	<b>735</b>	<b>3.5</b>	0	0.0	<b>901</b>	<b>4.2</b>
8.0- 8.5	893	4.3	0	0.0	958	4.5
8.5- 9.0	792	3.8	0	0.0	782	3.7
9.0- 9.5	646	3.1	0	0.0	701	3.3
9.5-10.0	672	3.2	0	0.0	675	3.2
<b>10.0-11.0</b>	<b>1280</b>	<b>6.1</b>	0	0.0	1201	5.6
<b>11.0-12.0</b>	<b>1069</b>	<b>5.1</b>	0	0.0	874	4.1
12.0-13.0	889	4.2	0	0.0	<b>673</b>	3.2
<b>13.0-14.0</b>	<b>580</b>	<b>2.8</b>	0	0.0	408	1.9
14.0-15.0	<b>449</b>	<b>2.1</b>	0	0.0	278	1.3
15.0-16.0	339	1.6	0	0.0	193	0.9
<b>16.0-17.0</b>	<b>274</b>	<b>1.3</b>	0	0.0	145	0.7
17.0-18.0	159	0.8	0	0.0	77	0.4
18.0-19.0	125	0.6	0	0.0	42	0.2
19.0-20.0	69	0.3	0	0.0	9	0.0
20.0-21.0	54	0.3	0	0.0	9	0.0
>21.0	40	0.2	0	0.0	7	0.0

RECOVERY RATES

LEVEL A	LEVEL B	LEVEL C
57.5	0.0	58.4

SITE ID: AK  
 SITE LOCATION: COLD BAY, AK.  
 DATA : AUGUST 1977 THROUGH SEPTEMBER 1981

1.6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)
0.5	97	0.46	0	0.00	150	0.70
1.0	428	2.04	0	0.00	621	2.91
1.5	947	4.51	0	0.00	1301	6.10
2.0	1665	7.93	0	0.00	2183	10.23
2.5	2510	11.95	0	0.00	3185	14.92
3.0	3301	16.00	0	0.00	4205	19.00
3.5	4418	21.04	0	0.00	5281	24.74
4.0	5393	25.68	0	0.00	6314	29.58
4.5	6519	31.04	0	0.00	7480	35.05
5.0	7422	35.34	0	0.00	8435	39.52
5.5	8383	39.92	0	0.00	9529	44.65
6.0	9244	44.01	0	0.00	10466	49.04
6.5	10219	48.66	0	0.00	11572	54.22
7.0	11105	52.88	0	0.00	12501	58.57
7.5	11937	56.84	0	0.00	13410	62.83
8.0	12672	60.34	0	0.00	14311	67.05
8.5	13565	64.59	0	0.00	15269	71.54
9.0	14357	68.36	0	0.00	16051	75.20
9.5	15003	71.44	0	0.00	16752	78.49
10.0	15675	74.64	0	0.00	17427	81.65
11.0	16955	80.73	0	0.00	18628	87.28
12.0	18024	85.82	0	0.00	19502	91.37
13.0	18913	90.05	0	0.00	20175	94.53
14.0	19493	92.81	0	0.00	20583	96.44
15.0	19942	94.95	0	0.00	20861	97.74
16.0	20281	96.57	0	0.00	21054	98.65
17.0	20555	97.87	0	0.00	21199	99.33
18.0	20714	98.63	0	0.00	21276	99.69
19.0	20839	99.22	0	0.00	21318	99.88
20.0	20908	99.55	0	0.00	21327	99.93
21.0	20962	99.81	0	0.00	21336	99.97
>21.0	21002	100.00	0	0.00	21343	100.00

SITE ID: AK  
SITE LOCATION: COLD BAY, AK.  
DATA : AUGUST 1977 THROUGH SEPTEMBER 1981

1.7 WIND SPEED PERSISTENCE FREQUENCY (LEVEL A)

HOURS	NUMBER OF OCCURENCES								
	WIND SPEED CLASS,			METERS/SEC					
	< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20	
1	487	874	862	820	820	692	312	21	
2	173	237	225	209	217	206	88	6	
3	95	71	88	83	78	152	61	4	
4	62	24	38	24	47	90	46	2	
5	44	8	17	15	12	80	23	6	
6	25	6	5	7	3	57	17	0	
7	16	2	1	2	2	45	9	1	
8	15	0	2	2	1	36	11	0	
9	10	1	1	0	0	19	7	0	
10	6	0	0	1	0	17	5	0	
11	5	0	1	0	0	15	6	0	
12	3	0	0	0	0	11	6	0	
13	2	1	0	0	0	9	5	0	
14	1	0	0	0	0	6	3	0	
15	2	0	0	0	0	9	3	0	
16	1	0	0	0	0	5	3	0	
17	0	0	0	0	0	3	0	0	
18	0	0	0	0	0	0	1	0	
19	0	0	0	0	0	4	2	0	
20	0	0	0	0	0	0	0	0	
21	0	0	0	0	0	1	0	0	
22	0	0	0	0	0	0	1	0	
23	0	0	0	0	0	0	0	0	
>23	0	0	0	0	0	0	0	0	

SITE ID: AK  
 SITE LOCATION: COLD BAY, AK.  
 DATA : AUGUST 1977 THROUGH SEPTEMBER 1981

-----  
 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR

(ELEV A)	ALPHA (A, B)	ALPHA (B, C)	ALPHA (A, C)	ALPHA (A, B, C)	% A	% B	% C
N	0.00	0.00	0.08	0.00	2.73	0.00	2.63
NNE	0.00	0.00	-0.19	0.00	2.86	0.00	4.22
NE	0.00	0.00	0.15	0.00	2.30	0.00	3.80
ENE	0.00	0.00	0.34	0.00	5.25	0.00	2.16
E	0.00	0.00	0.21	0.00	4.90	0.00	2.90
ESE	0.00	0.00	0.18	0.00	9.76	0.00	9.35
SE	0.00	0.00	0.22	0.00	15.95	0.00	12.16
SSE	0.00	0.00	0.10	0.00	5.70	0.00	6.76
S	0.00	0.00	-0.20	0.00	2.39	0.00	2.58
SSW	0.00	0.00	0.29	0.00	3.16	0.00	1.96
SW	0.00	0.00	-0.22	0.00	5.45	0.00	2.86
WSW	0.00	0.00	-0.01	0.00	6.67	0.00	4.55
W	0.00	0.00	0.09	0.00	6.99	0.00	5.41
WNW	0.00	0.00	0.14	0.00	6.74	0.00	6.11
NW	0.00	0.00	0.09	0.00	7.38	0.00	7.80
NNW	0.00	0.00	0.07	0.00	5.26	0.00	5.00

NOTES:

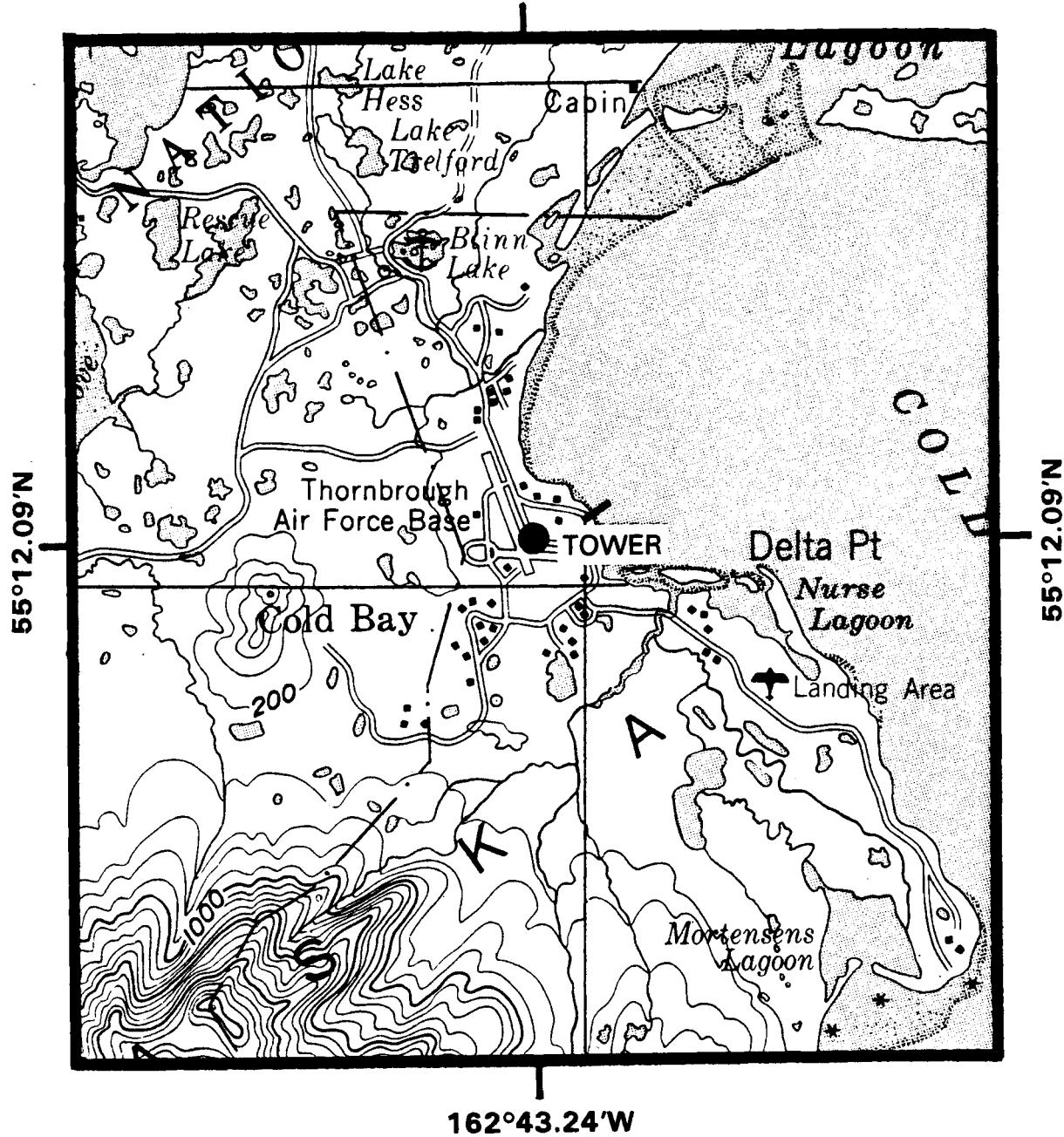
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

$$2. \text{ ALPHA} = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))}$$

WHERE; Z=ELEVATION  
WS=WIND SPEED

# COLD BAY, AK

162°43.24'W



162°43.24'W

SCALE 1:250000

0 5 10 15 MILES

0 5 10 15 20 KILOMETERS

CONTOUR INTERVAL 200 FEET

AK-07

CULEBRA, PUERTO RICO

SITE ID: PR  
SITE LOCATION: CULEBRA, PR.  
DATA : MARCH 1977 THROUGH DECEMBER 1981

I. 1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 42408

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	75.6
WD(A)	100.0	78.3
WS(C)	100.0	82.1
WD(C)	100.0	82.5

I.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	HEIGHT (METERS)	MEAN		POWER WATTS/M**2
		MEAN WS	MEAN WD	
(A) 45.7	7.0	84.0	291.07	
(C) 9.1	6.2	83.8	212.05	

I.3 MAXIMUM WIND SPEED

ELEVATION (KETERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	31.7	55.3	09/01/79	02:00	(B)-999.9 (C) 29.1
(C) 9.1	29.1	70.2	09/01/79	02:00	(A) 31.7 (B)-999.9

NOTES:

1. SITE ELEVATION: 80 METERS ABOVE SEA LEVEL.
3. SENSOR LEVEL B NOT AVAILABLE AT SITE PR.

SITE ID: PR  
SITE LOCATION: CULEBRA, PR.  
DATA : MARCH 1977 THROUGH DECEMBER 1981

1.4 WIND SPEED AND DIRECTION VERSUS TIME-OF-DAY

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	6.8	83.4	0.0	0.0	5.9	84.7
01:00	6.8	82.8	0.0	0.0	5.9	84.9
02:00	6.7	83.7	0.0	0.0	5.8	85.3
03:00	6.7	83.8	0.0	0.0	5.8	85.4
04:00	6.8	83.7	0.0	0.0	5.8	85.1
05:00	6.8	84.2	0.0	0.0	5.9	85.1
06:00	6.8	84.0	0.0	0.0	5.9	84.3
07:00	6.8	82.9	0.0	0.0	6.1	82.1
08:00	7.0	82.6	0.0	0.0	6.5	80.8
09:00	7.3	82.7	0.0	0.0	6.7	81.1
10:00	7.4	84.1	0.0	0.0	6.8	82.2
11:00	7.4	85.5	0.0	0.0	6.9	83.1
12:00	7.4	86.3	0.0	0.0	6.8	83.9
13:00	7.3	86.3	0.0	0.0	6.7	84.3
14:00	7.2	86.0	0.0	0.0	6.6	84.2
15:00	7.1	85.9	0.0	0.0	6.4	83.6
16:00	7.0	86.2	0.0	0.0	6.2	84.1
17:00	6.9	85.7	0.0	0.0	6.1	84.8
18:00	7.0	84.7	0.0	0.0	6.1	84.7
19:00	7.1	83.5	0.0	0.0	6.1	84.1
20:00	7.0	82.1	0.0	0.0	6.1	83.2
21:00	7.0	81.6	0.0	0.0	6.1	83.4
22:00	7.0	81.8	0.0	0.0	6.1	83.3
23:00	6.9	82.7	0.0	0.0	6.0	84.3

SITE ID: PR  
SITE LOCATION: CULEBRA, PR.  
DATA : MARCH 1977 THROUGH DECEMBER 1981

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	%	LEVEL B COUNT	%	LEVEL C COUNT	%
------------	---------------	---	---------------	---	---------------	---

0.0- 0.5	73	0.2	0	0.0	111	0.3
0.5- 1.0	52	0.2	0	0.0	97	0.3
1.0- 1.5	76	0.2	0	0.0	160	0.5
1.5- 2.0	160	0.5	0	0.0	380	1.1
2.0- 2.5	291	0.9	0	0.0	789	2.3
2.5- 3.0	381	1.2	0	0.0	1086	3.1
3.0- 3.5	529	1.7	0	0.0	1318	3.8
3.5- 4.0	815	2.5	0	0.0	1547	4.4
4.0- 4.5	1611	5.0	0	0.0	2375	6.8
4.5- 5.0	1857	5.8	0	0.0	2417	6.9
5.0- 5.5	2368	7.4	0	0.0	3275	9.4
5.5- 6.0	2689	8.4	0	0.0	3003	8.6
6.0- 6.5	3562	11.1	0	0.0	3705	10.6
6.5- 7.0	3110	9.7	0	0.0	2895	8.3
7.0- 7.5	3009	9.4	0	0.0	2823	8.1
7.5- 8.0	?	• 1	0	0.0	1950	5.6
8.0- 8.5	2417	7.5	0	0.0	1980	5.7
8.5- 9.0	1449	4.5	0	0.0	1240	3.6
9.0- 9.5	987	3.1	0	0.0	802	2.3
9.5-10.0	879	2.7	0	0.0	746	2.1
10.0-11.0	1416	4.4	0	0.0	1074	3.1
11.0-12.0	879	2.7	0	0.0	462	1.3
12.0-13.0	525	1.6	0	0.0	272	0.8
13.0-14.0	281	0.9	0	0.0	155	0.4
14.0-15.0	137	0.4	0	0.0	77	0.2
15.0-16.0	123	0.4	0	0.0	29	0.1
16.0-17.0	53	0.2	0	0.0	18	0.1
17.0-18.0	22	0.1	0	0.0	5	0.0
18.0-19.0	12	0.0	0	0.0	8	0.0
19.0-20.0	4	0.0	0	0.0	5	0.0
20.0-21.0	7	0.0	0	0.0	1	0.0
>21.0	9	0.0	0	0.0	6	0.0

RECOVERY RATES

LEVEL A	LEVEL B	LEVEL C
75.6	0.0	82.1

SITE ID: PR  
 SITE LOCATION: CULEBRA, PR.  
 DATA : MARCH 1977 THROUGH DECEMBER 1981

-----  
1.6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED  
-----

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)
0.5	73	0.23	0	0.00	111	0.32
1.0	125	0.39	0	0.00	208	0.60
1.5	201	0.63	0	0.00	368	1.06
2.0	361	1.13	0	0.00	748	2.15
2.5	652	2.03	0	0.00	1537	4.41
3.0	1033	3.22	0	0.00	2623	7.53
3.5	1562	4.87	0	0.00	3941	11.32
4.0	2377	7.42	0	0.00	5488	15.76
4.5	3988	12.44	0	0.00	7863	22.58
5.0	5845	18.24	0	0.00	10280	29.52
5.5	8213	25.62	0	0.00	13555	38.93
6.0	10902	34.01	0	0.00	16558	47.55
6.5	14464	45.13	0	0.00	20263	58.19
7.0	17574	54.83	0	0.00	23158	66.51
7.5	20583	64.22	0	0.00	25981	74.62
8.0	22853	71.30	0	0.00	27940	80.24
8.5	25270	78.84	0	0.00	29920	85.93
9.0	26719	83.36	0	0.00	31160	89.49
9.5	27706	86.44	0	0.00	31962	91.79
10.0	28585	89.18	0	0.00	32708	93.93
11.0	30001	93.60	0	0.00	33782	97.02
12.0	30880	96.34	0	0.00	34244	98.35
13.0	31405	97.98	0	0.00	34516	99.13
14.0	31686	98.86	0	0.00	34671	99.57
15.0	31823	99.28	0	0.00	34748	99.79
16.0	31946	99.67	0	0.00	34777	99.88
17.0	31999	99.83	0	0.00	34795	99.93
18.0	32021	99.90	0	0.00	34800	99.94
19.0	32033	99.94	0	0.00	34808	99.97
20.0	32037	99.95	0	0.00	34813	99.98
21.0	32044	99.97	0	0.00	34814	99.98
>21.0	32053	100.00	0	0.00	34820	100.00

SITE ID: PR  
SITE LOCATION: CULEBRA, PR.  
DATA : MARCH 1977 THROUGH DECEMBER 1981

1.7 WIND SPEED PERSISTENCE FREQUENCY (LEVEL A)

HOURS	NUMBER OF OCCURENCES							
	WIND SPEED CLASS, METERS/SEC							
< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20	
1	158	470	919	1550	1873	1089	148	1
2	57	152	326	480	718	368	35	0
3	20	63	165	267	314	193	24	1
4	19	27	78	118	173	149	9	0
5	9	17	42	49	74	102	11	0
6	3	4	29	29	50	79	9	1
7	6	8	14	20	20	66	1	0
8	2	2	8	9	11	49	5	0
9	3	0	4	2	1	39	4	0
10	1	1	2	3	2	45	3	0
11	3	0	0	1	1	29	2	0
12	0	0	0	0	0	28	0	0
13	1	0	0	1	1	18	1	0
14	0	0	0	0	0	19	0	0
15	0	0	0	0	0	19	2	0
16	1	0	0	0	0	10	2	0
17	0	0	0	0	0	8	1	0
18	0	0	0	0	0	3	1	0
19	0	0	0	0	0	4	0	0
20	0	0	0	0	0	4	1	0
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	1	0	0
23	0	0	0	0	0	1	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: PR  
 SITE LOCATION: CULEBRA, PR.  
 DATA : MARCH 1977 THROUGH DECEMBER 1981

-----  
 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR

(ELEV A)	ALPHA (A, B)	ALPHA (B, C)	ALPHA (A, C)	ALPHA (A, B, C)	% A	% B	% C
N	0.00	0.00	0.19	0.00	0.68	0.00	0.48
NNE	0.00	0.00	0.09	0.00	2.03	0.00	1.21
NE	0.00	0.00	0.04	0.00	7.84	0.00	8.85
ENE	0.00	0.00	0.05	0.00	28.47	0.00	29.81
E	0.00	0.00	0.06	0.00	28.67	0.00	38.79
ESE	0.00	0.00	0.16	0.00	11.40	0.00	9.50
SE	0.00	0.00	0.23	0.00	5.52	0.00	3.26
SSE	0.00	0.00	0.30	0.00	2.87	0.00	1.71
S	0.00	0.00	0.30	0.00	1.69	0.00	1.43
SSW	0.00	0.00	0.33	0.00	0.95	0.00	1.03
SW	0.00	0.00	0.22	0.00	0.49	0.00	0.64
WSW	0.00	0.00	0.23	0.00	0.27	0.00	0.21
W	0.00	0.00	0.16	0.00	0.14	0.00	0.12
WNW	0.00	0.00	0.06	0.00	0.20	0.00	0.14
NW	0.00	0.00	0.08	0.00	0.37	0.00	0.36
NNW	0.00	0.00	0.17	0.00	0.55	0.00	0.45

NOTES:

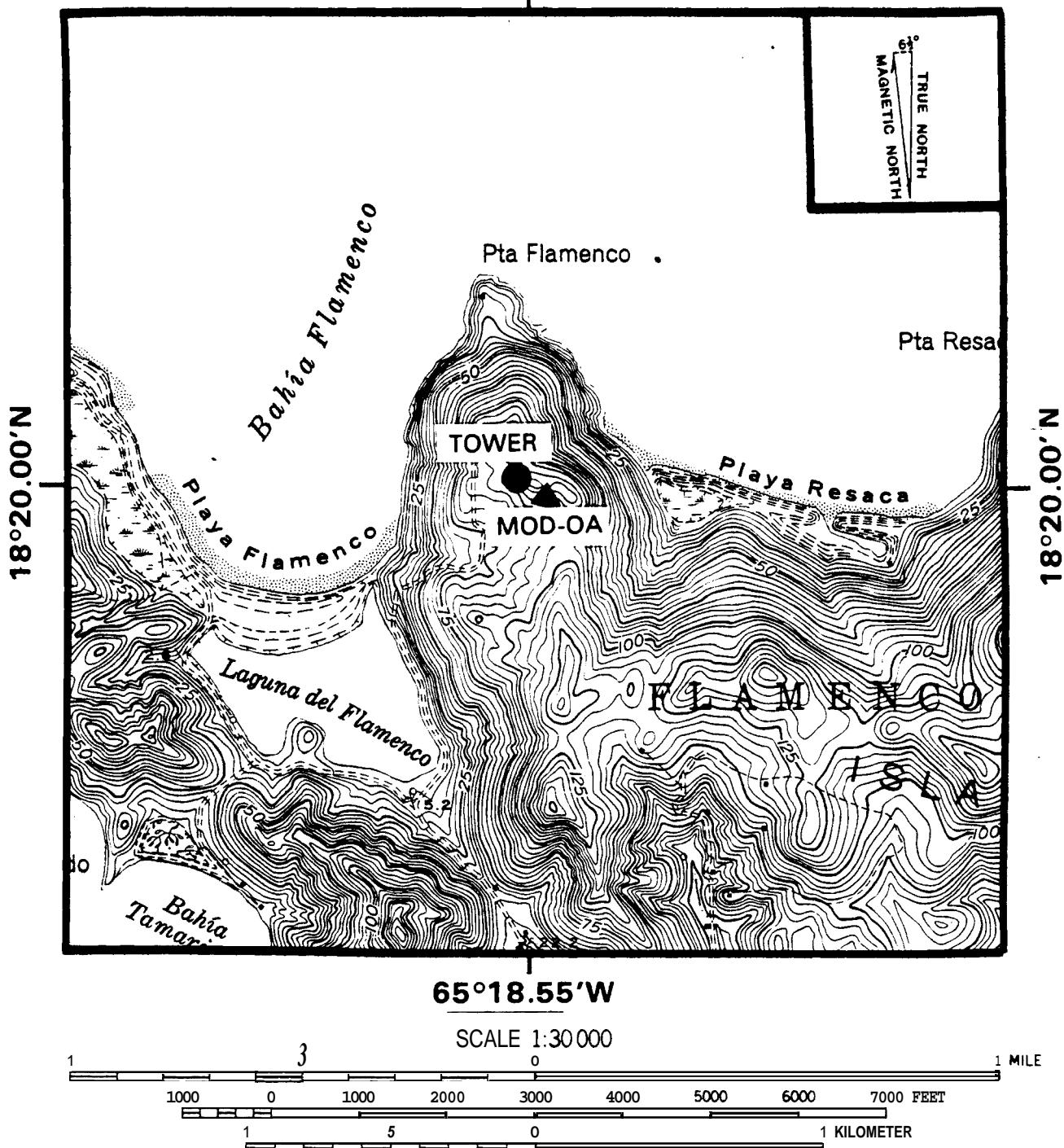
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

$$2. \text{ ALPHA} = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))}$$

WHERE; Z=ELEVATION  
WS=WIND SPEED

# CULEBRA, P.R.

65°18.55'W



HOLYOKE, MASSACHUSETTS

SITE ID: MA  
SITE LOCATION: HOLYOKE, NA.  
DATA : DECEMBER 1976 THROUGH SEPTEMBER 1981

1. I SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 42360

SENSOR	% ON-LINE	\$ RECOVERED
WS(A)	100.0	78.8
WD(A)	100.0	72.4
WS(C)	100.0	75.6
WD(C)	100.0	72.5

1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	HEIGHT (METERS)	MEAN	MEAN	POWER
		WS	WD	WATTS/M**2
(A)	45.7	6.9	265.7	391.05
(C)	18.2	4.7	260.9	119.22

1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	27.7	290.0	04/03/77	09:00	(B)-999.9 (C) 18.3
(C) 18.2	22.7	-999.9	04/15/81	15:00	(A) 22.0 (B)-999.9

NOTES:

1. SITE ELEVATION: 372 METERS ABOVE SEA LEVEL.
3. SENSOR LEVEL B NOT AVAILABLE AT SITE MA.

SITE ID: MA  
SITE LOCATION: HOLYOKE, MA.  
DATA : DECEMBER 1976 THROUGH SEPTEMBER 1981

1.4 WIND SPEED AND DIRECTION VERSUS TIME-OF-DAY

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	7.0	266.2	0.0	0.0	4.8	262.6
01:00	6.9	270.5	0.0	0.0	4.7	266.9
02:00	6.9	274.8	0.0	0.0	4.7	270.8
03:00	6.7	278.6	0.0	0.0	4.7	275.6
04:00	6.7	283.5	0.0	0.0	4.6	281.1
05:00	6.6	285.7	0.0	0.0	4.6	282.9
06:00	6.5	287.3	0.0	0.0	4.5	284.1
07:00	6.3	288.6	0.0	0.0	4.4	283.8
08:00	6.1	288.3	0.0	0.0	4.2	284.0
09:00	6.0	280.5	0.0	0.0	4.2	278.4
10:00	6.0	276.3	0.0	0.0	4.1	268.1
11:00	6.3	263.7	0.0	0.0	4.3	254.0
12:00	6.6	251.8	0.0	0.0	4.5	244.7
13:00	6.8	248.1	0.0	0.0	4.6	241.3
14:00	7.0	246.5	0.0	0.0	4.7	237.3
15:00	7.2	247.7	0.0	0.0	4.8	238.3
16:00	7.3	248.9	0.0	0.0	4.8	239.4
17:00	7.4	250.4	0.0	0.0	4.9	243.5
18:00	7.4	250.8	0.0	0.0	5.0	246.8
19:00	7.5	251.2	0.0	0.0	5.1	248.7
20:00	7.5	252.7	0.0	0.0	5.1	251.0
21:00	7.4	257.4	0.0	0.0	5.1	253.9
22:00	7.3	258.5	0.0	0.0	5.0	255.5
23:00	7.2	261.7	0.0	0.0	4.9	257.7

SITE ID: MA  
SITE LOCATION: HOLYOKE, MA.  
DATA : DECEMBER 1976 THROUGH SEPTEMBER 1981

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B %	LEVEL C COUNT	LEVEL C %
------------	------------------	--------------	------------------	--------------

0.0- 0.5	139	0.4	0	0.0	100	0.3
0.5- 1.0	390	1.2	0	0.0	550	1.7
1.0- 1.5	788	2.4	0	0.0	1236	3.9
1.5- 2.0	984	2.9	0	0.0	1746	5.5
2.0- 2.5	1248	3.7	0	0.0	2460	7.7
2.5- 3.0	1263	3.8	0	0.0	2650	8.3
3.0- 3.5	1363	4.1	0	0.0	2644	8.3
3.5- 4.0	1559	4.7	0	0.0	2806	8.8
4.0- 4.5	2196	6.6	0	0.0	3371	10.5
4.5- 5.0	1768	5.3	0	0.0	2210	6.9
5.0- 5.5	1756	5.3	0	0.0	2213	6.9
5.5- 6.0	1798	5.4	0	0.0	1738	5.4
6.0- 6.5	2078	6.2	0	0.0	1979	6.2
6.5- 7.0	1669	5.0	0	0.0	1243	3.9
7.0- 7.5	1736	5.2	0	0.0	1128	3.5
7.5- 8.0	1499	4.5	0	0.0	717	2.2
8.0- 8.5	1797	5.4	0	0.0	895	2.8
8.5- 9.0	1341	4.0	0	0.0	582	1.8
9.0- 9.5	952	2.9	0	0.0	362	1.1
9.5-10.0	925	2.8	0	0.0	329	1.0
10.0-11.0	1634	4.9	0	0.0	444	1.4
11.0-12.0	1198	3.6	0	0.0	257	0.8
12.0-13.0	953	2.9	0	0.0	176	0.5
13.0-14.0	698	2.1	0	0.0	89	0.3
14.0-15.0	523	1.6	0	0.0	42	0.1
15.0-16.0	349	1.0	0	0.0	18	0.1
16.0-17.0	251	0.8	0	0.0	15	0.0
17.0-18.0	174	0.5	0	0.0	8	0.0
18.0-19.0	109	0.3	0	0.0	3	0.0
19.0-20.0	73	0.2	0	0.0	5	0.0
20.0-21.0	45	0.1	0	0.0	0	0.0
>21.0	105	0.3	0	0.0	5	0.0

RECOVERY RATES

LEVEL A	LEVEL B	LEVEL C
78.8	0.0	75.6

SITE ID: MA  
 SITE LOCATION: HOLYOKE, MA.  
 DATA : DECEMBER 1976 THROUGH SEPTEMBER 1981

-----  
 1.6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED  
 -----

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)
0.5	139	0.42	0	0.00	100	0.31
1.0	529	1.59	0	0.00	650	2.03
1.5	1317	3.95	0	0.00	1886	5.89
2.0	2301	6.90	0	0.00	3632	11.34
2.5	3549	10.64	0	0.00	6092	19.03
3.0	4812	14.42	0	0.00	8742	27.30
3.5	6175	18.51	0	0.00	11386	35.56
4.0	7734	23.18	0	0.00	14192	44.32
4.5	9930	29.77	0	0.00	17563	54.85
5.0	11698	35.06	0	0.00	19773	61.75
5.5	13454	40.33	0	0.00	21986	68.66
6.0	15252	45.72	0	0.00	23724	74.09
6.5	17330	51.95	0	0.00	25703	80.27
7.0	18999	56.95	0	0.00	26946	84.15
7.5	20735	62.15	0	0.00	28074	87.67
8.0	22234	66.65	0	0.00	28791	89.91
8.5	24031	72.03	0	0.00	29686	92.71
9.0	25372	76.05	0	0.00	30268	94.53
9.5	26324	78.91	0	0.00	30630	95.66
10.0	27249	81.68	0	0.00	30959	96.68
11.0	28883	86.58	0	0.00	31403	98.07
12.0	30081	90.17	0	0.00	31660	98.87
13.0	31034	93.02	0	0.00	31836	99.42
14.0	31732	95.12	0	0.00	31925	99.70
15.0	32255	96.68	0	0.00	31967	99.83
16.0	32604	97.73	0	0.00	31985	99.89
17.0	32855	98.48	0	0.00	32000	99.93
18.0	33029	99.00	0	0.00	32008	99.96
19.0	33138	99.33	0	0.00	32011	99.97
20.0	33211	99.55	0	0.00	32016	99.98
21.0	33256	99.69	0	0.00	32016	99.98
>21.0	33361	100.00	0	0.00	32021	100.00

SITE ID: MA  
SITE LOCATION: HOLYOKE, MA.  
DATA : DECEMBER 1976 THROUGH SEPTEMBER 1981

1.7 WIND SPEED PERSISTENCE FREQUENCY (LEVEL A)

HOURS	NUMBER OF OCCURENCES							
	WIND SPEED CLASS, METERS/SEC							
	< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20
1	44	11	24	0	15	72	17	11
2	177	379	478	418	507	444	144	10
3	113	133	206	146	153	261	65	5
4	86	66	58	59	58	208	57	5
5	76	17	41	19	14	152	32	3
6	64	4	10	3	4	80	23	4
7	42	3	5	2	2	73	17	0
8	35	1	2	0	0	57	21	0
9	38	0	0	0	0	35	15	1
10	19	0	1	0	0	11	9	0
11	23	0	1	0	0	12	14	0
12	10	1	0	0	0	9	8	0
13	9	0	0	0	0	5	6	0
14	2	0	0	0	0	10	2	0
15	6	0	0	0	0	7	2	0
16	1	0	0	0	0	5	3	0
17	1	0	0	0	0	4	0	0
18	1	0	0	0	0	0	0	0
19	1	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: MA  
 SITE LOCATION: HOLYOKE, MA.  
 DATA : DECEMBER 1976 THROUGH SEPTEMBER 1981

-----  
 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR

(ELEV A)	ALPHA (A,B)	ALPHA (B,C)	ALPHA (A,C)	ALPHA (A,B,C)	% A	% B	% C
N	0.00	0.00	0.49	0.00	3.66	0.00	4.04
NNE	0.00	0.00	0.44	0.00	3.84	0.00	3.78
NE	0.00	0.00	0.33	0.00	3.29	0.00	3.05
ENE	0.00	0.00	0.32	0.00	2.44	0.00	2.62
E	0.00	0.00	0.25	0.00	2.61	0.00	3.02
ESE	0.00	0.00	0.24	0.00	2.83	0.00	3.43
SE	0.00	0.00	0.27	0.00	4.77	0.00	5.06
SSE	0.00	0.00	0.31	0.00	6.58	0.00	6.85
S	0.00	0.00	0.35	0.00	7.43	0.00	7.08
SSW	0.00	0.00	0.38	0.00	5.52	0.00	5.18
SW	0.00	0.00	0.38	0.00	5.21	0.00	4.99
WSW	0.00	0.00	0.32	0.00	5.48	0.00	6.45
W	0.00	0.00	0.45	0.00	11.32	0.00	12.13
WNW	0.00	0.00	0.45	0.00	10.65	0.00	10.84
NW	0.00	0.00	0.47	0.00	9.75	0.00	9.27
NNW	0.00	0.00	0.64	0.00	6.01	0.00	4.77

-----  
 NOTES :

ALPHA

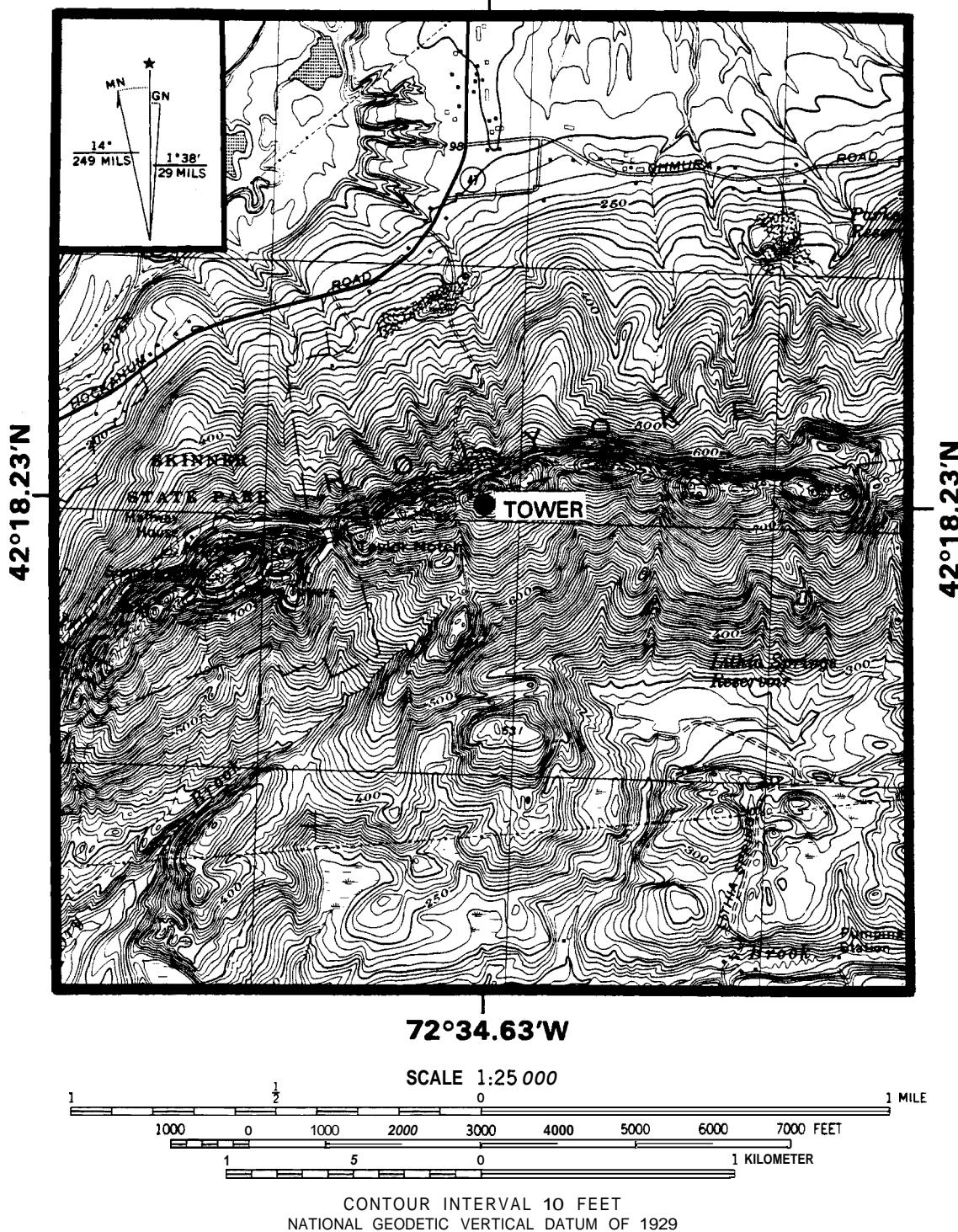
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

$$2. \text{ ALPHA} = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))}$$

WHERE; Z=ELEVATION  
 WS=WIND SPEED

# HOLYOKE, MA.

72°34.63'W



HURON, SOUTH DAKOTA

SITE ID: SD  
SITE LOCATION: HURON, SD.  
DATA DECEMBER 1976 THROUGH DECEMBER 1981

1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 44568

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	83.2
WD(A)	100.0	78.7
WS(C)	100.0	79.4
WD(C)	100.0	82.5

1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	(A) 45.7	HEIGHT	MEAN	MEAN	POWER
		(KETERS)	WS	WD	WATTS/M**2
(C) 9.1		6.8	184.5	333.60	
		4.7	89.9	131.99	

1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	24.6	176.4	10/16/80	17:00	(B)-999.9
(C) 9.1	20.6	178.9	10/16/80	17:00	(C) 20.6
					(A) 24.6
					(B)-999.9

NOTES:

1. SITE ELEVATION: 396 METERS ABOVE SEA LEVEL.
3. SENSOR LEVEL B NOT AVAILABLE AT SITE SD.

SITE ID: SD  
SITE LOCATION: HURON, SD.  
DATA : DECEMBER 1976 THROUGH DECEMBER 1981

-----  
1.4 WIND SPEED AND DIRECTION VERSUS TIME-OF-DAY  
-----

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	6.9	143.2	0.0	0.0	4.2	117.7
01:00	6.8	154.2	0.0	0.0	4.2	118.5
02:00	6.8	162.1	0.0	0.0	4.2	115.5
03:00	6.7	173.0	0.0	0.0	4.1	114.7
04:00	6.6	175.2	0.0	0.0	4.1	118.2
05:00	6.6	180.7	0.0	0.0	4.1	112.5
06:00	6.5	174.4	0.0	0.0	4.1	110.1
07:00	6.3	186.1	0.0	0.0	4.3	103.5
08:00	6.4	193.2	0.0	0.0	4.6	103.7
09:00	6.5	213.0	0.0	0.0	5.0	144.9
10:00	6.7	234.1	0.0	0.0	5.3	252.5
11:00	6.9	255.6	0.0	0.0	5.5	287.4
12:00	7.0	265.9	0.0	0.0	5.7	287.6
13:00	7.2	269.1	0.0	0.0	5.8	287.5
14:00	7.2	278.1	0.0	0.0	5.8	296.1
15:00	7.2	284.8	0.0	0.0	5.7	316.1
16:00	7.0	299.1	0.0	0.0	5.5	342.5
17:00	6.9	332.8	0.0	0.0	5.2	14.4
18:00	6.8	41.5	0.0	0.0	4.7	54.2
19:00	6.7	69.4	0.0	0.0	4.4	68.8
20:00	6.8	82.5	0.0	0.0	4.2	81.5
21:00	6.9	99.3	0.0	0.0	4.2	89.8
22:00	7.0	114.9	0.0	0.0	4.3	96.1
23:00	7.0	132.6	0.0	0.0	4.3	112.3

SITE ID: SD  
SITE LOCATION: HURON, SD.  
DATA : DECEMBER 1976 THROUGH DECEMBER 1981

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

MIND SPEED	LEVEL A COUNT	%	LEVEL B COUNT	%	LEVEL C COUNT	%
------------	---------------	---	---------------	---	---------------	---

0.0- 0.5	105	0.3	0	0.0	285	0.8
0.5- 1.0	368	1.0	0	0.0	836	2.4
1.0- 1.5	652	1.8	0	0.0	1641	4.6
1.5- 2.0	915	2.5	0	0.0	2325	6.6
2.0- 2.5	1258	3.4	0	0.0	2888	8.2
2.5- 3.0	1380	3.7	0	0.0	2755	7.8
3.0- 3.5	1499	4.0	0	0.0	2568	7.3
3.5- 4.0	1753	4.7	0	0.0	2779	7.9
4.0- 4.5	2426	6.5	0	0.0	3254	9.2
4.5- 5.0	1937	5.2	0	0.0	2176	6.2
5.0- 5.5	2061	5.6	0	0.0	1953	5.5
5.5- 6.0	1967	5.3	0	0.0	1665	4.7
6.0- 6.5	2365	6.4	0	0.0	1904	5.4
6.5- 7.0	2081	5.6	0	0.0	1295	3.7
7.0- 7.5	1933	5.2	0	0.0	1412	4.0
7.5- 8.0	1814	4.9	0	0.0	1022	2.9
8.0- 8.5	2225	6.0	0	0.0	1156	3.3
8.5- 9.0	1541	4.2	0	0.0	813	2.3
9.0- 9.5	1332	3.6	0	0.0	577	1.6
9.5-10.0	1247	3.4	0	0.0	484	1.4
10.0-11.0	2095	5.7	0	0.0	740	2.1
11.0-12.0	1412	3.8	0	0.0	418	1.2
12.0-13.0	1039	2.8	0	0.0	250	0.7
13.0-14.0	612	1.7	0	0.0	98	0.3
14.0-15.0	406	1.1	0	0.0	38	0.1
15.0-16.0	275	0.7	0	0.0	23	0.1
16.0-17.0	153	0.4	0	0.0	8	0.0
17.0-18.0	95	0.3	0	0.0	5	0.0
18.0-19.0	52	0.1	0	0.0	2	0.0
19.0-20.0	33	0.1	0	0.0	1	0.0
20.0-21.0	16	0.0	0	0.0	2	0.0
>21.0	28	0.1	0	0.0	0	0.0

RECOVERY RATES  
LEVEL A LEVEL B LEVEL C  
63.2 0.0 79.4

SITE ID: SD  
 SITE LOCATION: HURON, SD.  
 DATA : DECEMBER 1976 THROUGH DECEMBER 1981

I. 6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (% I)
0.5	105	0.28	0	0.00	285	0.81
1.0	473	1.28	0	0.00	1121	3.17
1.5	1125	3.03	0	0.00	2762	7.81
2.0	2040	5.50	0	0.00	5087	14.38
2.5	3298	8.90	0	0.00	7975	22.55
3.0	4678	12.62	0	0.00	10730	30.33
3.5	6177	16.66	0	0.00	13298	37.59
4.0	7930	21.39	0	0.00	16077	45.45
4.5	10356	27.93	0	0.00	19331	54.65
5.0	12293	33.16	0	0.00	21507	60.80
5.5	14354	38.72	0	0.00	23460	66.32
6.0	16321	44.02	0	0.00	25125	71.03
6.5	18686	50.40	0	0.00	27029	76.41
7.0	20767	56.01	0	0.00	28324	80.07
7.5	22700	61.23	0	0.00	29736	84.06
8.0	24514	66.12	0	0.00	30758	86.95
8.5	26739	72.12	0	0.00	31914	90.22
9.0	28280	76.28	0	0.00	32727	92.52
9.5	29612	79.87	0	0.00	33304	94.15
10.0	30859	83.23	0	0.00	33788	95.52
11.0	32954	88.88	0	0.00	34528	97.61
12.0	34366	92.69	0	0.00	34946	98.79
13.0	35405	95.50	0	0.00	35196	99.50
14.0	36017	97.15	0	0.00	35294	99.78
15.0	36423	98.24	0	0.00	35332	99.88
16.0	36698	98.98	0	0.00	35355	99.95
17.0	36851	99.40	0	0.00	35363	99.97
18.0	36946	99.65	0	0.00	35368	99.99
19.0	36998	99.79	0	0.00	35370	99.99
20.0	37031	99.88	0	0.00	35371	99.99
21.0	37047	99.92	0	0.00	35373	100.00
>21.0	37075	100.00	0	0.00	35373	100.00

SITE ID: SD  
SITE LOCATION: HURON, SD.  
DATA : DECEMBER 1976 THROUGH DECEMBER 1981

1.7 WIND SPEED PERSISTENCE FREQUENCY (LEVEL A)

HOURS	NUMBER OF OCCURENCES							
	WIND SPEED CLASS, METERS/SEC							
	< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20
1	577	1466	1877	1923	2056	1311	287	9
2	277	456	531	539	516	395	106	4
3	154	157	199	126	180	261	71	1
4	109	42	80	67	53	186	42	2
5	65	18	29	20	30	149	34	0
6	44	3	15	10	11	98	20	0
7	41	1	3	3	6	68	23	1
8	26	1	4	6	2	63	14	0
9	26	0	3	0	0	36	13	1
10	14	0	0	0	2	36	7	0
11	12	0	0	0	0	28	11	0
12	4	0	0	0	0	14	7	0
13	9	0	0	0	0	19	9	0
14	6	0	0	0	0	19	2	0
15	0	0	0	0	0	8	0	0
16	1	0	0	0	0	5	3	0
17	1	0	0	0	0	1	0	0
18	0	0	0	0	0	5	0	0
19	1	0	0	0	0	1	0	0
20	1	0	0	0	0	1	0	0
21	0	0	0	0	0	1	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	1	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: SD  
 SITE LOCATION: HURON, SD.  
 DATA : DECEMBER 1976 THROUGH DECEMBER 1981

-----  
 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR

(ELEV A)	ALPHA (A, B)	ALPHA (B, C)	ALPHA (A, C)	ALPHA (A, B, C)	%A	%B	%C
N	0.00	0.00	0.00	0.00	5.70	0.00	4.63
NNE	0.00	0.00	0.23	0.00	3.78	0.00	3.55
NE	0.00	0.00	0.24	0.00	2.81	0.00	2.54
ENE	0.00	0.00	0.21	0.00	2.76	0.00	2.76
E	0.00	0.00	0.22	0.00	4.04	0.00	4.06
ESE	0.00	0.00	0.23	0.00	5.63	0.00	6.42
SE	0.00	0.00	0.25	0.00	10.64	0.00	12.65
SSE	0.00	0.00	0.22	0.00	11.42	0.00	11.96
S	0.00	0.00	0.21	0.00	7.57	0.00	5.96
SSW	0.00	0.00	0.21	0.00	3.07	0.00	2.49
SW	0.00	0.00	0.25	0.00	2.28	0.00	2.18
WSW	0.00	0.00	0.30	0.00	2.73	0.00	2.89
W	0.00	0.00	0.28	0.00	4.42	0.00	4.18
KNK	0.00	0.00	0.23	0.00	6.91	0.00	7.12
NW	0.00	0.00	0.20	0.00	9.79	0.00	10.39
NPJW	0.00	0.00	0.18	0.00	9.96	0.00	10.31

NOTES :

$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

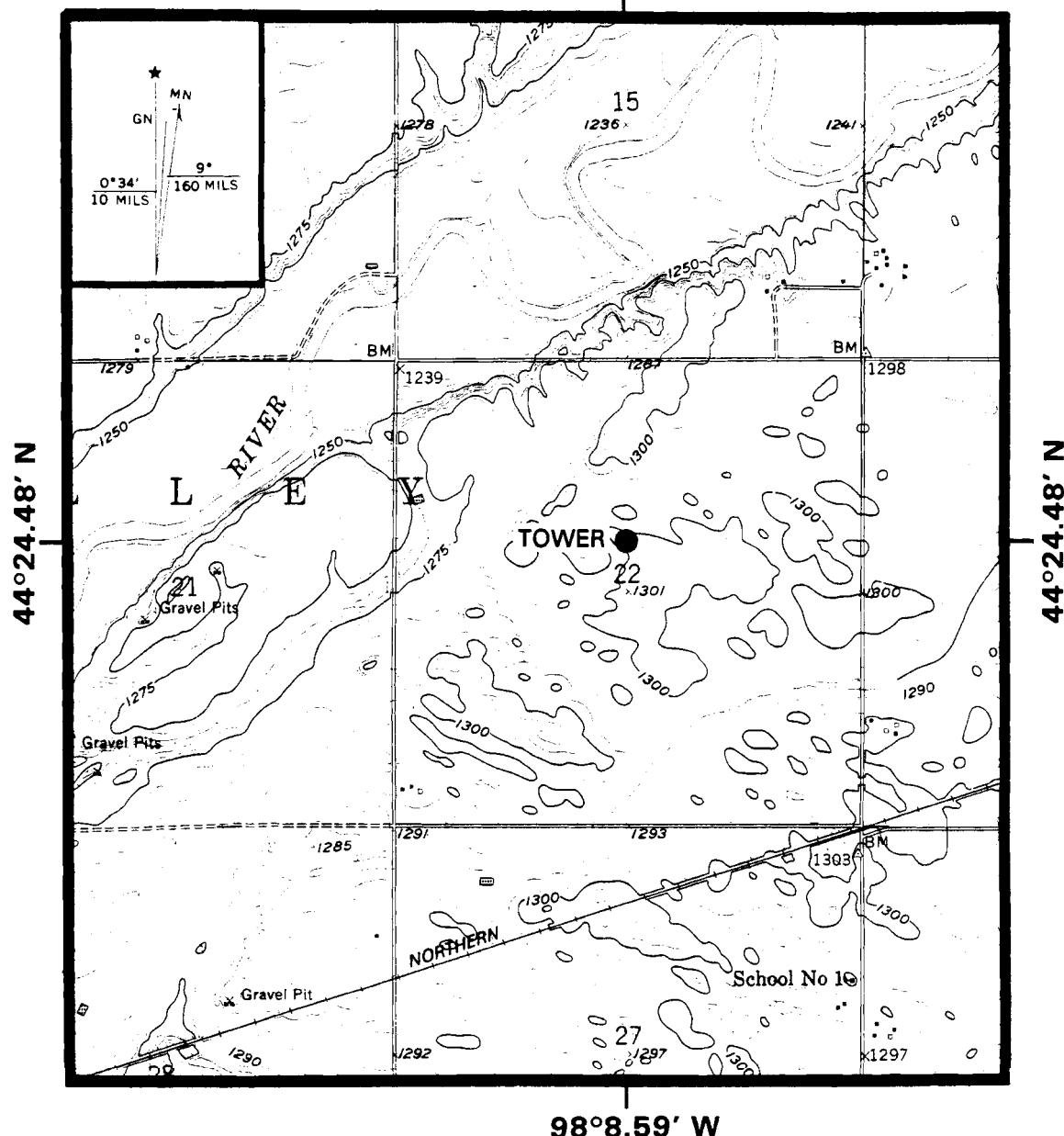
ALPHA

$$2. \text{ ALPHA} = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))}$$

WHERE; Z=ELEVATION  
WS=WIND SPEED

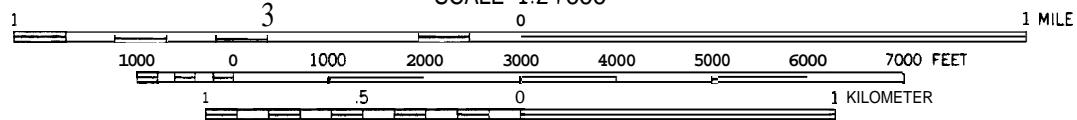
# HURON, SOUTH DAKOTA

**98°8.59' W**



**98°8.59' W**

SCALE 1:24000



CONTOUR INTERVAL 5 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929

SD-07

KINGSLEY DAM, NEBRASKA

SITE ID: NB  
SITE LOCATION: KINGSLEY DAM, NB.  
DATA DECEMBER 1976 THROUGH AUGUST 1981

1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 41640

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	90.1
WD(A)	100.0	89.0
WS(C)	100.0	90.9
WD(C)	100.0	90.4

1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	HEIGHT (METERS)	MEAN		POWER WATTS/M**2
		WS	WD	
(A)	45.7	6.5	260.5	286.31
(C)	9.1	5.3	252.9	161.03

1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	27.2	319.4	01/06/80	12:00	(B)-999.9 (C) 21.6
(C) 9.1	22.4	297.0	04/18/78	04:00	(A) 26.8 (B)-999.9

NOTES:

1. SITE ELEVATION: 1024 METERS ABOVE SEA LEVEL.
3. SENSOR LEVEL B NOT AVAILABLE AT SITE NB.

SITE ID: NB  
SITE LOCATION: KINGSLEY DAM, NB.  
DATA : DECEMBER 1976 THROUGH AUGUST 1981

1.4 WIND SPEED AND DIRECTION VERSUS TIME-OF-DAY

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	6.8	203.9	0.0	0.0	5.1	204.3
01:00	6.6	241.1	0.0	0.0	4.9	231.3
02:00	6.5	256.9	0.0	0.0	4.8	249.7
03:00	6.3	269.0	0.0	0.0	4.7	262.1
04:00	6.1	273.8	0.0	0.0	4.6	264.4
05:00	6.0	274.3	0.0	0.0	4.6	266.2
06:00	5.9	274.9	0.0	0.0	4.7	269.9
07:00	5.9	275.5	0.0	0.0	5.0	276.0
08:00	6.0	277.7	0.0	0.0	5.3	281.5
09:00	6.1	276.6	0.0	0.0	5.5	282.7
10:00	6.2	283.4	0.0	0.0	5.6	289.2
11:00	6.4	283.5	0.0	0.0	5.8	287.4
12:00	6.5	283.9	0.0	0.0	5.9	286.8
13:00	6.7	285.2	0.0	0.0	5.9	288.0
14:00	6.7	289.6	0.0	0.0	5.9	295.2
15:00	6.7	279.9	0.0	0.0	5.8	291.2
16:00	6.7	81.2	0.0	0.0	5.6	71.6
17:00	6.6	93.3	0.0	0.0	5.3	102.7
18:00	6.7	103.0	0.0	0.0	5.1	116.1
19:00	7.0	110.2	0.0	0.0	5.1	126.5
20:00	7.1	116.9	0.0	0.0	5.2	131.2
21:00	7.2	128.7	0.0	0.0	5.3	142.9
22:00	7.1	147.0	0.0	0.0	5.3	156.4
23:00	7.0	172.9	0.0	0.0	5.2	178.7

SITE ID: NB  
 SITE LOCATION: KINGSLEY DAM, NB.  
 DATA : DECEMBER 1976 THROUGH AUGUST 1981

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	%	LEVEL B COUNT	%	LEVEL C COUNT	%
------------	---------------	---	---------------	---	---------------	---

0.0- 0.5	52	0.1	0	0.0	<b>135</b>	0.4
0.5- 1.0	310	0.8	0	0.0	<b>628</b>	<b>1.7</b>
1.0- 1.5	614	1.6	0	0.0	<b>1202</b>	3.2
1.5- 2.0	991	2.6	0	0.0	<b>1740</b>	4.6
2.0- 2.5	44	3.9	<b>0</b>	<b>0.0</b>	<b>2289</b>	6.1
2.5- 3.0	1627	4.3	0	0.0	<b>2490</b>	6.6
3.0- 3.5	<b>1699</b>	4.5	0	0.0	<b>2593</b>	6.9
3.5- 4.0	1989	5.3	0	0.0	<b>2889</b>	7.6
4.0- 4.5	2654	7.1	0	0.0	<b>3478</b>	9.2
4.5- 5.0	2207	5.9	0	0.0	<b>2523</b>	6.7
5.0- 5.5	2292	6.1	0	0.0	<b>2415</b>	6.4
5.5- <b>6.0</b>	2189	5.8	0	0.0	<b>2133</b>	5.6
6.0- 6.5	2478	6.6	<b>0</b>	<b>0.0</b>	<b>2344</b>	6.2
6.5- 7.0	2058	5.5	0	0.0	<b>1842</b>	<b>4.9</b>
7.0- 7.5	1989	5.3	<b>0</b>	<b>0.0</b>	<b>1606</b>	4.2
7.5- 8.0	1681	4.5	0	0.0	<b>1290</b>	3.4
<b>8.0-</b> 8.5	2012	5.4	0	0.0	<b>1527</b>	4.0
8.5- <b>9.0</b>	1453	3.9	0	0.0	<b>954</b>	2.5
<b>9.0-</b> 9.5	1127	3.0	0	0.0	<b>696</b>	1.8
9.5-10.0	1069	2.8	0	0.0	<b>636</b>	1.7
<b>10.0-11.0</b>	1790	4.8	<b>0</b>	<b>0.0</b>	<b>983</b>	2.6
11.0-12.0	1198	3.2	0	0.0	<b>587</b>	1.6
12.0-13.0	1074	2.9	0	0.0	<b>364</b>	<b>1.0</b>
13.0-14.0	601	1.6	0	0.0	<b>186</b>	0.5
14.0-15.0	366	1.0	0	0.0	<b>117</b>	0.3
15.0-16.0	221	0.6	0	0.0	<b>72</b>	0.2
<b>16.0-17.0</b>	128	0.3	0	0.0	<b>54</b>	0.1
17.0-18.0	<b>70</b>	0.2	0	0.0	<b>19</b>	<b>0.1</b>
<b>18.0-19.0</b>	59	0.2	0	0.0	<b>19</b>	0.1
19.0-20.0	25	0.1	0	0.0	<b>8</b>	0.0
<b>20.0-21.0</b>	<b>21</b>	<b>0.1</b>	<b>0</b>	<b>0.0</b>	<b>6</b>	<b>0.0</b>
<b>&gt;21.0</b>	22	0.1	0	0.0	6	0.0

RECOVERY RATES

LEVEL A	LEVEL B	LEVEL C
90.1	0.0	<b>90.9</b>

SITE ID: NB  
 SITE LOCATION: KINGSLEY DAM, NB.  
 DATA : DECEMBER 1976 THROUGH AUGUST 1981

1.6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)
0.5	52	0.14	0	0.00	135	0.36
1.0	362	0.97	0	0.00	763	2.02
1.5	976	2.60	0	0.00	1965	5.19
2.0	1967	5.24	0	0.00	3705	9.79
2.5	3413	9.10	0	0.00	5994	15.84
3.0	5040	13.14	0	0.00	8424	22.43
3.5	6139	17.96	0	0.00	11077	29.28
4.0	8728	23.27	0	0.00	13966	36.92
4.5	11382	30.34	0	0.00	17444	46.11
5.0	13589	36.23	0	0.00	19967	52.78
5.5	15881	42.34	0	0.00	22382	59.16
6.0	18070	48.17	0	0.00	24515	64.80
6.5	20548	54.78	0	0.00	26859	71.00
7.0	22606	60.26	0	0.00	28701	75.87
7.5	24595	65.57	0	0.00	30307	80.11
8.0	26276	70.05	0	0.00	31597	83.52
8.5	28288	75.41	0	0.00	33124	87.56
9.0	29741	79.28	0	0.00	34078	90.08
9.5	30868	82.29	0	0.00	34774	91.92
10.0	31937	85.14	0	0.00	35410	93.60
11.0	33727	89.91	0	0.00	36393	96.20
12.0	34925	93.10	0	0.00	36980	97.75
13.0	35999	95.97	0	0.00	37344	98.71
14.0	36600	97.57	0	0.00	37530	99.20
15.0	36966	98.54	0	0.00	37647	99.51
16.0	37187	99.13	0	0.00	37719	99.70
17.0	37315	99.47	0	0.00	37773	99.85
18.0	37385	99.66	0	0.00	37792	99.90
19.0	37444	99.82	0	0.00	37811	99.95
20.0	37469	99.89	0	0.00	37819	99.97
21.0	37490	99.94	0	0.00	37825	99.98
>21.0	37512	100.00	0	0.00	37831	100.00

SITE ID: NB  
SITE LOCATION: KINGSLEY DAM, NB.  
DATA : DECEMBER 1976 THROUGH AUGUST 1981

1.7 WIND SPEED PERSISTENCE FREQUENCY (LEVEL A)

HOURS	NUMBER OF OCCURENCES							
	WIND SPEED CLASS, METERS/SEC							
	< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20
1	762	173	021	352	218	2111	1400	387
2	335	484	632	576	574	516	135	2
3	202	173	231	175	187	306	70	2
4	134	47	72	59	68	229	37	3
5	77	23	31	19	19	156	37	1
6	64	9	13	9	13	107	19	0
7	40	2	2	1	2	86	14	1
8	13	0	2	0	2	61	20	0
9	22	0	0	0	3	39	2	0
10	8	0	1	0	0	34	5	0
11	5	0	1	0	0	34	9	0
12	4	0	0	0	0	17	2	0
13	4	0	1	0	0	15	2	0
14	2	0	0	0	0	11	3	0
15	6	0	0	0	0	7	2	0
16	1	0	0	0	0	4	0	0
17	1	0	0	0	0	5	1	0
18	0	0	0	0	0	2	0	0
19	0	0	0	0	0	2	1	0
20	0	0	0	0	0	1	0	0
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	1	0	0
23	0	0	0	0	0	0	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: NB  
 SITE LOCATION: KINGSLEY DAM, NB.  
 DATA : DECEMBER 1976 THROUGH AUGUST 1961

-----  
 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR

(ELEV A)	ALPHA (A, B)	ALPHA (B, C)	ALPHA (A, C)	ALPHA (A, B, C)	%A	%B	%C
N	0.00	0.00	0.19	0.00	4.65	0.00	3.64
NNE	0.00	0.00	0.11	0.00	4.79	0.00	5.17
NE	0.00	0.00	0.07	0.00	4.63	0.00	5.42
ENE	0.00	0.00	0.12	0.00	4.76	0.00	5.04
E	0.00	0.00	0.14	0.00	4.94	0.00	5.84
ESE	0.00	0.00	0.17	0.00	5.01	0.00	5.26
SE	0.00	0.00	0.18	0.00	7.04	0.00	6.20
SSE	0.00	0.00	0.14	0.00	8.51	0.00	7.69
S	0.00	0.00	0.10	0.00	7.24	0.00	7.81
SSW	0.00	0.00	0.11	0.00	4.65	0.00	5.28
SW	0.00	0.00	0.09	0.00	3.59	0.00	4.21
WSW	0.00	0.00	0.18	0.00	4.48	0.00	5.15
W	0.00	0.00	0.15	0.00	7.23	0.00	8.48
WNW	0.00	0.00	0.11	0.00	11.68	0.00	11.35
NW	0.00	0.00	0.12	0.00	6.95	0.00	7.24
NNW	0.00	0.00	0.10	0.00	6.02	0.00	5.60

NOTES :

$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

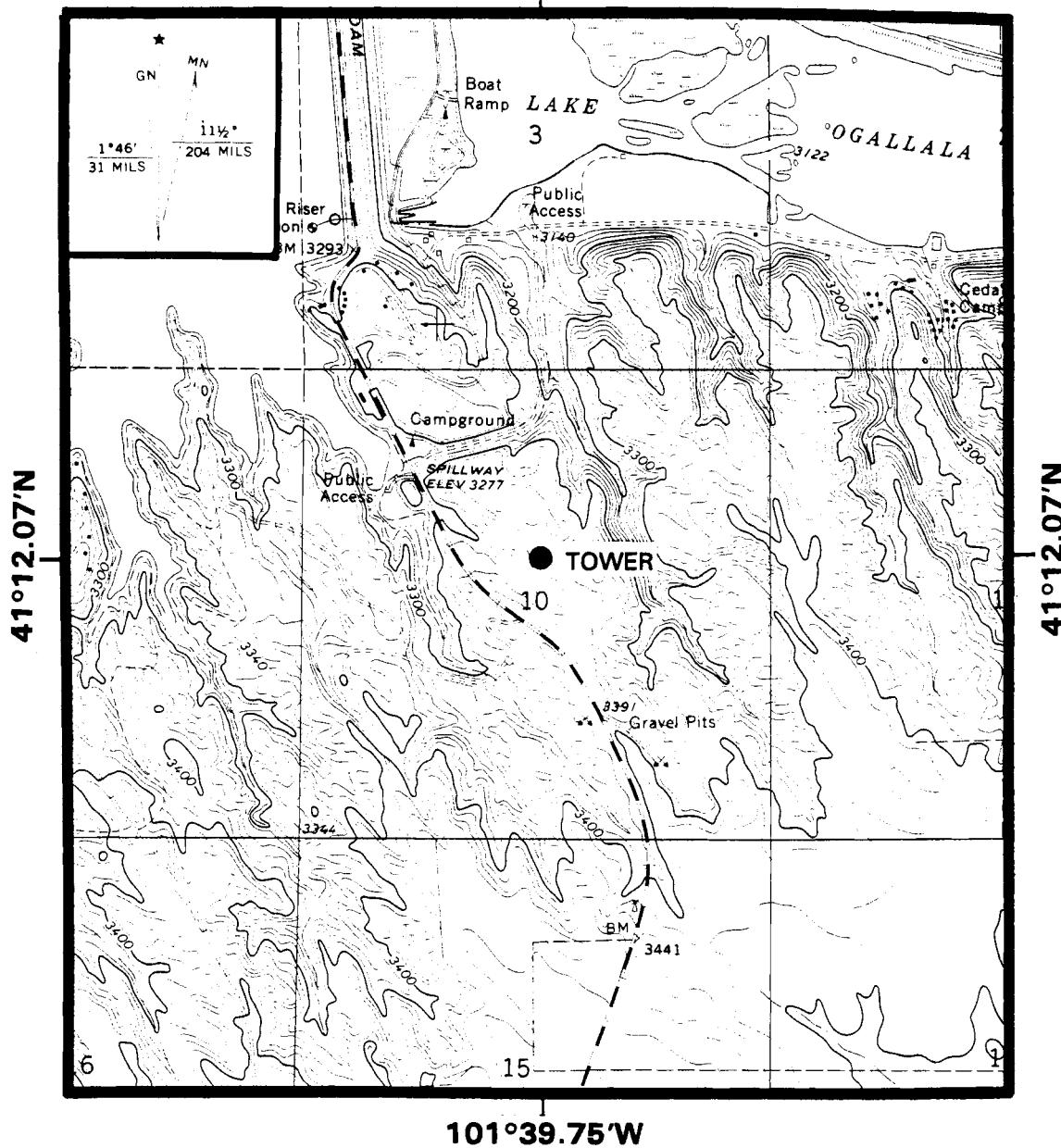
ALPHA

$$2. \text{ ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))}$$

WHERE; Z=ELEVATION  
WS=WIND SPEED

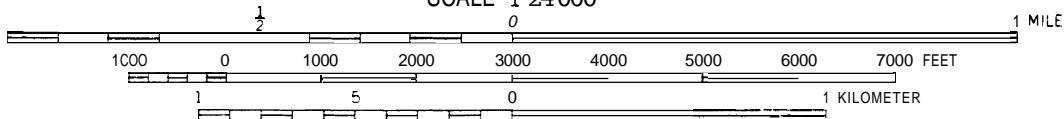
# KINGSLEY DAM, NEB.

101°39.75'W



101°39.75'W

SCALE 1:24000



CONTOUR INTERVAL 20 FEET  
DOTTED LINES REPRESENT 5-FOOT CONTOURS  
DATUM IS MEAN SEA LEVEL

NB-07

LUDINGTON, MICHIGAN

SITE ID: MI  
SITE LOCATION: LUDINGTON, MI.  
DATA : APRIL 1977 THROUGH OCTOBER 1979

1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 22656

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	91.2
WD(A)	100.0	86.0
WS(C)	100.0	79.0
WD(C)	100.0	83.2

1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	HEIGHT (METERS)	MEAN	MEAN	POWER
		WS	WD	WATTS/M**2
(A) 45.7	7.5	200.1	466.74	
(C) 18.2	5.2	189.5	181.84	

1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	28.2	-999.9	01/26/78	15:00	(B)-999.9 (C) 23.7
(C) 18.2	23.7	351.6	01/26/78	15:00	(A) 28.2 (B)-999.9

NOTES:

1. SITE ELEVATION: 213 METERS ABOVE SEA LEVEL.
3. SENSOR LEVEL B NOT AVAILABLE AT SITE MI.

SITE ID: MI  
SITE LOCATION: LUDINGTON, MI.  
DATA : APRIL 1977 THROUGH OCTOBER 1979

1 4 WIND SPEED AND DIRECTION VERSUS TIME-OF-DAY

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	7.9	128.6	0.0	0.0	5.3	159.4
01:00	7.8	135.8	0.0	0.0	5.4	158.3
02:00	7.8	141.8	0.0	0.0	5.4	162.5
03:00	7.8	149.1	0.0	0.0	5.4	166.4
04:00	7.7	152.8	0.0	0.0	5.3	166.8
05:00	7.7	151.5	0.0	0.0	5.3	167.9
06:00	7.6	151.8	0.0	0.0	5.2	167.6
07:00	7.6	149.9	0.0	0.0	5.2	167.0
08:00	7.4	154.9	0.0	0.0	5.1	170.9
09:00	7.2	167.6	0.0	0.0	4.9	178.0
10:00	7.1	201.6	0.0	0.0	4.9	195.9
11:00	7.1	241.2	0.0	0.0	4.9	215.9
12:00	7.3	259.2	0.0	0.0	4.9	225.7
13:00	7.4	269.3	0.0	0.0	5.0	231.0
14:00	7.4	271.3	0.0	0.0	5.1	237.8
15:00	7.6	273.8	0.0	0.0	5.2	240.5
16:00	7.5	274.8	0.0	0.0	5.3	237.7
17:00	7.4	269.5	0.0	0.0	5.2	229.7
18:00	7.3	259.9	0.0	0.0	5.1	216.6
19:00	7.2	226.9	0.0	0.0	5.0	194.9
20:00	7.3	150.8	0.0	0.0	5.0	175.9
21:00	7.4	119.8	0.0	0.0	5.1	160.7
22:00	7.6	124.9	0.0	0.0	5.2	156.9
23:00	7.7	128.3	0.0	0.0	5.3	157.0

SITE ID:

MI

SITE LOCATION: LUDINGTON, MI.

DATA : APRIL 1977 THROUGH OCTOBER 1979

## 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	%	LEVEL B COUNT	%	LEVEL C COUNT	%
------------	---------------	---	---------------	---	---------------	---

0.0- 0.5	25	0.1	0	0.0	256	1.4
0.5- 1.0	126	0.6	0	0.0	643	3.6
1.0- 1.5	216	1.0	0	0.0	693	3.9
1.5- 2.0	419	2.0	0	0.0	872	4.9
2.0- 2.5	604	2.9	0	0.0	960	5.4
2.5- 3.0	699	3.4	0	0.0	1107	6.2
3.0- 3.5	678	3.3	0	0.0	1076	6.0
3.5- 4.0	865	4.2	0	0.0	1248	7.0
4.0- 4.5	1287	6.2	0	0.0	1565	8.7
4.5- 5.0	919	4.4	0	0.0	1066	6.0
5.0- 5.5	992	4.8	0	0.0	1184	6.6
5.5- 6.0	893	4.3	0	0.0	1047	5.8
6.0- 6.5	1317	6.4	0	0.0	1260	7.0
6.5- 7.0	1067	5.2	0	0.0	850	4.7
7.0- 7.5	1135	5.5	0	0.0	773	4.3
7.5- 8.0	964	4.7	0	0.0	522	2.9
8.0- 8.5	1419	6.9	0	0.0	625	3.5
8.5- 9.0	905	4.4	0	0.0	381	2.1
9.0- 9.5	761	3.7	0	0.0	311	1.7
9.5-10.0	732	3.5	0	0.0	265	1.5
10.0-11.0	1280	6.2	0	0.0	421	2.4
11.0-12.0	921	4.5	0	0.0	274	1.5
12.0-13.0	781	3.8	0	0.0	190	1.1
13.0-14.0	454	2.2	0	0.0	107	0.6
14.0-15.0	355	1.7	0	0.0	80	0.4
15.0-16.0	268	1.3	0	0.0	43	0.2
16.0-17.0	202	1.0	0	0.0	31	0.2
17.0-18.0	140	0.7	0	0.0	29	0.2
18.0-19.0	67	0.3	0	0.0	10	0.1
19.0-20.0	53	0.3	0	0.0	5	0.0
20.0-21.0	34	0.2	0	0.0	7	0.0
>21.0	74	0.4	0	0.0	8	0.0

## RECOVERY RATES

LEVEL A	LEVEL B	LEVEL C
91.2	0.0	79.0

SITE ID: HI  
 SITE LOCATION: LUDINGTON, MI.  
 DATA : APRIL 1977 THROUGH OCTOBER 1979

-----  
 1.6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED  
 -----

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)
0.5	25	0.12	0	0.00	256	1.43
1.0	151	0.73	0	0.00	899	5.02
1.5	367	1.78	0	0.00	1592	8.89
2.0	786	3.81	0	0.00	2464	13.76
2.5	1390	6.73	0	0.00	3424	19.12
3.0	2089	10.12	0	0.00	4531	25.30
3.5	2767	13.40	0	0.00	5607	31.31
4.0	3632	17.59	0	0.00	6855	38.28
4.5	4919	23.82	0	0.00	8420	47.02
5.0	5838	28.27	0	0.00	9486	52.97
5.5	6830	33.07	0	0.00	10670	59.58
6.0	7723	37.40	0	0.00	11717	65.43
6.5	9040	43.77	0	0.00	12977	72.46
7.0	10107	48.94	0	0.00	13827	77.21
7.5	11242	54.44	0	0.00	14600	81.52
8.0	12206	59.10	0	0.00	15122	84.44
8.5	13625	65.97	0	0.00	15747	87.93
9.0	14530	70.36	0	0.00	16128	90.06
9.5	15291	74.04	0	0.00	16439	91.79
10.0	16023	77.59	0	0.00	16704	93.27
11.0	17303	83.78	0	0.00	17125	95.62
12.0	18224	88.24	0	0.00	17399	97.15
13.0	19005	92.02	0	0.00	17589	98.21
14.0	19459	94.22	0	0.00	17696	98.81
15.0	19814	95.94	0	0.00	17776	99.26
16.0	20082	97.24	0	0.00	17819	99.50
17.0	20284	98.22	0	0.00	17850	99.67
18.0	20424	98.90	0	0.00	17879	99.83
19.0	20491	99.22	0	0.00	17889	99.89
20.0	20544	99.48	0	0.00	17894	99.92
21.0	20578	99.64	0	0.00	17901	99.96
>21.0	20652	100.00	0	0.00	17909	100.00

SITE ID: NI  
SITE LOCATION: LUDINGTON, MI.  
DATA : APRIL 1977 THROUGH OCTOBER 1979

1.7 WIND SPEED PERSISTENCE FREQUENCY (LEVEL A)

HOURS	NUMBER OF OCCURENCES								
	WIND SPEED CLASS, METERS/SEC								
< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20		
1	273	738	882	953	1037	717	229	10	
2	125	201	268	262	311	213	75	4	
3	86	63	122	55	101	149	42	3	
4	54	27	49	25	34	100	24	2	
5	24	11	11	9	20	91	26	2	
6	18	3	7	2	4	61	13	0	
7	24	0	3	0	3	55	12	1	
8	12	0	1	0	0	36	8	0	
9	10	0	1	0	0	24	8	0	
10	4	0	0	0	0	21	3	0	
11	3	0	0	0	0	18	7	0	
12	1	0	0	0	0	12	3	0	
13	2	0	0	0	0	4	2	0	
14	1	0	0	0	0	6	1	0	
15	0	0	0	0	0	6	0	0	
16	1	0	0	0	0	3	1	0	
17	0	0	0	0	0	3	1	0	
18	0	0	0	0	0	5	1	0	
19	0	0	0	0	0	3	1	0	
20	0	0	0	0	0	0	0	0	
21	0	0	0	0	0	0	1	0	
22	0	0	0	0	0	0	0	0	
23	0	0	0	0	0	0	0	0	
>23	0	0	0	0	0	0	0	0	

SITE ID: MI  
 SITE LOCATION: LUDINGTON, MI.  
 DATA : APRIL 1977 THROUGH OCTOBER 1979

-----  
 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR

(ELEV A)	ALPHA (A, B)	ALPHA (B, C)	ALPHA (A, C)	ALPHA (A, B, C)	%A	%B	%C
N	0.00	0.00	0.11	0.00	5.80	0.00	4.96
NNE	0.00	0.00	0.20	0.00	5.73	0.00	5.62
NE	0.00	0.00	0.19	0.00	5.65	0.00	5.62
ENE	0.00	0.00	0.21	0.00	4.52	0.00	4.72
E	0.00	0.00	0.35	0.00	4.56	0.00	4.31
ESE	0.00	0.00	0.25	0.00	5.26	0.00	6.27
SE	0.00	0.00	0.35	0.00	5.74	0.00	5.91
SSE	0.00	0.00	0.43	0.00	5.59	0.00	4.95
S	0.00	0.00	0.36	0.00	7.85	0.00	9.99
SSW	0.00	0.00	0.34	0.00	9.02	0.00	10.42
SW	0.00	0.00	0.43	0.00	6.26	0.00	5.44
WSW	0.00	0.00	0.58	0.00	5.54	0.00	5.32
W	0.00	0.00	0.80	0.00	4.48	0.00	3.77
WNW	0.00	0.00	0.82	0.00	5.50	0.00	5.06
NW	0.00	0.00	0.77	0.00	5.34	0.00	5.20
NNW	0.00	0.00	0.30	0.00	6.11	0.00	5.87

NOTES:

$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

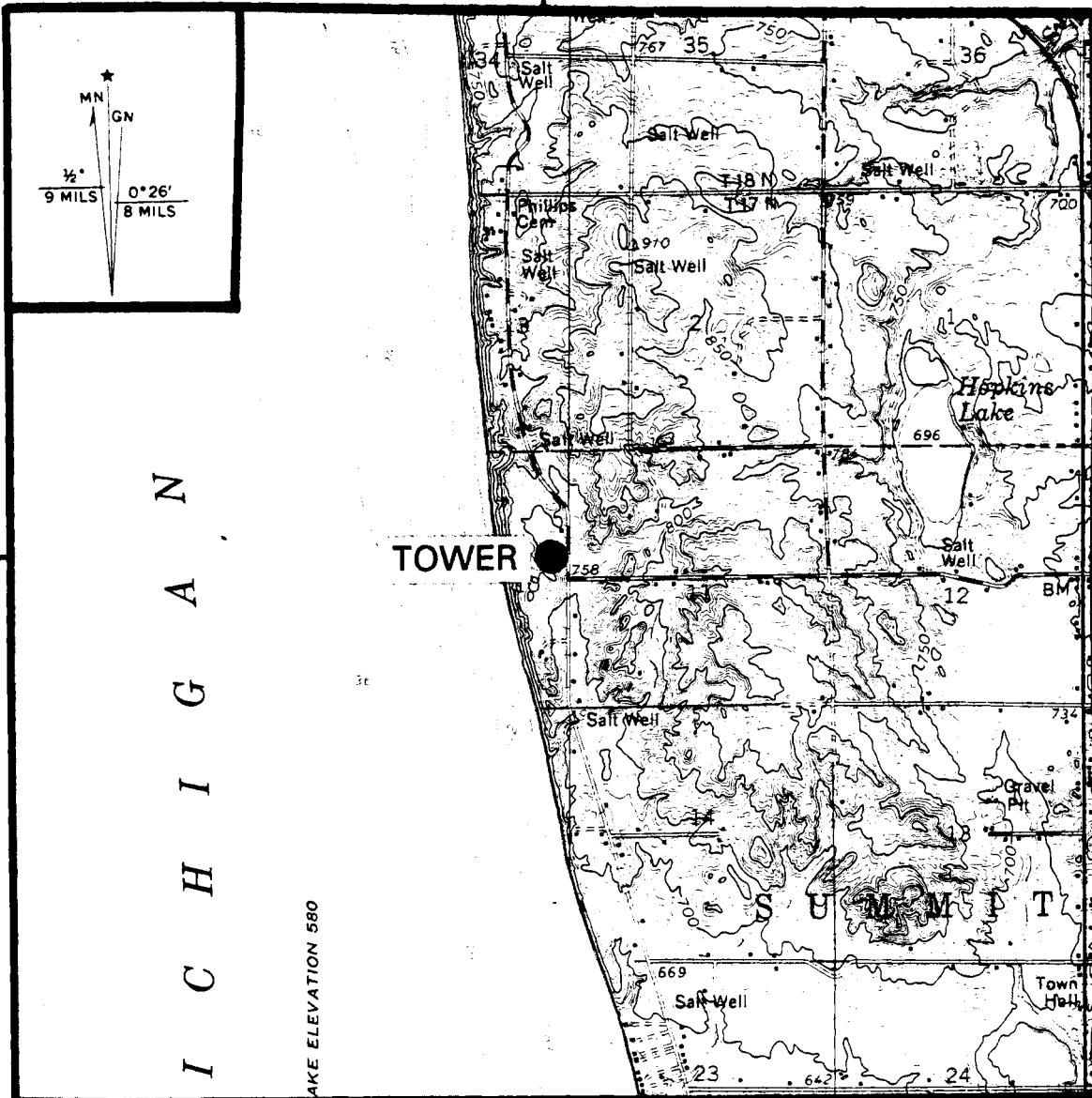
$$2. \text{ ALPHA} = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))}$$

WHERE; Z=ELEVATION  
WS=WIND SPEED

# LUDINGTON, MI

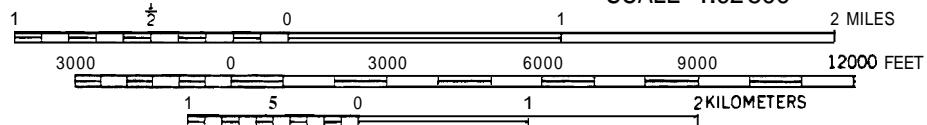
86°26.59'W

I C H I G A N  
43°53.15'N



86°25.59'W

SCALE 1:62500



MONTAUK POINT, NEW YORK

SITE ID: NY  
SITE LOCATION: MONTAUK POINT, NY.  
DATA : JANUARY 1977 THROUGH DECEMBER 1981  
I. I SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 43824

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	76.7
WD(A)	100.0	74.8
WS(C)	100.0	80.3
WD(C)	100.0	78.8

1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	(A) 45.7	HEIGHT	MEAN	MEAN	POWER
		(METERS)	WS	WD	WATTS/M**2
	(C) 18.2	7.2	262.7	271.4	436.65
		6.2			307.97

1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	KIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	26.0	207.0	11/14/78	19:00	(B)-999.9 (C) 24.0
(C) 18.2	24.0	213.0	11/14/78	19:00	(A) 26.0 (B)-999.9

NOTES:

1. SITE ELEVATION: 2 METERS ABOVE SEA LEVEL.
3. SENSOR LEVEL B NOT AVAILABLE AT SITE NY.

SITE ID: NY  
SITE LOCATION: MONTAUK POINT, NY.  
DATA : JANUARY 1977 THROUGH DECEMBER 1981

1.4 WIND SPEED AND DIRECTION VERSUS TIME-OF-DAY

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	7.2	273.6	0.0	0.0	6.1	282.7
01:00	7.1	276.0	0.0	0.0	6.0	285.9
02:00	7.0	279.9	0.0	0.0	5.9	289.4
03:00	7.1	282.1	0.0	0.0	5.9	290.8
04:00	7.0	283.6	0.0	0.0	5.9	293.1
05:00	7.0	285.6	0.0	0.0	5.9	294.9
06:00	6.9	287.3	0.0	0.0	5.9	296.6
07:00	6.9	288.6	0.0	0.0	6.0	298.6
08:00	7.0	289.2	0.0	0.0	6.1	298.4
09:00	7.0	285.3	0.0	0.0	6.2	294.5
10:00	7.0	278.9	0.0	0.0	6.3	288.3
11:00	7.1	268.2	0.0	0.0	6.4	277.9
12:00	7.2	255.9	0.0	0.0	6.5	263.8
13:00	7.3	247.2	0.0	0.0	6.6	253.2
14:00	7.4	239.1	0.0	0.0	6.6	245.3
15:00	7.4	236.0	0.0	0.0	6.6	241.3
16:00	7.5	234.2	0.0	0.0	6.5	240.0
17:00	7.5	234.6	0.0	0.0	6.4	239.9
18:00	7.6	237.9	0.0	0.0	6.4	243.0
19:00	7.6	241.5	0.0	0.0	6.3	246.2
20:00	7.6	247.8	0.0	0.0	6.3	255.0
21:00	7.5	253.4	0.0	0.0	6.2	261.5
22:00	7.4	260.0	0.0	0.0	6.2	268.6
23:00	7.3	268.9	0.0	0.0	6.2	278.0

SITE ID: NY  
SITE LOCATION: MONTAUK POINT, NY.  
DATA : JANUARY 1977 THROUGH DECEMBER 1981

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	%	LEVEL B COUNT	%	LEVEL C COUNT	%
------------	---------------	---	---------------	---	---------------	---

0.0- 0.5	48	0.1	0	0.0	170	0.5
0.5- 1.0	267	0.8	0	0.0	625	1.8
1.0- 1.5	527	1.6	0	0.0	969	2.8
1.5- 2.0	820	2.4	0	0.0	1209	3.4
2.0- 2.5	1058	3.1	0	0.0	1480	4.2
2.5- 3.0	1162	3.5	0	0.0	1603	4.6
3.0- 3.5	1193	3.5	0	0.0	1807	5.1
3.5- 4.0	4 4	4.3	0	0.0	1957	5.6
4.0- 4.5	1933	5.7	0	0.0	2695	7.7
4.5- 5.0	1666	5.0	0	0.0	2073	5.9
5.0- 5.5	1834	5.5	0	0.0	2163	6.1
5.5- 6.0	1749	5.2	0	0.0	2003	5.7
6.0- 6.5	2148	6.4	0	0.0	2309	6.6
6.5- 7.0	1846	5.5	0	0.0	1759	5.0
7.0- 7.5	1852	5.5	0	0.0	1742	5.0
7.5- 8.0	1547	4.6	0	0.0	1460	4.1
8.0- 8.5	1980	5.9	0	0.0	1554	4.4
8.5- 9.0	1469	4.4	0	0.0	1053	3.0
9.0- 9.5	1054	3.1	0	0.0	897	2.5
9.5-10.0	1098	3.3	0	0.0	813	2.3
10.0-11.0	1862	5.5	0	0.0	1361	3.9
11.0-12.0	1394	4.1	0	0.0	1010	2.9
12.0-13.0	1099	3.3	0	0.0	831	2.4
13.0-14.0	711	2.1	0	0.0	490	1.4
14.0-15.0	608	1.8	0	0.0	428	1.2
15.0-16.0	426	1.3	0	0.0	288	0.8
16.0-17.0	343	1.0	0	0.0	183	0.5
17.0-18.0	218	0.6	0	0.0	115	0.3
18.0-19.0	109	0.3	0	0.0	64	0.2
19.0-20.0	69	0.2	0	0.0	37	0.1
20.0-21.0	57	0.2	0	0.0	28	0.1
>21.0	40	0.1	0	0.0	13	0.0

RECOVERY RATES  
LEVEL A LEVEL B LEVEL C  
76.7 0.0 80.3

SITE ID: NY  
 SITE LOCATION: KONTAUK POINT, NY.  
 DATA : JANUARY 1977 THROUGH DECEMBER 1981

1.6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)
0.5	48	0.14	0	0.00	170	0.48
1.0	315	0.94	0	0.00	795	2.26
1.5	842	2.50	0	0.00	1764	5.01
2.0	1662	4.94	0	0.00	2973	8.45
2.5	2720	8.09	0	0.00	4453	12.65
3.0	3882	11.54	0	0.00	6056	17.21
3.5	5075	15.09	0	0.00	7863	22.35
4.0	6521	19.39	0	0.00	9820	27.91
4.5	8454	25.14	0	0.00	12515	35.57
5.0	10120	30.09	0	0.00	14588	41.46
5.5	11954	35.54	0	0.00	16751	47.60
6.0	13703	40.74	0	0.00	18754	53.30
6.5	15851	47.13	0	0.00	21063	59.86
7.0	17697	52.62	0	0.00	22822	64.86
7.5	19549	58.12	0	0.00	24564	69.81
8.0	21096	62.72	0	0.00	26024	73.95
8.5	23076	68.61	0	0.00	27578	78.37
9.0	24545	72.98	0	0.00	28631	81.36
9.5	25599	76.11	0	0.00	29528	83.91
10.0	26697	79.38	0	0.00	30341	86.22
11.0	28559	84.91	0	0.00	31702	90.09
12.0	29953	89.06	0	0.00	32712	92.96
13.0	31052	92.33	0	0.00	33543	95.32
14.0	31763	94.44	0	0.00	34033	96.71
15.0	32371	96.25	0	0.00	34461	97.93
16.0	32797	97.51	0	0.00	34749	98.75
17.0	33140	98.53	0	0.00	34932	99.27
18.0	33358	99.18	0	0.00	35047	99.60
19.0	33467	99.51	0	0.00	35111	99.78
20.0	33536	99.71	0	0.00	35148	99.88
21.0	33593	99.88	0	0.00	35176	99.96
>21.0	33633	100.00	0	0.00	35189	100.00

SITE ID: NY  
SITE LOCATION: MONTAUK POINT, NY.  
DATA : JANUARY 1977 THROUGH DECEMBER 1981

1.7 WIND SPEED PERSISTENCE FREQUENCY (LEVEL A)

HOURS	NUMBER OF OCCURENCES							
	WIND SPEED CLASS, METERS/SEC							
< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20	
1	5	16	11	88	13	64	15	66
2	170	332	443	457	511	349	102	5
3	101	112	183	150	185	226	50	6
4	75	44	73	56	71	166	39	2
5	48	22	20	20	37	115	34	0
6	42	5	15	12	6	98	19	0
7	27	3	9	6	8	68	20	1
8	25	2	2	0	1	43	16	1
9	15	0	2	1	3	34	11	0
10	11	0	1	1	0	37	6	0
11	10	0	1	0	0	26	9	0
12	5	0	0	0	0	21	3	0
13	1	0	0	0	0	17	8	0
14	2	0	0	0	0	19	4	0
15	1	0	0	1	0	11	1	0
16	2	0	0	0	0	8	1	0
17	0	0	0	0	0	4	7	0
18	0	0	0	0	0	4	2	0
19	0	0	0	0	0	1	3	0
20	0	0	0	0	0	3	0	0
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	1	0	0
23	0	0	0	0	0	0	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: NY  
 SITE LOCATION: MONTAUK POINT, NY.  
 DATA : JANUARY 1977 THROUGH DECEMBER 1981

-----  
 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR

(ELEV A)	ALPHA (A,B)	ALPHA (B,C)	ALPHA (A,C)	ALPHA (A,B,C)	%A	%B	%C
N	0.00	0.00	0.06	0.00	3.01	0.00	3.23
NNE	0.00	0.00	0.20	0.00	2.96	0.00	3.31
NE	0.00	0.00	0.17	0.00	4.32	0.00	4.72
ENE	0.00	0.00	0.22	0.00	3.94	0.00	4.31
E	0.00	0.00	0.20	0.00	3.21	0.00	3.55
ESE	0.00	0.00	0.30	0.00	2.60	0.00	2.37
SE	0.00	0.00	0.27	0.00	3.41	0.00	4.26
SSE	0.00	0.00	0.29	0.00	3.90	0.00	3.96
S	0.00	0.00	0.25	0.00	4.71	0.00	5.36
SSW	0.00	0.00	0.25	0.00	6.92	0.00	7.16
SW	0.00	0.00	0.17	0.00	9.57	0.00	9.25
WSW	0.00	0.00	0.15	0.00	7.45	0.00	7.66
W	0.00	0.00	0.11	0.00	10.15	0.00	9.88
WNW	0.00	0.00	0.17	0.00	10.36	0.00	10.73
NW	0.00	0.00	0.07	0.00	11.05	0.00	11.69
NMW	0.00	0.00	0.08	0.00	5.80	0.00	6.45

NOTES:

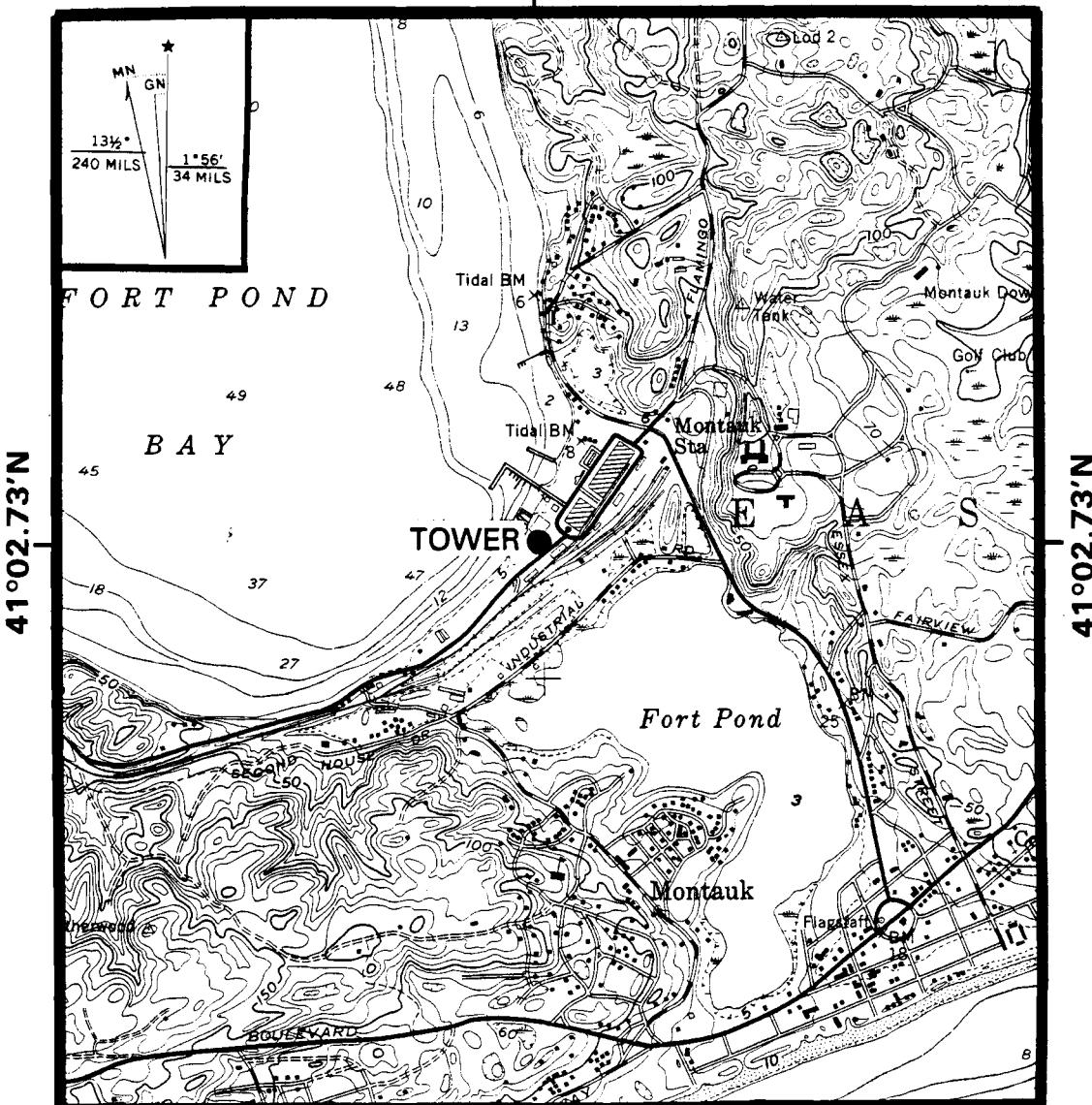
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

$$2. \text{ ALPHA} = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))}$$

WHERE; Z=ELEVATION  
WS=WIND SPEED

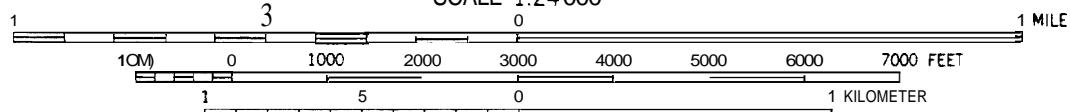
# MONTAUK, NY

71°57.48'W



71°57.48'W

SCALE 1:24 000



POINT ARENA, CALIFORNIA

SITE ID: CA  
SITE LOCATION: POINT ARENA, CA.  
DATA : JANUARY 1977 THROUGH SEPTEMBER 1981

1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 41616

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	77.1
WD(A)	100.0	75.8
WS(C)	100.0	80.7
WD(C)	100.0	70.7

1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	(A) 45.7	HEIGHT	MEAN	MEAN	POWER
		(METERS)	WS	WD	WATTS/M**2
(C) 9.1		6.5	347.0	322.81	
		4.7	357.8	130.54	

1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	22.4	152.0	12/20/77	22:00	(B)-999.9 (C) 16.1
(C) 9.1	17.9	149.0	12/20/77	19:00	(A) 21.5 (B)-999.9

NOTES:

1. SITE ELEVATION: 21 METERS ABOVE SEA LEVEL.
3. SENSOR LEVEL B NOT AVAILABLE AT SITE CA.

SITE ID: CA  
SITE LOCATION: POINT ARENA, CA.  
DATA : JANUARY 1977 THROUGH SEPTEMBER 1981

-----  
1.4 WIND SPEED AND DIRECTION VERSUS TIME-OF-DAY  
-----

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	6.4	0.2	0.0	0.0	4.4	17.4
01:00	6.3	1.1	0.0	0.0	4.3	20.1
02:00	6.2	2.4	0.0	0.0	4.3	23.2
03:00	6.1	4.6	0.0	0.0	4.2	26.2
04:00	6.0	7.6	0.0	0.0	4.2	28.3
05:00	6.0	8.9	0.0	0.0	4.1	29.3
06:00	5.9	7.1	0.0	0.0	4.2	27.0
07:00	5.9	3.5	0.0	0.0	4.3	20.8
08:00	6.0	356.1	0.0	0.0	4.4	7.2
09:00	6.2	338.4	0.0	0.0	4.7	340.8
10:00	6.5	319.2	0.0	0.0	4.9	317.2
11:00	6.7	313.9	0.0	0.0	5.1	311.0
12:00	6.9	314.6	0.0	0.0	5.3	311.5
13:00	7.0	316.1	0.0	0.0	5.3	314.3
14:00	7.1	320.0	0.0	0.0	5.3	317.1
15:00	7.0	326.0	0.0	0.0	5.3	323.9
16:00	7.0	332.6	0.0	0.0	5.2	332.0
17:00	7.0	339.3	0.0	0.0	5.0	342.6
18:00	6.8	345.7	0.0	0.0	4.9	352.5
19:00	6.7	351.0	0.0	0.0	4.7	359.9
20:00	6.6	354.5	0.0	0.0	4.6	5.3
21:00	6.5	357.6	0.0	0.0	4.5	9.7
22:00	6.4	358.3	0.0	0.0	4.4	12.9
23:00	6.4	358.9	0.0	0.0	4.4	15.3

SITE ID:

CA

SITE LOCATION:

POINT ARENA, CA.

DATA :

JANUARY 1977 THROUGH SEPTEMBER 1981

---

---

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

---

---

WIND SPEED	LEVEL A COUNT	LEVEL A %	LEVEL B COUNT	LEVEL B %	LEVEL C COUNT	LEVEL C %
------------	------------------	--------------	------------------	--------------	------------------	--------------

---

0.0- 0.5	145	0.5	0	0.0	390	1.2
0.5- 1.0	548	1.7	0	0.0	1220	3.6
1.0- 1.5	873	2.7	0	0.0	2010	6.0
1.5- 2.0	1171	3.7	0	0.0	2489	7.4
2.0- 2.5	1590	5.0	0	0.0	2682	8.0
2.5- 3.0	1429	4.5	0	0.0	2251	6.7
3.0- 3.5	1485	4.6	0	0.0	2039	6.1
3.5- 4.0	1552	4.8	0	0.0	1975	5.9
4.0- 4.5	1795	5.6	0	0.0	2445	7.3
4.5- 5.0	1466	4.6	0	0.0	1898	5.7
5.0- 5.5	1537	4.8	0	0.0	1927	5.7
5.5- 6.0	1496	4.7	0	0.0	1831	5.5
6.0- 6.5	1829	5.7	0	0.0	2128	6.3
6.5- 7.0	1591	5.0	0	0.0	1658	4.9
7.0- 7.5	1623	5.1	0	0.0	1514	4.5
7.5- 8.0	1529	4.8	0	0.0	1157	3.4
8.0- 8.5	1834	5.7	0	0.0	1252	3.7
8.5- 9.0	1362	4.2	0	0.0	755	2.2
9.0- 9.5	1152	3.6	0	0.0	452	1.3
9.5-10.0	1114	3.5	0	0.0	380	1.1
<b>10.0-11.0</b>	<b>1686</b>	<b>5.3</b>	<b>0</b>	<b>0.0</b>	<b>547</b>	<b>1.6</b>
11.0-12.0	1186	3.7	0	0.0	244	0.7
12.0-13.0	854	2.7	0	0.0	139	0.4
13.0-14.0	449	1.4	0	0.0	81	0.2
14.0-15.0	295	0.9	0	0.0	58	0.2
15.0-16.0	173	0.5	0	0.0	25	0.1
<b>16.0-17.0</b>	<b>132</b>	<b>0.4</b>	<b>0</b>	<b>0.0</b>	<b>14</b>	<b>0.0</b>
<b>17.0-18.0</b>	<b>73</b>	<b>0.2</b>	<b>0</b>	<b>0.0</b>	<b>3</b>	<b>0.0</b>
18.0-19.0	58	0.2	0	0.0	0	0.0
19.0-20.0	29	0.1	0	0.0	0	0.0
20.0-21.0	10	0.0	0	0.0	0	0.0
<b>&gt;21.0</b>	<b>13</b>	<b>0.0</b>	<b>0</b>	<b>0.0</b>	<b>0</b>	<b>0.0</b>

## RECOVERY RATES

LEVEL A	LEVEL B	LEVEL C
77.1	0.0	80.7

SITE ID: CA  
 SITE LOCATION: POINT ARENA, CA.  
 DATA : JANUARY 1977 THROUGH SEPTEMBER 1981

-----  
 1.6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED  
 -----

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)
0.5	145	0.45	0	0.00	390	1.16
1.0	693	2.16	0	0.00	1610	4.80
1.5	1566	4.88	0	0.00	3620	10.79
2.0	2737	8.53	0	0.00	6109	18.20
2.5	4327	13.49	0	0.00	8791	26.19
3.0	5756	17.94	0	0.00	11042	32.90
3.5	7241	22.57	0	0.00	13081	38.97
4.0	8793	27.41	0	0.00	15056	44.86
4.5	10588	33.01	0	0.00	17501	52.14
5.0	12054	37.58	0	0.00	19399	57.80
5.5	13591	42.37	0	0.00	21326	63.54
6.0	15087	47.03	0	0.00	23157	68.99
6.5	16916	52.73	0	0.00	25285	75.33
7.0	18507	57.69	0	0.00	26943	80.27
7.5	20130	62.75	0	0.00	28457	84.78
8.0	21659	67.52	0	0.00	29614	88.23
8.5	23493	73.23	0	0.00	30866	91.96
9.0	24855	77.48	0	0.00	31621	94.21
9.5	26007	81.07	0	0.00	32073	95.56
10.0	27121	84.54	0	0.00	32453	96.69
11.0	28807	89.80	0	0.00	33000	98.32
12.0	29993	93.50	0	0.00	33244	99.05
13.0	30847	96.16	0	0.00	33383	99.46
14.0	31296	97.56	0	0.00	33464	99.70
15.0	31591	98.48	0	0.00	33522	99.87
16.0	31764	99.02	0	0.00	33547	99.95
17.0	31896	99.43	0	0.00	33561	99.99
18.0	31969	99.66	0	0.00	33564	100.00
19.0	32027	99.84	0	0.00	33564	100.00
20.0	32056	99.93	0	0.00	33564	100.00
21.0	32066	99.96	0	0.00	33564	100.00
>21.0	32079	100.00	0	0.00	33564	100.00

SITE ID: CA  
SITE LOCATION: POINT ARENA, CA.  
DATA : JANUARY 1977 THROUGH SEPTEMBER 1981

-----  
1.7 WIND SPEED PERSISTENCE FREQUENCY (LEVEL A)  
-----

HOURS	NUMBER OF OCCURENCES							
	WIND SPEED CLASS, METERS/SEC							
< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20	
1	573	120	91	157	120	2109	780	221
2	210	385	383	347	381	214	60	2
3	155	125	167	157	167	109	36	0
4	108	61	77	52	80	128	23	1
5	82	25	31	19	32	77	18	0
6	59	11	17	15	11	73	16	0
7	35	8	3	5	8	56	17	0
8	30	2	2	5	3	44	11	0
9	20	1	0	0	1	50	12	0
10	15	0	1	0	0	30	6	0
11	14	0	1	1	2	31	8	0
12	8	0	0	0	0	33	6	0
13	5	0	0	0	0	19	4	0
14	4	0	0	0	0	9	2	0
15	4	0	0	0	0	9	3	0
16	4	0	0	0	0	3	0	0
17	2	0	0	0	0	5	0	0
18	2	0	0	0	0	9	1	0
19	0	0	0	0	0	3	0	0
20	1	0	0	0	0	0	1	0
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	3	0	0
23	0	0	0	0	0	0	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: CA  
 SITE LOCATION: POINT ARENA, CA.  
 DATA : JANUARY 1977 THROUGH SEPTEMBER 1981

-----  
 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR

(ELEV A)	ALPHA (A,B)	ALPHA (B,C)	ALPHA (A,C)	ALPHA (A,B,C)	% A	% B	% C
N	0.00	0.00	0.22	0.00	12.73	0.00	9.16
NNE	0.00	0.00	0.15	0.00	3.63	0.00	4.31
NE	0.00	0.00	0.27	0.00	1.46	0.00	2.61
ENE	0.00	0.00	0.27	0.00	0.93	0.00	2.48
E	0.00	0.00	0.31	0.00	1.17	0.00	1.93
ESE	0.00	0.00	0.33	0.00	2.24	0.00	2.27
SE	0.00	0.00	0.21	0.00	9.89	0.00	8.50
SSE	0.00	0.00	0.17	0.00	8.20	0.00	7.38
S	0.00	0.00	0.10	0.00	2.63	0.00	2.31
SSW	0.00	0.00	0.13	0.00	1.21	0.00	1.05
SW	0.00	0.00	0.12	0.00	0.94	0.00	0.79
WSW	0.00	0.00	0.20	0.00	0.96	0.00	0.69
W	0.00	0.00	0.32	0.00	1.47	0.00	1.03
WNW	0.00	0.00	0.19	0.00	1.73	0.00	1.62
NW	0.00	0.00	0.17	0.00	8.88	0.00	8.31
NNW	0.00	0.00	0.18	0.00	31.58	0.00	27.55

NOTES:

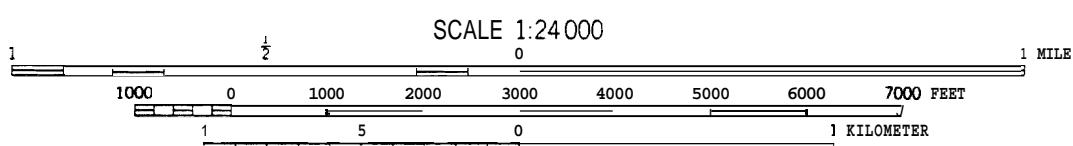
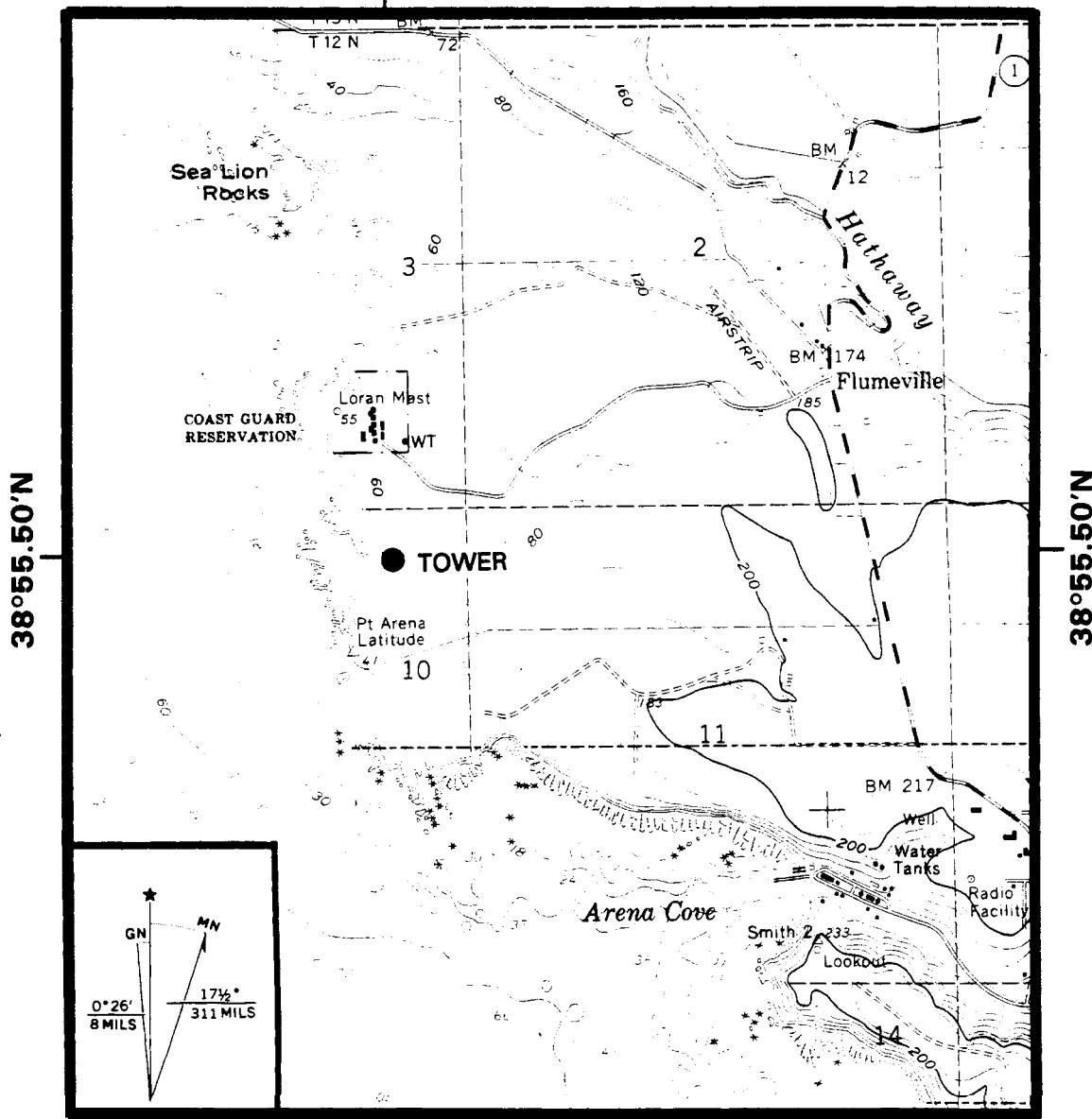
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

$$2. \text{ ALPHA} = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))}$$

WHERE; Z=ELEVATION  
WS=WIND SPEED

# POINT ARENA, CALIF.

123°43.29'W



CONTOUR INTERVAL 40 FEET

DOTTED LINES REPRESENT 20-FOOT CONTOURS

NATIONAL GEODETIC VERTICAL DATUM OF 1929

DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOWER LOW WATER

SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER

THE MEAN RANGE OF TIDE IS APPROXIMATELY 4 FEET

CA-07

RUSSELL, KANSAS

SITE ID: KS  
SITE LOCATION: RUSSELL, KS.  
DATA DECEMBER 1976 THROUGH AUGUST 1981

1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 41640

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	86.8
WD(A)	100.0	86.7
WS(C)	100.0	87.6
WD(C)	100.0	85.6

1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	(A) 45.7	HEIGHT	MEAN	MEAN	POWER
		(METERS)	WS	WD	WATTS/M**2
	(C) 9.1	7.3	150.1	373.73	
		5.3	159.5	173.66	

1.3 MAXIMUM WIND SPEED

ELEVATION	WIND	WIND			OTHER LEVELS
(METERS)	SPEED	DIR.	DATE	TIME	
(A) 45.7	23.3	300.0	04/18/78	09:00	(B)-999.9
					(C) 19.7
(C) 9.1	20.8	299.0	04/18/78	10:00	(A) 23.3
					(B)-999.9

NOTES:

1. SITE ELEVATION: 564 METERS ABOVE SEA LEVEL.
3. SENSOR LEVEL B NOT AVAILABLE AT SITE KS.

SITE ID: KS  
SITE LOCATION: RUSSELL, KS.  
DATA : DECEMBER 1976 THROUGH AUGUST 1981

-----  
1.4 WIND SPEED AND DIRECTION VERSUS TIME-OF-DAY  
-----

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	7.4	141.5	0.0	0.0	4.8	155.8
01:00	7.3	159.7	0.0	0.0	4.8	173.6
02:00	7.3	167.4	0.0	0.0	4.7	181.7
03:00	7.1	182.4	0.0	0.0	4.6	188.6
04:00	7.1	185.8	0.0	0.0	4.6	191.1
05:00	7.0	192.4	0.0	0.0	4.5	191.6
06:00	7.0	191.3	0.0	0.0	4.6	192.2
07:00	6.8	203.9	0.0	0.0	4.8	199.9
08:00	6.8	204.0	0.0	0.0	5.3	203.8
09:00	7.0	204.7	0.0	0.0	5.8	206.0
10:00	7.2	198.7	0.0	0.0	6.1	202.1
11:00	7.4	184.2	0.0	0.0	6.3	189.0
12:00	7.5	179.4	0.0	0.0	6.4	182.5
13:00	7.6	174.8	0.0	0.0	6.4	178.1
14:00	7.6	165.2	0.0	0.0	6.4	169.9
15:00	7.6	154.3	0.0	0.0	6.4	158.7
16:00	7.5	133.2	0.0	0.0	6.1	137.7
17:00	7.4	120.2	0.0	0.0	5.7	123.5
18:00	7.2	110.2	0.0	0.0	5.2	114.2
19:00	7.2	105.6	0.0	0.0	4.9	111.8
20:00	7.2	107.6	0.0	0.0	4.7	115.6
21:00	7.3	112.7	0.0	0.0	4.7	120.0
22:00	7.3	122.9	0.0	0.0	4.7	134.3
23:00	7.4	131.8	0.0	0.0	4.8	144.3

SITE ID: KS  
 SITE LOCATION: RUSSELL, KS.  
 DATA : DECEMBER 1976 THROUGH AUGUST 1981

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL A %	LEVEL B COUNT	LEVEL B %	LEVEL C COUNT	LEVEL C %
------------	---------------	-----------	---------------	-----------	---------------	-----------

0.0- 0.5	<b>36</b>	0.1	0	0.0	<b>80</b>	0.2
0.5- 1.0	255	0.7	0	0.0	<b>464</b>	1.3
1.0- 1.5	412	1.1	0	0.0	<b>998</b>	2.7
1.5- 2.0	647	1.8	0	0.0	<b>1641</b>	4.5
2.0- 2.5	911	<b>2.5</b>	0	0.0	<b>2479</b>	6.8
2.5- 3.0	1169	3.2	0	0.0	<b>2867</b>	7.9
3.0- 3.5	1202	<b>3.3</b>	0	0.0	<b>2850</b>	7.8
3.5- 4.0	1451	4.0	0	0.0	<b>2858</b>	7.8
4.0- 4.5	2137	5.9	0	0.0	<b>3160</b>	8.7
4.5- 5.0	1687	4.7	0	0.0	<b>2202</b>	6.0
<b>5.0- 5.5</b>	1998	5.5	<b>0</b>	<b>0.0</b>	<b>2168</b>	5.9
5.5- 6.0	1827	5.1	0	<b>0.0</b>	<b>1839</b>	5.0
6.0- 6.5	2353	6.5	0	0.0	<b>2051</b>	5.6
<b>6.5- 7.0</b>	2040	5.6	0	0.0	<b>1504</b>	4.1
<b>7.0- 7.5</b>	2070	5.7	0	0.0	<b>1565</b>	4.3
7.5- 8.0	1863	5.2	<b>0</b>	<b>0.0</b>	<b>1243</b>	3.4
8.0- 8.5	2262	6.3	0	0.0	<b>1354</b>	3.7
8.5- 9.0	1798	5.0	0	0.0	<b>981</b>	2.7
9.0- 9.5	1437	4.0	0	0.0	<b>694</b>	1.9
<b>9.5-10.0</b>	<b>1389</b>	<b>3.8</b>	0	0.0	<b>744</b>	2.0
<b>10.0-11.0</b>	2268	<b>6.3</b>	0	0.0	<b>1123</b>	3.1
<b>11.0-12.0</b>	1638	4.5	<b>0</b>	<b>0.0</b>	<b>715</b>	2.0
<b>12.0-13.0</b>	1219	3.4	0	0.0	<b>410</b>	1.1
13.0-14.0	824	2.3	0	0.0	<b>241</b>	0.7
14.0-15.0	476	1.3	0	0.0	<b>140</b>	0.4
15.0-16.0	333	0.9	0	0.0	<b>63</b>	0.2
16.0-17.0	238	0.7	0	0.0	<b>30</b>	0.1
17.0-18.0	126	0.3	0	0.0	<b>6</b>	0.0
18.0-19.0	44	0.1	0	0.0	<b>6</b>	0.0
19.0-20.0	21	0.1	0	0.0	<b>1</b>	0.0
20.0-21.0	10	0.0	0	0.0	<b>1</b>	0.0
<b>&gt;21.0</b>	12	0.0	0	0.0	<b>0</b>	0.0

RECOVERY RATES

LEVEL A	LEVEL B	LEVEL C
86.8	0.0	87.6

SITE ID: KS  
 SITE LOCATION: RUSSELL, KS.  
 DATA : DECEMBER 1976 THROUGH AUGUST 1981

-----  
 1.6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED  
 -----

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)
0.5	36	0.10	0	0.00	80	0.22
1.0	291	0.80	0	0.00	544	1.49
1.5	703	1.94	0	0.00	1542	4.23
2.0	1350	3.73	0	0.00	3183	8.73
2.5	2261	6.25	0	0.00	5662	15.52
3.0	3430	9.49	0	0.00	8529	23.38
3.5	4632	12.81	0	0.00	11379	31.19
4.0	6083	16.83	0	0.00	14237	39.03
4.5	8220	22.74	0	0.00	17397	47.69
5.0	9907	27.40	0	0.00	19599	53.73
5.5	11905	32.93	0	0.00	21767	59.67
6.0	13732	37.98	0	0.00	23606	64.71
6.5	16085	44.49	0	0.00	25657	70.34
7.0	18125	50.13	0	0.00	27161	74.46
7.5	20195	55.86	0	0.00	28726	78.75
8.0	22058	61.01	0	0.00	29969	82.16
8.5	24320	67.27	0	0.00	31323	85.87
9.0	26118	72.24	0	0.00	32304	88.56
9.5	27555	76.22	0	0.00	32998	90.46
10.0	28944	80.06	0	0.00	33742	92.50
11.0	31212	86.33	0	0.00	34865	95.58
12.0	32850	90.86	0	0.00	35580	97.54
13.0	34069	94.24	0	0.00	35990	98.66
14.0	34893	96.51	0	0.00	36231	99.32
15.0	35369	97.83	0	0.00	36371	99.71
16.0	35702	98.75	0	0.00	36434	99.88
17.0	35940	99.41	0	0.00	36464	99.96
18.0	36066	99.76	0	0.00	36470	99.98
19.0	36110	99.88	0	0.00	36476	99.99
20.0	36131	99.94	0	0.00	36477	100.00
21.0	36141	99.97	0	0.00	36478	100.00
>21.0	36153	100.00	0	0.00	36478	100.00

SITE ID: KS  
SITE LOCATION: RUSSELL, KS.  
DATA : DECEMBER 1976 THROUGH AUGUST 1981

-----  
1.7 WIND SPEED PERSISTENCE FREQUENCY (LEVEL A)  
-----

NUMBER OF OCCURENCES

HOURS	WIND SPEED CLASS, METERS/SEC							
	< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20
1	502	123	315	951	820	1958	1292	346
2	216	311	460	489	576	456	114	2
3	108	115	170	141	194	255	63	2
4	84	34	73	69	68	210	40	1
5	57	21	23	15	18	157	48	0
6	44	8	15	5	12	107	27	0
7	27	6	6	0	4	78	29	0
8	18	2	4	1	0	55	17	0
9	8	1	1	0	0	49	17	0
10	8	1	0	0	0	38	17	0
11	8	1	0	0	1	32	13	0
12	4	0	0	0	0	18	7	0
13	4	0	0	0	0	22	6	0
14	4	0	0	0	0	11	4	0
15	2	0	0	0	0	13	6	0
16	0	0	0	0	0	7	5	0
17	0	0	0	0	0	9	1	0
18	1	0	0	0	0	0	0	0
19	1	0	0	0	0	2	0	0
20	0	0	0	0	0	1	0	0
21	0	0	0	0	0	1	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: KS  
 SITE LOCATION: RUSSELL, KS.  
 DATA : DECEMBER 1976 THROUGH AUGUST 1981

-----  
 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR (ELEV A)	ALPHA (A,B)	ALPHA (B,C)	ALPHA (A,C)	ALPHA (A,B,C)	%A	%B	%C
N	0.00	0.00	0.14	0.00	6.54	0.00	5.45
NNE	0.00	0.00	0.14	0.00	5.72	0.00	5.71
NE	0.00	0.00	0.16	0.00	5.10	0.00	5.03
ENE	0.00	0.00	0.17	0.00	4.11	0.00	4.07
E	0.00	0.00	0.23	0.00	5.03	0.00	4.76
ESE	0.00	0.00	0.23	0.00	5.73	0.00	5.80
SE	0.00	0.00	0.24	0.00	7.69	0.00	7.71
SSE	0.00	0.00	0.21	0.00	11.61	0.00	10.46
S	0.00	0.00	0.20	0.00	12.27	0.00	12.14
SSW	0.00	0.00	0.17	0.00	6.10	0.00	6.75
SW	0.00	0.00	0.26	0.00	4.09	0.00	4.81
WSW	0.00	0.00	0.29	0.00	3.57	0.00	4.16
W	0.00	0.00	0.25	0.00	3.71	0.00	3.81
WNW	0.00	0.00	0.22	0.00	4.35	0.00	4.22
NW	0.00	0.00	0.20	0.00	6.25	0.00	5.73
NNW	0.00	0.00	0.14	0.00	7.29	0.00	6.78

-----  
 NOTES:

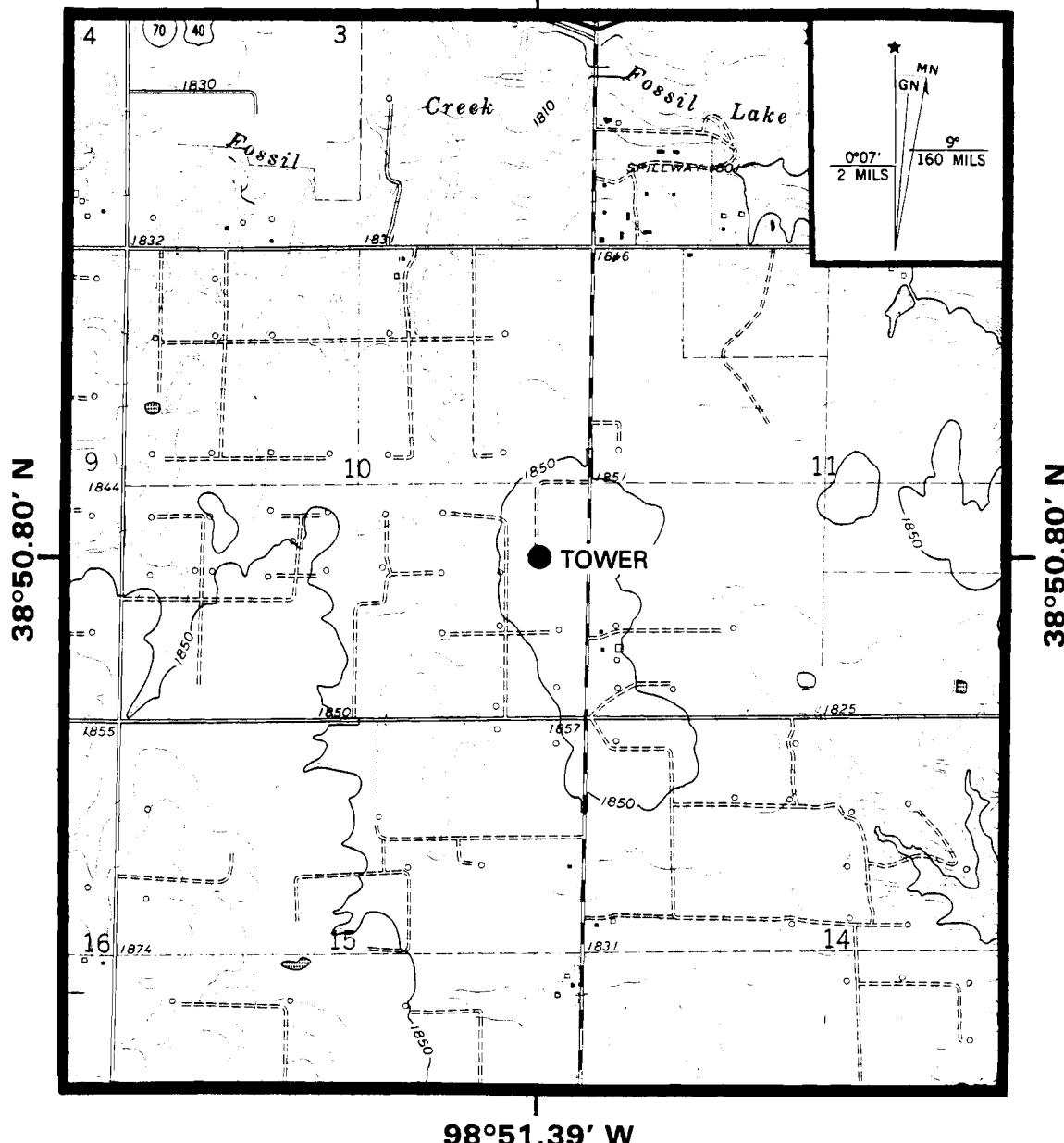
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

$$2. \text{ ALPHA} = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))}$$

WHERE; Z=ELEVATION  
WS=WIND SPEED

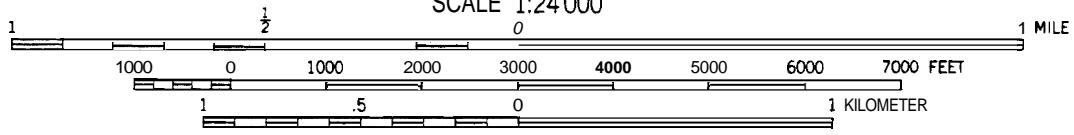
# RUSSELL, KANSAS

**98°51.39' W**



**98°51.39' W**

SCALE 1:24000



CONTOUR INTERVAL 10 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929

KS-07

**SAN GORGONIO, CALIFORNIA**

SITE ID: SG  
SITE LOCATION: SAN GORGONIO PASS, CA  
DATA : DECEMBER 1976 THROUGH DECEMBER 1981

1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 44568

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	80.4
WD(A)	100.0	81.6
WS(B)	100.0	9.1
WD(B)	100.0	8.9
WS(C)	100.0	81.1
WD(C)	100.0	82.9

1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

SITE DATA	(A)	45.7	HEIGHT	MEAN	MEAN	POWER
			(METERS)	WS	WD	WATTS/M**2
	(B)	30.0		6.9	241.3	460.81
	(C)	9.1		6.2	264.3	344.82

1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	27.0	260.0	12/14/77	12:00	(B)-999.9 (C) 21.0
(B) 30.0	20.5	232.2	05/15/81	19:00	(A) 21.4 (C)-999.9
(C) 9.1	23.9	266.0	12/05/76	12:00	(A) 18.9 (B)-999.9

NOTES:

1. SITE ELEVATION: 329 PIETERS ABOVE SEA LEVEL.

SITE ID: SG  
SITE LOCATION: SAN GORGONIO PASS, CA  
DATA : DECEMBER 1976 THROUGH DECEMBER 1981

1 4 WIND SPEED AND DIRECTION VERSUS TIME-OF-DAY

TIME OF DAY	LEVEL A		LEVEL B		LEVEL C	
	WS	WD	WS	WD	WS	WD
00:00	7.9	272.5	6.6	253.3	6.2	279.1
01:00	7.7	275.4	6.3	254.2	6.0	282.5
02:00	7.5	278.3	6.3	257.7	5.9	284.4
03:00	7.2	278.9	6.1	252.6	5.8	284.2
04:00	7.0	280.4	5.7	246.7	5.6	285.7
05:00	6.7	279.9	5.6	242.4	5.4	286.7
06:00	6.5	280.1	5.8	230.7	5.2	285.2
07:00	6.4	273.2	6.0	225.0	5.1	276.3
08:00	6.2	242.9	6.0	200.2	5.1	243.1
09:00	6.4	192.9	6.1	191.1	5.3	192.4
10:00	6.7	181.9	6.5	190.4	5.6	182.3
11:00	7.0	180.4	6.7	199.1	5.8	181.4
12:00	7.4	185.9	7.0	210.8	6.1	185.8
13:00	7.8	193.1	7.1	218.7	6.4	193.2
14:00	8.1	203.2	7.4	229.0	6.6	204.5
15:00	8.4	214.0	7.7	233.1	6.7	214.8
16:00	8.7	227.9	7.8	234.1	6.8	234.9
17:00	8.9	250.1	8.1	250.7	6.9	261.7
18:00	9.2	262.2	8.0	251.1	7.2	268.5
19:00	9.3	264.0	8.0	252.2	7.2	269.9
20:00	9.2	264.9	7.9	255.0	7.1	270.7
21:00	8.9	266.6	7.6	254.0	6.9	272.7
22:00	8.5	267.8	7.4	254.4	6.6	275.1
23:00	8.2	270.4	6.9	254.3	6.4	277.5

SITE ID: SG  
 SITE LOCATION: SAN GORGONIO PASS, CA  
 DATA : DECEMBER 1976 THROUGH DECEMBER 1981

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	%	LEVEL B COUNT	%	LEVEL C COUNT	%
------------	---------------	---	---------------	---	---------------	---

0.0- 0.5	467	<b>1.3</b>	6	0.1	223	0.6
0.5- 1.0	1506	4.2	123	3.0	979	2.7
1.0- 1.5	1763	4.9	<b>233</b>	5.8	1790	5.0
1.5- 2.0	2001	5.6	241	6.0	2653	7.3
2.0- 2.5	2110	5.9	260	6.4	2940	8.1
2.5- 3.0	1803	5.0	254	6.3	2501	6.9
3.0- 3.5	1478	4.1	198	4.9	2006	5.6
3.5- 4.0	<b>1389</b>	3.9	168	4.2	1753	4.9
4.0- 4.5	1506	4.2	148	3.7	1863	5.2
4.5- 5.0	946	2.6	156	3.9	1244	3.4
5.0- 5.5	<b>1013</b>	2.8	<b>99</b>	2.4	1152	3.2
5.5- 6.0	808	2.3	124	3.1	931	2.6
6.0- 6.5	932	<b>2.6</b>	130	<b>3.2</b>	970	2.7
6.5- 7.0	<b>697</b>	<b>1.9</b>	100	2.5	824	2.3
7.0- 7.5	760	2.1	<b>122</b>	3.0	936	2.6
7.5- 8.0	665	1.9	92	2.3	975	<b>2.7</b>
8.0- 8.5	<b>792</b>	2.2	92	2.3	1274	3.5
8.5- 9.0	686	<b>1.9</b>	101	2.5	1109	<b>3.1</b>
9.0- 9.5	678	1.9	111	2.7	1010	2.8
<b>9.5-10.0</b>	775	2.2	121	3.0	1140	3.2
10.0-11.0	1695	4.7	247	6.1	2171	6.0
11.0-12.0	1870	5.2	275	6.8	1934	5.4
12.0-13.0	2014	5.6	240	5.9	1590	<b>4.4</b>
13.0-14.0	1679	4.7	160	4.0	953	2.6
14.0-15.0	1514	4.2	99	2.4	542	1.5
15.0-16.0	1268	3.5	52	1.3	341	0.9
16.0-17.0	<b>1239</b>	3.5	42	1.0	184	0.5
17.0-18.0	689	1.9	21	0.5	73	0.2
18.0-19.0	416	1.2	13	0.3	32	0.1
19.0-20.0	300	0.8	12	0.3	20	0.1
20.0-21.0	<b>159</b>	0.4	<b>7</b>	0.2	12	0.0
<b>&gt;21.0</b>	<b>197</b>	0.6	0	0.0	5	0.0

RECOVERY RATES	LEVEL A	LEVEL B	LEVEL C
	80.4	<b>9.1</b>	81.1

SITE ID: SG  
 SITE LOCATION: SAN GORGONIO PASS, CA  
 DATA : DECEMBER 1976 THROUGH DECEMBER 1981

1.6 CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)	CFD (ABS)	CFD (%)
0.5	467	1.30	6	0.15	223	0.62
1.0	1973	5.51	129	3.19	1202	3.33
1.5	3736	10.43	362	8.94	2992	8.28
2.0	5737	16.02	603	14.90	5645	15.62
2.5	7847	21.91	863	21.32	8585	23.76
3.0	9650	26.94	1117	27.60	11086	30.68
3.5	11128	31.07	1315	32.49	13092	36.24
4.0	12517	34.95	1483	36.64	14845	41.09
4.5	14023	39.15	1631	40.30	16708	46.24
5.0	14969	41.80	1787	44.16	17952	49.69
5.5	15982	44.62	1886	46.60	19104	52.88
6.0	16790	46.88	2010	49.67	20035	55.45
6.5	17722	49.48	2140	52.88	21005	58.14
7.0	18419	51.43	2240	55.35	21829	60.42
7.5	19179	53.55	2362	58.36	22765	63.01
8.0	19844	55.41	2454	60.64	23740	65.71
8.5	20636	57.62	2546	62.91	25014	69.23
9.0	21322	59.53	2647	65.41	26123	72.30
9.5	22000	61.43	2758	68.15	27133	75.10
10.0	22775	63.59	2879	71.14	28273	78.25
11.0	24470	68.32	3126	77.24	30444	84.26
12.0	26340	73.54	3401	84.04	32378	89.62
13.0	28354	79.17	3641	89.97	33968	94.02
14.0	30033	83.86	3801	93.92	34921	96.65
15.0	31547	88.08	3900	96.37	35463	98.15
16.0	32815	91.62	3952	97.65	35804	99.10
17.0	34054	95.08	3994	98.69	35988	99.61
18.0	34743	97.01	4015	99.21	36061	99.81
19.0	35159	98.17	4028	99.53	36093	99.90
20.0	35459	99.01	4040	99.83	36113	99.95
21.0	35618	99.45	4047	100.00	36125	99.99
>21.0	35815	100.00	4047	100.00	36130	100.00

SITE ID: SG  
SITE LOCATION: SAN GORGONIO PASS, CA  
DATA : DECEMBER 1976 THROUGH DECEMBER 1981

1.7 UIND SPEED PERSISTENCE FREQUENCY (LEVEL A)

HOURS	NUMBER OF OCCURENCES							
	WIND SPEED CLASS, METERS/SEC							
	< 3	3-4	4-5	5-6	6-7	7-12	12-20	> 20
1	890	1460	1339	1132	1021	1062	646	71
2	320	345	260	194	177	443	154	25
3	237	110	99	46	51	293	93	11
4	158	37	34	16	6	202	74	5
5	114	26	12	5	4	108	54	5
6	82	7	4	1	1	79	44	4
7	52	2	2	1	1	51	40	2
8	24	1	0	0	0	37	29	0
9	33	1	0	0	0	26	30	0
10	18	0	0	0	0	15	21	0
11	21	0	0	0	0	8	16	0
12	7	0	0	0	0	8	19	1
13	6	0	0	0	0	7	11	0
14	5	0	0	0	0	2	9	0
15	6	0	0	0	0	2	6	0
16	6	0	0	0	0	3	2	0
17	4	0	0	0	0	0	5	0
18	2	0	0	0	0	0	3	0
19	0	0	0	0	0	2	3	0
20	0	0	0	0	0	0	2	0
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	1	0
23	1	0	0	0	0	0	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: SG  
 SITE LOCATION: SAN GORGONIO PASS, CA  
 CATA : DECEMBER 1976 THROUGH DECEMBER 1981

-----  
 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION  
 -----

WIND DIR

(ELEV A)	ALPHA (A,B)	ALPHA (B,C)	ALPHA (A,C)	ALPHA (A,B,C)	%A	%B	%C
N	-0.26	0.26	0.12	0.15	3.35	3.26	2.30
NNE	-0.22	0.08	0.00	0.02	2.62	2.69	2.14
NE	-0.18	0.06	0.00	0.01	2.31	1.88	1.88
ENE	0.41	-0.15	0.00	-0.03	2.22	1.46	1.84
E	0.06	0.05	0.06	0.05	3.65	3.88	3.00
ESE	-0.13	0.14	0.07	0.08	6.17	7.93	5.65
SE	0.27	-0.04	0.04	0.02	5.44	2.67	5.46
SSE	0.06	-0.07	-0.04	-0.04	2.30	1.63	1.97
S	-0.80	0.25	-0.03	0.03	1.36	1.48	0.98
SSW	-1.24	0.49	0.04	0.14	2.01	5.53	1.59
SW	0.12	0.18	0.17	0.17	10.56	19.05	8.51
WSW	0.19	0.12	0.14	0.14	22.41	27.30	21.90
W	1.54	-0.38	0.12	0.01	18.44	6.23	19.11
WNW	2.12	-0.35	0.29	0.15	5.16	4.00	8.83
NW	0.26	0.11	0.15	0.14	5.12	5.86	8.50
NNW	0.40	-0.02	0.09	0.07	4.57	3.39	5.47

NOTES:

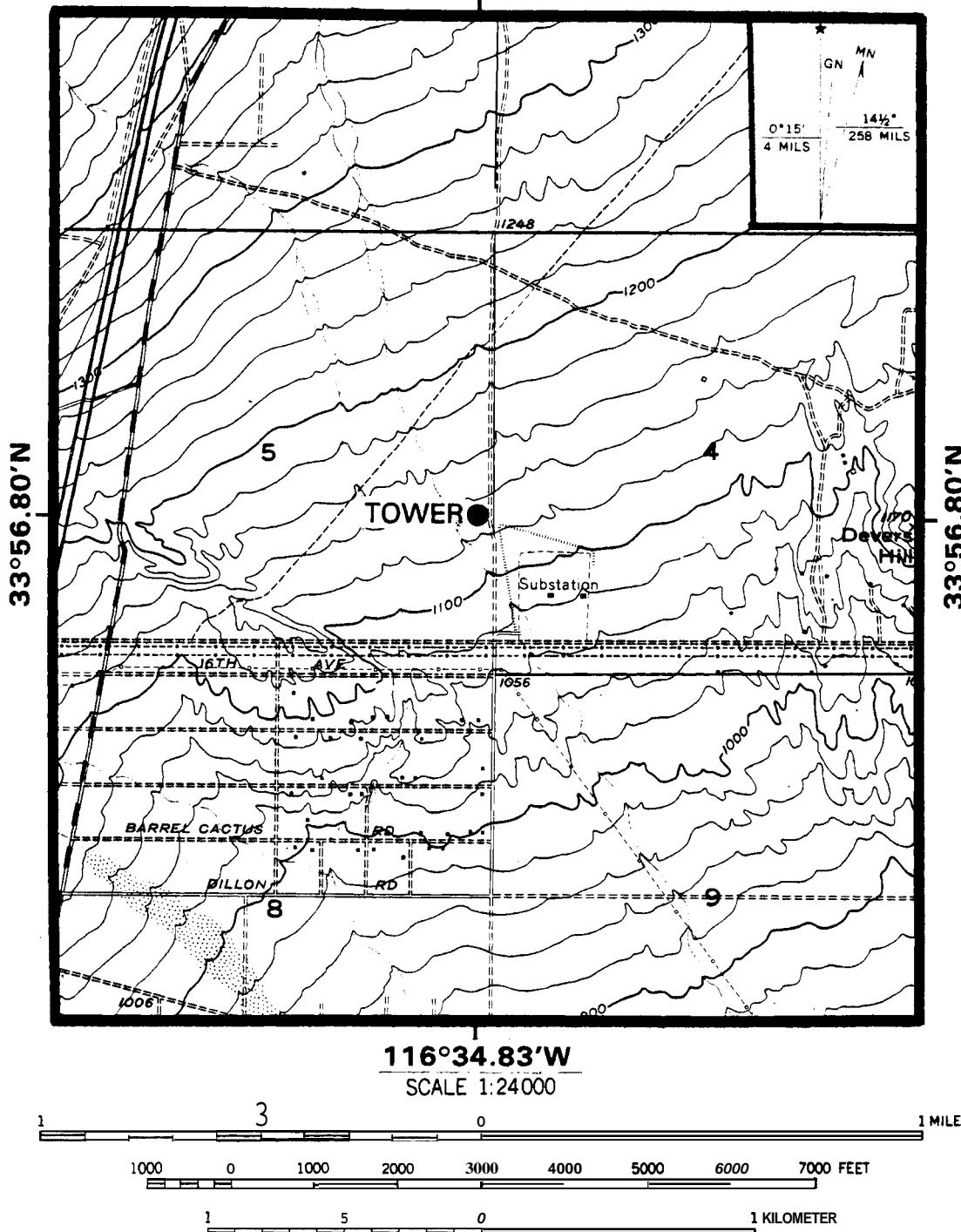
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

$$2. \text{ ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))}$$

WHERE; Z=ELEVATION  
WS=WIND SPEED

# SAN GORGONIO PASS, CA

116°34.83'W



## APPENDIX A

### LISTING OF FORTRAN PROGRAM USED TO GENERATE THE SUMMARY TABLES

PROGRAM WIND

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC  
C  
C >>>  
C >>> 03-NOV-78  
C >>> G R JOHNSON  
C >>> BATTELLE NORTHWEST  
C >>> PO 30X 999  
C >>> RICHLAND, WN. 99352  
C >>>  
C >>> 31- DEC - 8 (LAST MODIFICATION)  
C >>> W F SANDUSKY(ATHOS. SCIENCES DEPT.)  
C  
C INPUT/OUTPUT LOGICAL UNIT ASSIGNMENTS:  
C  
C LUN(1) = TEST SITE INPUT DATA / WIND PROGRAM HELP FILE.  
C LUN(2)* = PLOTTED OUTPUT (DEVICE INDEPENDENT GRAPHICS).  
C LUN(2)* = PLOTTED OUTPUT COMMAND FILE (VIEW DIRECTIVES).  
C LUN(3) = SITE CUMULATIVE DATA. (UNFORMATTED SEQUENTIAL FILE)  
C       RECORD: SITE (ALPHANUMERIC SITE CODE)  
C                 MONTH (01 = OCT. 1978)  
C                 +WS ]  
C                 +WS^2 ]  
C                 #WS ] SUMS, SUM OF SQUARES, AND COUNTS  
C                 +WD ] ARE REPEATED FOR EACH LEVEL.  
C                 +WD^2 ]  
C                 #WD ]  
C LUN(4) = MONTHLY SITE NWS DATA. (UNFORMATTED SEQUENTIAL FILES)  
C       RECORD: SITE (ALPHANUMERIC SITE CODE)  
C                 MONTH (01 = OCT. 1978 FOR RT=1  
C                         = JAN. XXXX FOR RT=2)  
C                 RT (1=MONTHLY DATA)  
C                         (2=HISTORICAL DATA)  
C                 WS  
C                 WD  
C LUN(5) = INTERACTIVE TERMINAL.  
C LUN(6) = HARDCOPY OUTPUT.  
C * LUN(2) IS OPENED AND CLOSED AS NECESSARY.  
C  
C THE COMMON BLOCK "CUMDAT" CONTAINS CUMMULATIVE WIND DATA FOR THE  
C CURRENT SITE. DATA IS STORED IN THE ABXAS "CUMDAT" AS DEFINED;  
C CMOCUM = LOGICAL FLAG SET IF CUMULATIVE DATA  
C             FOZ THE CURRENT MONTH WAS INPUT FROM  
C             WIND.DAT (LUN=3). INHIBITS MULTIPLE  
C             DOWNLOADING OF CUMULATIVE SITE DATA  
C             WHEN WIND IS EXECUTED MORE THAN ONCE  
C             FOR THE SAME MONTH.  
C CUMDAT(LEVEL,M,I): LEVEL = (1) A, (2) B, (3) C  
C                 M = MONTH (01 = OCT. 1978)  
C                 I = (1) SUM OF WIND SPEEDS  
C                         (2) NOT USED  
C                         (3) NUMBER OF WIND SPEED SAMPLES
```

(4) Y COMPONENT OF WIND DIRECTION C  
 (5) X COMPONENT OF WIND DIRECTION C  
 (6) NUMBER OF WIND DIRECTION SAMPLES C

THE COMMON BLOCK "DISDAT" CONTAINS WIND SPEED AND DIRECTION DISTRIBUTION DATA COMPILED FOR THE CURRENT SITE. DATA IS STORED IN THE ARRAY "DISDAT" AS DEFINED BELOW:  
 C DISDAT(LEVEL,WS,WD): LEVEL = (1) A, (2) a, (3) C C  
 WS = (01) 0-.5 M/S C  
 (02) .5-1. ... C  
 (20) 9.5-10. C  
 (21) 10.-11. C  
 (22) 11.-12. ... C  
 (30) 19.-20 C  
 (31) 20.-25. C  
 (32) >25. C  
 (33) TOTAL C  
 WD = (01) 0.1-22.5 C  
 (02) 22.6-45.0 ... C  
 (16) 337.6-360.0 C  
 (17) TOTAL C

THE COMMON BLOCK "INPDAT" CONTAINS THE LAST SAMPLE DATA INPUT FROM THE TEST SITE INPUT FILE (LUN #1). DATA IS STORED IN THE VARIABLES DEFINED BELOW;  
 C INSIT = SITE CODE C C  
 C INDAY = SAMPLE DATE C C  
 C INTIM = SAMPLE TIME C C  
 C INWS(L) = WIND SPEED (L=LEVEL) C C  
 C INWD(L) = WIND DIRECTION C C  
 C INTEMP(L) = TEMPERATURE C C  
 C ENDFIL = LOGICAL FLAG SET WHEN EOF IS ENCOUNTERED ON INPUT. C C

THE COMMON BLOCK "MAXDAT" CONTAINS MAXIMUM WIND SPEED DATA COLLECTED FOR THE CURRENT SITE. DATA IS STORED IN THE ARRAY "MAXDAT" AS DEFINED BELOW;  
 C MAXDAT(LEVEL,I): LEVEL = (1) A, (2) B, (3) C C  
 I = (1) WS(A) @ MAX WS(LEVEL) C  
 (2) WS(B) C  
 (3) WS(C) C  
 (4) WD C  
 (5) DATE (JULIAN) C  
 (6) TIME C

THE COMMON BLOCK "NWSDAT" CONTAINS NATIONAL WEATHER SERVICE DATA FOR THE CURRENT SITE. DATA IS STORED IN THE ARRAY "NWSDAT" AS DEFINED BELOW:  
 C A T , I : M = MONTH (01 = OCT. 1978) C  
 I = (1) MONTHLY MEAN WIND SPEED C  
 (2) MONTHLY MEAN WIND DIRECTION C

```

C          (3) HISTORICAL MEAN WIND SPEED
C          (4) HISTORICAL MEAN WIND DIRECTION
C
C THE COMMON BLOCK "PERSIS" CONTAINS WIND PERSISTANCE DATA COMPILED
C FOR THE CURRENT SITE. DATA IS STORED IN THE ARRAY "PERSIS" AS DE-
C FINED BELOW;
C PERSIS(LEVEL,HR,WS):  LEVEL = (1) A, (2) B, (3) C
C                         HX = (01) <1 HR
C                         (02) .1-.2
C                         (03) .2-.4
C                         (04) .4-.8
C                         (05) .8-1
C                         (06) 1-1.5
C                         (07) 1.5-2 ...
C                         (13) 4.5-5
C                         (14) 5-6
C                         (15) 6-7 ...
C                         (18) 9-10
C                         (19) 10-12
C                         (20) 12-14 ...
C                         (23) 18-20
C                         (24) >20
C US = (1) <4 M/S
C           (2) 4-12
C           (3) 12-20
C           (4) >20
C
C THE BLOCK ALSO CONTAINS VARIABLES USED IN COMPILING THE DATA FOR
C EACH SITE, INCLUDING;
C           LWS(L) = LAST WIND SPEED INPUT (L=LEVEL)
C           LTIM(L) = LAST TOD INPUT
C           LDAY(L) = LAST DATE INPUT
C           PTIM(L) = ACCUMULATED TIME FOR THIS WIND SPEED
C
C THE COMMON BLOCK "RPFORM" CONTAINS THE REPORT FORMATTING VARIABLES
C INCLUDING;      CSITE = CURRENT SITE CODE (INTEGER)
C                  CSITCA = CURRENT SITE NUMBER (A2 FORMAT)
C                  CSITLO = CURRENT SITE NAME
C                  CMO = CURRENT SAMPLE MONTH (01 = OCT. 1978)
C                  CHON = CURRENT MONTH (NAME)
C                  CYR = CURRENT YEAR (9999)
C                  CLEV = SENSOR HEIGHTS (OFF-LINE IF <= 0)
C                  PAGE = PAGE COUNT
C                  LINE = LINE COUNT
C                  PLT = PLOT COUNT
C
C THE COMMON BLOCK "SITDAT" CONTAINS SITE DATA. THE DATA IS STORED
C IN THE ARRAYS "SITCOD" AND "SITDAT" AS DEFINED BELOW;
C FINED BELOW:
C SITCOD(SITE): SITE = THE TWO DIGIT INTEGER SITE COCE
C SITDAT(I,SITE(: I = (1) HEIGHT OF LEVEL "A"
C           (2) HEIGHT OF LEVEL "B"
C           (3) HEIGHT OF LEVEL "C"

```

```

C          (4) SITE ELEVATION
C          SITE = THE TWO DIGIT INTEGER SITE CODE
C
C          THE COMMON BLOCK "SITLOC" CONTAINS SITE LOCATION NAMES. THE NAMES
C          ARE STORED IN THE ARRAY "SITLOC" AS DEFINED BELOW;
C          SITLOC(I,SITE):    I = A TWO CHARACTER PORTION OF THE SITE NAME
C                               (MAXIMUM OF 20 CHARACTER)
C          SITE = THE TWO DIGIT INTEGER SITE CODE
C
C          THE COMMON BLOCK "SUMDAT" CONTAINS SITE SUMMARY DATA. DATA IS
C          STORED IN THE ARRAY "SUMDAT" AS DEFINED BELOW;
C          SUMDAT(I,LEVEL,SITE):   I = (1) % SAMPLE RECOVERY
C                               (2) MEAN WIND SPEED
C                               (3) STANDARD DEVIATION (WS)
C                               (4) MAXIMUM WIND SPEED
C                               (5) TURBULENCE INTENSITY (IT)
C                               (6) ALPHA (POWER LAW EXPONENT)
C                               (7) POWER
C                               (8)
C          LEVEL = (1) A, (2) B, (3) C
C          SITE = THE TWO DIGIT INTEGER SITE CODE
C
C          THE COMMON BLOCK "TIMDAT" CONTAINS WIND SPEED DATA RELATED TO THE
C          TIME-OF-DAY (COMPILED FOR THE CURRENT SITE). DATA IS STORED IN
C          THE ARRAY "TIMDAT" AS DEFINED BELOW;
C          TIMDAT(LEVEL,TOD,I):  LEVEL = (1) A, (2) B, (3) C
C                               TOD = (01) 00:00 - 00:59
C                               (02) 01:00 ...
C                               (24) 23:00 - 23:59
C          I = (1) SUM OF WIND SPEEDS
C          (2) SUM OF SQUARES (WIND SPEED)
C          (3) NUMBER OF IHS SAMPLES
C          (4) SUM OF Y COMPONENT OF WIND
C               DIRECTION
C          (5) SUM OF X COMPONENT OF WIND
C               DIRECTION
C          (6) NO OF WD SAMPLES
C
C          THE COMMON BLOCK "WINDAT" CONTAINS BASIC WIND SPEED AND DIRECTION
C          DATA COMPILED FOR THE CURRENT SITE. DATA IS STORED IN THE ARRAY
C          "WINDAT" AS DEFINED BELOW. THE COMMON BLOCK ALSO CONTAINS A COUNT
C          OF THE TOTAL POSSIBLE SAMPLES FOR THE CURRENT MONTH AT A GIVEN
C          SAMPLING RATE AND THE WIND SPEEDS FOR THESE SAMPLES;
C          TPSMPL      = TOTAL POSSIBLE SAMPLES
C          WINDAT(LEVEL,I): LEVEL = (1) A, (2) B, (3) C
C          I = (1) SUM OF WIND SPEEDS
C          (2) NOT USED
C          (3) ANEMOMETER ON-LINE (COUNT)
C          (4) WIND SPEED SAMPLES RECOVERED
C          (5) SUM OF Y COMPONENT OF WIND DIRECTION
C          (6) SUM OF X COMPONENT OF WIND DIRECTION
C          (7) WIND VANE ON-LINE (COUNT)

```

C (8) WIND DIRECTION SAMPLES RECOVERED C  
 C  
 C THE COMMON BLOCK "WSHEAR" CONTAINS WIND SHEAR DATA COLLECTED FOR C  
 C THE CURRENT SITE. DATA IS STORED IN THE ARRAY "WSHEAR" AS DEFINED C  
 C BELOW;  
 C WSHEAR(LEVEL,DWX,I): LEVEL = (1) A-E, (2) 3-C, (3) A-C C  
 C DWX = (1) DWS C  
 C (2) DWD C  
 C I = (1) SUM OF WIND DIFFERENCES C  
 C (2) SUM OF SQUARES (WIND DIFFERENCES) C  
 C (3) NUMBER OF WIND SHAR SAMPLES C  
 C (4) MAXIMUM DWX C  
 C (5) AVERAGE WIND SPEED @ MAX C  
 C (6) AVERAGE WIND DIRECTION @ MAX C  
 C (7) DATE OF MAX OCCURANCE C  
 C (8) TIME OF MAX OCCURANCE C  
 C (9) MINIMUM DWX C  
 C (10) AVERAGE WIND SPEED @ MIN C  
 C (11) AVERAGE WIND DIRECTION @ MIN C  
 C (12) DATZ OF MIN OCCURANCE C  
 C (13) TIME OF MIN OCCURANCE C  
 C  
 C THE COMMON BLOCK "WSVSWD" CONTAINS WIND SPEED VERSUS DIRECTION C  
 C DATA COMPILED FOR THE CURRENT SITE. DATA IS STORED IN THE ARRAYS C  
 C "WSVSWD" AND "DETCNT" AS DEFINED BELOW. DATA IS GROUPED IN 1 HOUR C  
 C SETS.  
 C DETCNT(SPEED,WD,LEVEL) (AN OCCURANCE COUNT ONLY (NO GROUPING))  
 C WSVSWD(LEVEL,WD,I): LEVEL = (1) A, (2) 3, (3) C C  
 C WD = (01) 348.75 - 11.25 C  
 C (02) 11.25 - 33.75 ... C  
 C (16) 326.25 - 348.75 C  
 C I = (1) SUM OF (STD DEV OF WIND SPEED/ C  
 C AVERAGE WIND SPEED) C  
 C (2) COUNT OF ELEMENTS SUMMED IN 1 AND 3C C  
 C (3) SUM OF WIND SPEEDS C  
 C SPEED = (1) 0-4 C  
 C (2) 4-10 C  
 C (3) 10-20 C  
 C (4) >20 C  
 C  
 C THE COMMON BLOCK "SPDALL" CONTAINS ALL WIND SPEEDS FOR A GIVEN HOUR C  
 C SPDALL(LEVEL,OBS) LEVEL = (1) A (2) B (3) C C  
 C OBS = (01) FIRST C  
 C (02) 2ND ... C  
 C (30) 30TH C  
 CCC  
 C >>>  
 C >>> MONTH CODES ARE EVALUATED SO THAT CM0=1 DEFINES THE MONTH M1,IYR1  
 C >>> (EG: 01 = OCTOBER 1978). NOMAX IS THE MAXIMUM NUMBER OF SAMPLE  
 C >>> MONTHS HANDLED BY THE SYSTEM.  
 PARAMETER M1 = 12  
 PARAMETER IYR1=1976

```

PARAMETER      MOMAX = 75
PARAMETER      MKK=0
PARAMETER      MCK=10
C >>>
COMMON /CUMDAT/CUMDAT,CMOCUM
COMMON /INPDAT/INSIT,INDAY,INTIM,INWS,INWD,INTEMP,ENDFIL
COMMON /MAXDAT/MAXDAT
COMMON /NWSDAT/NWSDAT
COMMON /RPFORM/CSITE,CSITEA,CSITLO,CMO,CHON,CYR,CLEV,PAGE,LINE,PLT
COMMON /SITDAT/SITCOD,SITDAT
COMMON /SITLOC/SITLOC
COMMON /SUMDAT/SUMDAT
COMMON /TIMDAT/TIMDAT
COMMON /WINDAT/TPSMPL,WINDAT
COMMON /WSHEAR/WSHEAR
COMMON /PWS/PWS
COMMON /RPF234/WSA,CFDA,WSR,CFDR
COMMON /NCH/NCH
COMMON /LOOP/LOOP,LYR,LENGTH,LMO,N,YR
COMMON /POWER/POWER,RHO
REAL POWER(3),RHO(3)
INCLUDE 'DISDAT.FTN'
INCLUDE 'WSVSWD.FTN'
INCLUDE 'REWS.FTN'
INCLUDE 'SPEEDS.FTN'
INCLUDE 'PERSIS.FTN'
REAL CLEV(3)
REAL CUMDAT(3,MOMAX,6)
REAL INWS(3),INWD(3),INTEMP(3)
REAL MAXDAT(3,6)
REAL NWSDAT(MOMAX,4)
REAL SITDAT(4,20)
REAL SUMDAT(8,3,20)
REAL TIMDAT(3,24,6)
REAL WINDAT(3,8)
REAL WSHEAR(3,2,13)
REAL WSA(29),CFDA(29),WSR(104),CFDR(104)
REAL PWS(3,17)
INTEGER CSITE,CSITEA,CSITLO(10),CMO,CHON(15),CYR,PAGE,LINE,PLT
INTEGER INSIT,INDAY,INTIM,YR
INTEGER SITCOD(20)
INTEGER SITLOC(10,20)
INTEGER TPSMPL
LOGICAL CMOCUM
LOGICAL EIJDFIL
C ;>
C i>>WORKING SPACE
C >>>
C >>> CALL REPORT IIJITIALIZATIOII ROUTINE
C >>>
CALL RPINIT
C >i>

```

```

C >>> CALL SITE INITIALIZATION ROUTINE
2 >>>
10   CALL STINIT
      IF(ENDFIL) GO TO 30
      TYPE 12,M,YR,LMO,LYR
12   FORMAT(5X,'M='12,2X,'YR='I4,2X,'LMO='12,
      *     2X,'LYR='I4)
C >>>
C >>> CALL DATA COMPILEDOIJ ROUTINE
C >>>
C       CALL COMDAT
C >>>
C >>> COMPILE SUMMARY DATA
C >>>
C       CALL COMSUM
C >>>
C >>> GENERATE REPORTS
C >>>
C       TYPE 20,CSITEA
20   FORMAT(' WIND> GENERATING REPORTS FOR SITE ',A2,'.')
      CALL RP0101
      CALL RP0104
C       CALL ODDPAG
      CALL RP0105
      CALL RP0106
      CALL RP0107
C       CALL RP0108
      CALL RP0109
      IF(LOOP.EQ.2) GO TO 29
      CALL RP0110
29   CONTINUE
      CALL RPPL0T
C       CALL EVNPAG
      GO TO 10
C >>>
C >>> GENERATE ALL SITE SUMMARY, CLOSE FILES AND EXIT
C ,>>
30   TYPE 40
40   FORMAT(/' WIND> END-OF-FILE ENCOUNTERED ON INPUT.')
C       CALL RP0301
      TYPE 50
50   FORMAT(' WIND> SITE: AIJALYSIS COMPLETE.'//)
      CLOSE(UNIT=6,DISP='PRINT')
      CALL EXIT
      STOP
      END
      SUBROUTINE SINPUT
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
C THIS SUBROUTINE IBPUTS A RECORD FROM THE SAMPLE DATA INPUT FILE, C
C (LUN=1), TESTS FOR DATE COMPATABILITY, AND SETS THE "ENDFIL" FLAG C
C AS NECESSARY. C

```

C  
CC  
C >>>  
C >>> MONTH CODES ARE EVALUATED SO THAT CMO=1 DEFINES THE MONTH M1,IYR1  
C >>> (EG: 01 = OCTOBER 1978). MONAX IS THE MAXIMUM NUMBER OF SAMPLE  
C >>> MONTHS HANDLED BY THE SYSTEM.  
 PARAMETER M1 = 12  
 PARAMETER IYR1 = 1976  
 PARAMETER MONAX = 75  
 PARAMETER MKK=0  
 PARAMETER MCK=10  
C >>>  
 COMMON /INPDAT/INSIT,INDAY,INTIM,INWS,INWD,INTEMP,ENDFIL  
 COMMON /RPFORM/CSITE,CSITEA,CSITLO,CM0,CMON,CPR,CLEV,PAGE,LINE,PLT  
 COMMON/NCH/NCH  
 COMMON /LOOP/LOOP,LYR,LENGTH,LMO,M,YR  
 REAL INWS(3),INWD(3),INTEMP(3)  
 REAL CLEV(3)  
 INTEGER INSIT,INDAY,INTIM,NCH,IFLAG(8),YR  
 INTEGER CSITE,CSITEA,CSITLO(10),CM0,CMON(15),CYR,PAGE,LINE,PLT  
 LOGICAL ENDFIL  
C >>> WORKING SPACE  
 INTEGER CMONO,MO,DA  
1 CONTINUE  
 IF(LOOP.LE.2) GO TO 5  
 READ(1,2,ERR=990,END=30) INSIT,IM,IDA,IYR,INTIM,  
 - (INWD(L),L=3,1,-1),(INWS(L),L=3,1,-1)  
2 FORMAT(A2,1X,I2,1X,I2,1X,I2,1X,I4,6F8.2)  
 GO TO 19  
5 CONTINUE  
C >>> INPUT NEXT RECORD  
 IF(NCH.EQ.10) GO TO 15  
 READ(1,10,END=30) INSIT,INDAY,INTIM,(INWD(L),L=3,1,-1),  
 - (INWS(L),L=3,1,-1)  
 GO TO 19  
15 CONTINUE  
 READ(1,18,END=30) INSIT,INDAY,INTIM,(INWD(L),L=3,1,-1),  
 - (INWS(L),L=3,1,-1),  
18 FORMAT(A2,1X,I3,3X,I4,6F8.2,32X)  
 GO TO 19  
990 CONTINUE  
 TYPE 991  
991 FORMAT(/' READ ERROR ')  
 TYPE 992,IM,IDA,IYR,INTIM  
992 FORMAT(/' IM=',I2,2X,' IDA=',I2,2X,' IYR=',I2,2X,  
 - ' INTIM=',I4)  
 GO TO 1  
19 CONTINUE  
10 FORMAT(A2,1X,I3,3X,I4,6F8.2)  
C >>> TEST FOR DATE COMPATABILITY  
 IF(LOOP.ZQ.2) GO TO 50  
 CALL JULIAN(MO,DA,CYR,INDAY,I)

```

CMOMO=MOD(CMO+M1-1,12)
IF(CMOMO.EQ.0) CMOMO=12
IF(MO.EQ.CMOMO) RETURN
GO TO 60
50 CONTINUE
IYP=IYR
IYR=IYR+1900
C >>> PACK YR, MO, DAY INTO ONE WORD
INDAY=IYP*10000+IM*100+IDA
52 FORMAT(2X,'IYR=',I4,2X,'IM=',I2)
IF(IYR.LT.YR) GO TO 1
TYPE 52,IYR,IM
IF(IYR.EQ.YR.AND.IM.LT.M) GO TO 1
IF(IYR.EQ.YR.AND.IM.GE.M) RETURN
C TYPE 52,IYR,IM
IF(IYR.EQ.LYR.AND.IM.LE.LMO) RETURN
IF(IYR.EQ.LYR.AND.IM.GT.LMO) GO TO 30
IF(IYR.GT.LYR) GO TO 30
RETURN
60 CONTINUE
TYPE 650,CMOMO,MO,INDAY
650 FORMAT(/' CMOMO= ',I      ,0      ',I2,2X,'INDAY= ',I3)
TYPE 20
20 FORMAT(/' >>> ERROR: INPUT DATE CONFLICTS WITH FILE EXTENSION.'//)
CALL EXIT
STO?
C >>> SET EMDFILE
30 ENDFIL=.TRUE.
TYP5 32,IM,LMO
32 FORMAT(2X,'IM=',I2,2X,'LMO=',I2)
RETURN
END
SUBROUTINE SKPAGE
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
C THIS SUBROUTINE CONTAINS TWO ENTRY POINTS; EVNPAG AND ODDPAG. THE C
C PURPOSE OF THE ROUTINE IS TO GENERATE A "BLANK" PAGE AS NECESSARY C
C TO PROVIDE AN EVEN OR ODD PAGE COUNT (DEPENDING UPON THE ENTRY C
C POINT.
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
COMMON /RPFORM/CSITE,CSITEA,CSITLO,CMO,CMON,CYR,CLEV,PAGE,LINE,PLT
REAL CLEV(3)
INTEGER CSITE,CSITEA,CSITLO(10),CMO,CMON(15),CYR,PAGE,LINE,PLT
C >>>
C >>> EVNPAG ENTRY POINT
C >>>
ENTRY EVNPAG
IF(MOD(PAGE,2).EQ.0) RETURN
GO TO 10
C >>>
C >>> ODDPAG ENTRY POINT

```



```

END
SUBROUTINE RPNOTE(NO,RPT)
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C C
C THIS SUBROUTINE APPENDS FOOTNOTES TO THE REPORT.  THE ROUTINE C
C PROMPTS THE USER TO ENTER THE NOTES ONE LINE AT A TIME. "NO" IS C
C INITIAL NOTE NUMBER (IE: THE FIRST NOTE WILL BE NUMBER NO). "RPT" C
C IS THE REPORT TO WHICH THE NOTES APPLY. NOTES WILL BE CONTINUED C
C ON ADDITIONAL PAGE(S) IF NECESSARY. C
C
C THE COMMON BLOCK "RPFORM" CONTAINS THE REPORT FORMATTING VARIABLES C
C INCLUDING;      CSITE = CURRENT SITE CODE (INTEGER) C
C                  CSITEA = CURRENT SITE NUMBER (A2 FORMAT) C
C                  CSITLO = CURRENT SITE NAME C
C                  CMO = CURRENT MONTH (01 = OCT. 1978) C
C                  CMON = CURRENT MONTH (NAME) C
C                  CYR = CURRENT YEAR (9999) C
C                  CLEV = SENSOR HEIGHTS (OFF-LINE IF <= 0) C
C                  PAGE = PAGE COUNT C
C                  LINE = LINE COUNT C
C                  PLT = PLOT COUNT C
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
COMMON /RPFORM/CSITE,CSITEA,CSITLO,CMO,CMON,CYR,CLEV,PAGE,LINE,PLT
BYTE APAGE(2)
REAL CLEV(3)
INTEGER CSITE,CSITEA,CSITLO(10),CMO,CMON(15),CYR,PAGE,LINE,PLT
INTEGER ANS,TEXT(25)
DOUBLE PRECISION RPT
N=NO
IF(N.LE.0) N=1
TYPE 10,CSITEA,RPT
10 FORMAT(/' WIND> NOTES FOR SITE ',A2,', REPORT ',A5,' ? ',\$)
ACCEPT 20,ANS
20 FORMAT(A1)
IF(ANS.NE.'Y') GO TO 125
C >>> OUTPUT "NOTES:" HEADING (ON NEW PAGE IF NECESSARY)
IF(LINE.GT.60) CALL RPPAGE
IF(N.GT.1) GO TO 40
WRITE(6,30)
30 FORMAT(8X,'NOTES: ')
C >>> PROMPT USER TO ENTER FIRST LINE OF NOTE
40 TYPE 50
50 FORMAT(' NOTE> ',5('0.....9'))
TYPE 60
60 FORMAT(' NOTE> ',\$)
READ(5,70,END=110) TEXT
70 FORMAT(25A2)
C >>> PRINT FIRST NOTE LINE (INCLUDES NOTE NUMBER)
WRITE(6,80) N,TEXT
80 FORMAT(14X,I2,'.',25A2)
LINE=LINE+1

```

```

N=N+1
C >>> PROMPTS FOR ADDITIONAL LINES
90   TYPE 60
     READ(5,70,END=113, TEXT
C >>> OUTPUT ADDITIONAL NOTE LINE(S)
     IF(LINE.GT.62) CALL RP PAGE
     WRITE(6,100) TEXT
100  FORMAT(18X,25A2)
     LINE=LINE+1
     GO TO 90
C >>> PROMPT FOR MORE NOTES? (RETURN IF NO)
110  TYPE 120
120  FORMAT(/' WIND> MORE NOTES? ',\$)
     ACCEPT 20, ABS
     IF(ANS.EQ.'Y') GO TO 40
125  CONTINUE
     PAGE=PAGE+1
     ENCODE(2,130,APAGE) PAGE
130  FORMAT(I2)
     IF(APAGE(1).EQ.' ') APAGE(1)='0'
     DO 135 I=1,60
     IF(LINE.GE.62) GO TO 135
     WRITE(6,134)
     LINE=LINE+1
134  FORMAT(1H )
135  CONTINUE
136  CONTINUE
     WRITE(6,140) CSITEB,APAGE
140  FORMAT(39X,A2,'-',2A1)
     RETURN
     END
SUBROUTINE JULIAN(MO,DA,P3,JDATE,E)
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
C THIS SUBROUTINE CONVERTS THREE DIGIT JULIAN DATES TO GREGORIAN
C DATES AND VICE-VERSA. IF A NON-ZERO NUMBER APPEARS IN "JDATE",
C THE ROUTINE CONVERTS THAT NUMBER INTO A MONTH, "MO", AND A DAY,
C "DA", USING THE YEAR FOUND IN "YR" TO DETERMINE LEAP YEARS.
C IF "JDATE" IS ZERO, THE PROGRAM CONVERTS MO/DA/YR TO THE JULIAN
C DATE. IF MO, DA, AND YR ARE ZERO, THE CURRENT DATE IS USED. IF
C "YR" IS LESS THAN 700, THE YEAR IS ASSUMED TO BE "19XX", WHERE
C "XX" IS EQUAL TO "YR".
C
C THE ERROR FLAG IS SET AS FOLLOWS:  0 = SUCCESS.
C                                     -1 = INVALID GREGORIAN DATE.
C                                     -2 = INVALID JULIAN DATE.
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
     INTEGER MO,DA,YR,YR1,JDATE,E,DAYS(13)
     LOGICAL N1,N2,N3
     DATA DAYS/0,31,59,90,120,151,181,212,243,273,304,334,365/
     DATA ICHECK/0/

```

```

C >>> ADJUST FOR LEAP YEARS
    IF(MO.EQ.0.AND.DA.EQ.0.AND.YR.EQ.0) CALL JDATE(MO,DB,YR)
    IF(ICHECK.GE.1) GO TO 15
    YR1=YR
    IF(YR1.LT.100) YR1=YR1+1900
    N1=(YR1-4*(YR1/4)).GT.0
    IF(N1) GO TO 20
    N2=(YR1-100*(YR1/100)).EQ.0
    N3=(YR1-400*(YR1/400)).EQ.0
    IF(N2.AND..NOT.N3) GO TO 20
    DO 10 I=3,13
        DAYS(I)=DAYS(I)+1
10    CONTINUE
15    CONTINUE
    ICHECK=1
20    IF(JDATE.GT.0) GO TO 40
C >>> CONVERT GREGORIAN TO JULIAN
    IF(MO.GT.0.AND.MO.LE.12.AND.DA.GT.0.AND.DA.LE.31) GO TO 30
        E=-1
        RETURN
30    JDATE=DAYS(MO)+DA
    E=0
    RETURN
C >>> CONVERT JULIAN TO GREGORIAN
40    IF(JDATE.LE.DAYS(13)) GO TO 50
        E=-2
        RETURN
50    DO 60 I=2,12
        IF(JDATE.LE.DAYS(I)) GO TO 70
60    CONTINUE
70    MO=I-1
    DA=JDATE-DAYS(MO)
    E=0
    RETURN
    END
    SUBROUTINE MODAYS(MO,YR,NDAYS,E)
CCCCCCCCCCCCCC
C
C THIS ROUTINE RETURNS THE NUMBER OF DAYS IN A GIVEN MONTH, WITH AD-
C JUSTMENTS FOR LEAP YEARS. IF "MO" AND "YR" ARE ZERO THE CURRENT
C DATE IS USED. IF "YR" IS LESS THAN 100, THE YEAR IS ASSUMED TO BE
C "19XX" WHERE "XX" IS EQUAL TO "YR".
C
C THE ERROR FLAG IS SET AS FOLLLOWS:  0 = SUCCESS.
C                                     -1 = INVALID MONTH.
C
C
CCCCCCCCCCCCCC
    INTEGER MO,DA,YR,YR1,E,DAYS(12)
    LOGICAL N1,N2,N3
    DATA DAYS/31,28,31,30,31,30,31,31,30,31,30,31/
    DATA ICK/0/
C >>> ADJUST FOR LZAP YEARS

```









```

C      TION, AVAILABLE SENSORS, AND SENSOR HEIGHTS)          C
C      (4) INITIALIZE SITE LOCATION NAMES                  C
C      (5) PROVIDE THE OPTION OF INTERACTIVELY ALTERING THE SITE C
C      DATA AND LOCATION NAMES.                            C
C      (6) INTERACTIVELY INPUT NWS DATA FOR THE SAMPLE MONTH   C
C      (7) INITIALIZE (OPEN) INPUT AND OUTPUT FILES           C
C      (8) PROVIDE THE USER WITH A DESCRIPTION OF THE PROGRAM OP- C
C          TIONS AND USE ("HELP" FILE).  THIS INFORMATION MAY ALSO C
C          BE PRINTED ON THE SYSTEM LINE PRINTER.             C
C
C      DESCRIPTIONS OF THE VARIABLES INITIALIZED AND I/O FILES UTILIZE3 C
C      BY THE EOUTIIE CAN BE FOUND IN THE PROGRAM DOCUMENTATION FILE, C
C      ("WIND.DOC").                                     C
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C >>>
C >>> MONTH CODES ARE EVALUATED SO THAT CMO=1 DEFINES
C >>> THE MONTH M1,IYR1 (EG: 01 = OCTOBER 1978).  THE
C >>> PARAMETERS "M1" AND "IYR1" ARE INITIALIZED HERE.
C >>> MOMAX DEFINES THE MAXIMUM ALLOWABLE MONTH CODE.
      PARAMETER    1     = 12
      PARAMETER    IYR1  = 1976
      PARAMETER    MOMAX = 75
C >>>
      COMMON /CUMDAT/CUMDAT,CMOCUM
      COMMON /INPDAT/INSIT,INDAY,INTIM,INWS,INWD,INTEMP,ENDFIL
      COMMON /RPFORM/CSITE,CSITEA,CSITLO,CMO,CHON,CYR,CLEV,PAGE,LINE,PLT
      COMMON /SITDAT/SITCOD,SITDAT
      COMMON /SITLOC/SITLOC
      COMMON /SUMDAT/SUMDAT
      COMMON /WINDAT/TPSNPL,WINDAT
      COMMON /NCH/NCH
      COMMON /LOOP/LOOP,LYR,LENGTH,LMO,M,YR
      COMMON /POWER/POWER,RHO
      REAL POWER(3),RHO(3)
      REAL INWS(3),INWD(3),INTEMP(3)
      REAL CLEV(3)
      REAL CUMDAT(3,MOMAX,6)
      REAL SITDAT(4,20)
      REAL SUMDAT(8,3,20)
      REAL WINDAT(3,8)
      INTEGER INSIT,INDAY,INTIM,NCH
      INTEGER CSITE,CSITEA,CSITLO(10),CMO,CHON(15),CYR,PAGE,LINE,PLT
      INTEGER SITCOD(20)
      INTEGER SITLOC(10,20)
      INTEGER TPSNPL
      LOGICAL CMOCUM
      LOGICAL ENDFIL
C >>> WORKING SPACE
      INTEGER S,ANS,TTLINE(40),TEXT(10),M,YR,FEXT
      INTEGER IS,IM,RT,YRX
      INTEGER INFILE(16),MONTHS(5,13)

```

```

REAL NWSWS,NWSWD
DATA MONTHS/'JA','NU','AR','Y ',' ',' '
-          'FE','BR','UA','RY',' ', ' '
-          'MA','RC','H ',' ', ' ', ' '
-          'AP','RI','L ',' ', ' ', ' '
-          'M ',' ', ' ', ' ', ' ', ' '
-          'JU','NE',' ', ' ', ' ', ' '
-          'JU','LY',' ', ' ', ' ', ' '
-          'AU','GU','ST',' ', ' ', ' '
-          'SE','PT','EM','BE','R ',' '
-          'OC','TO','BE','R ',' ', ' '
-          'NO','VE','MB','ER',' ', ' '
-          'DE','CE','MB','ER',' ', ' '
-          'T','HR','OU','GH',' ',' '
C >>> INITIALIZE DATA COMPIILATION ARRAY (ALL SITS SUMMARY)
DATA SUMDAT/480*0.0/
C >>>
C >>> INITIALIZE SITE DATA: SITE NUMBER (A2 FORMAT)
C >>>i           HEIGHT OF LEVEL "A" SENSOR
C >>>           HEIGHT OF LEVEL "B" SENSOR
C >>>           HEIGHT OF LEVEL "C" SENSOR
C >>>           SITE ELEVATION
C >>>
DATA SITCOD/'TX',
2          'RI',
3          'NC',
4          'NM',
5          'AK',
6          'PR',
7          'MA',
8          'SD',
9          'NB',
-          'MT',
1          'NY',
2          'CA',
3          'KS',
4          'SG',
5          'OR',
6          'WA',
7          'MK',
3          'OK',
3          'AG',
-          'MI',
DATA SITDAT/45.7, 0.0, 9.1,1091.0,
2          45.7,30.0, 9.1,   14.0,
3          76.2,45.7,18.2,1347.0,
4          45.7,30.0, 9.1,1536.0,
5          21.6, 0.0, 9.1,   29.0,
6          45.7, 0.0, 9.1,   20.0,
7          45.7, 0.0,18.2,  372.0,
3          45.7, 0.0, 9.1,  396.0,
9          45.7, 0.0, 9.1,1024.0,

```

```

        45.7,30.0, 9.1,1420.0,
1      45.7, 0.0,18.2,    2.0,
2      45.7, 0.0, 9.1,   21.0,
3      45.7, 0.0, 9.1,  564.0,
4      45.7,30.0, 9.1,  329.0,
5      70.1,39.6, 9.1, 212.0,
6      105.1,60.9,15.2, 762.0,
7      45.7,30.0, 9.1,1090.0,
8      45.7,30.0, 9.1,1090.0,
9      45.7, 0.0, 9.1,  853.0,
-      45.7, 0.0,18.2, 213.0/
C >>>
C >>> INITIALIZE SITE LOCATION NAMES (20 CHARACTER MAX.)
C >>>
DATA SITLOC/'AM','AR','IL','LO',' ',' ','TX','.', '.', ' ', ' ', ' ',
2      'BL','OC','K ','IS','LA','ND','.', ' ', 'RI','.', ' ', ' ',
3      'BO','ON','E ','N ','C ',' ',' ',' ',' ',' ',' ',' ',' ',' ',
4      'CL','AY','TO','N ','N ','M ',' ',' ',' ',' ',' ',' ',' ',' ',
5      'CO','LD','B ','AY','.', ' ', 'AK','.', ' ', ' ',' ',' ',' ',
6      'CU','LE','BR','A ','P ','R ',' ',' ',' ',' ',' ',' ',' ',' ',
7      'HO','LY','OK','E ','M ','A ',' ',' ',' ',' ',' ',' ',' ',' ',
8      'I ','S ','D ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',
9      'KI','NG','SL','EX','D ','AM','NB','.', ' ', ' ',
-      'LI','VI','NG','ST','ON','MT','.', ' ', ' ',
'MO','NT','AU','K ','PO','IN','T ','N ','Y ',' ',
2      'PO','IN','T ','AR','EN','A ','C ','A ',' ',' ',' ',
3      'RU','SS','EL','L ','K ','S ',' ',' ',' ',' ',' ',' ',
4      'SA','N ','GO','RG','ON','IO','P ','AS','S ','CA ',
5      'BO','AR','DM','AN',' ','OR',' ',' ',' ',' ',' ',' ',
5      'GO','OD','NO','E ','HI','LL','S ','W ','A ',' ',
7      'ME','AD','E ','K ','AN','SA','S ',' ',' ',' ',' ',
3      'FT',' ','SI','LL',' ','OK',' ',' ',' ',' ',' ',
9      'AU','GS','PU','RG','ER','M ','T ',' ',' ','WA ',' ',
-      'LU','DI','NG','TO','M ','M ','I ',' ',' ',' ',
C >>>
C >>> INITIALIZE FGB ERROR CODES
C >>
      CALL ERRSET(29,.TRUE., .TRUE., .TRUE., .FALSE., 15)
C >>>
C >>> INITIALIZE MISC. VARIABLES
C >>>
      PAGE=0
      CMOCUM=.FALSE.
      ENDFIL=.FALSE.
C >>>
C >>> TYPE AND PRINT HELP FILE IF REQUESTED
C >>>
      TYPE 10
10     FORMAT(//1X,28(1H-)/' MVP CANDIDATE SITE ANALYSIS'/1X,28(1H-)
      //' WIND> NEED HELP? ',\$)
      ACCEPT 20,ANS
20     FORMAT(A1)

```

```

IF(ANS.NE.'Y') GO TO 105
OPEN(UNIT=1,NAME='WIND.HLP',STATUS='OLD',READONLY)
30 DO 50 I=1,24
      READ(1,40,END=60) TTLINE
40      FORMAT(4CA2)
      TYPE 40,TTLINE
50 CONTINUE
ACCEPT 20,ANS
GO TO 30
60 I=24-I
IF(I.GT.0) TYPE 70
70 FORMAT(<I>(/))
TYPE SO
80 FORMAT(' WIND> PRINT HELP FILE? ',\$)
ACCEPT 20,ANS
IF(ANS.NE.'Y') GO TO 100
OPEN(UNIT=6,NAME='WIND.HLP',STATUS= 'OLD')
REWIND 1
READ(1,40,END=90) TTLINE
WRITE(6,40) TTLINE
90 CLOSE(UNIT=6,DISP='PRINT')
100 CLOSE(UNIT=1)
CALL EXIT
STOP
C i>>
C >>> PROMPT FOR SAMPLE PERIOD (MONTH, YEAR).
C >>> INITIALIAZE CURRENT MONTH CODE, MONTH NAME, AND YEAR.
C >>> ZVALUATE FILE EXTENSION.
C >>
105 LOOP=1
TYPE GOO
800 FORMAT(/,' DO YOU WANT TO RUN A MULTI-MONTH ANALYSIS? ',\$)
ACCEPT 2C,ANS
IF(ANS.NE.'Y') GO TO 110
LOOP=2
TYPE 810
810 FORMAT(/,' INITIAL MONTH? ',\$)
ACCEPT *,M
TYPE 820
820 FORMAT(/,' INITIAL YEAR? ',\$)
ACCEPT *,YR
TYPE 830
830 FORMAT(/,' NUMBER OF MONTHS TO BE ANALYZED? ',\$)
ACCEPT *,LENGTH
GO TO 171
110 TYPE 120
120 FORMAT(/' WIND> ENTER SAMPLE PERIOD (MONTH, YEAR):')
130 TYPE 140
140 FORMAT(7X,'MONTH? ',\$)
ACCEPT *,M
IF(M.GT.0.AND.M.LE.12) GO TO 160
TYPE 150

```

```

150  FORMAT(' >>> ERROR: INVALID MONTH, TRY AGAIN.')
    GO TO 130
160  TYPE 170
170  FORMAT(7X,'YEAR? ',$,)
    ACCEPT #,YR
171  IF(YR.LT.1000) YR=YR+1900
    CMO=((YR-IYR1)*12+M)-M1+1
    IF(LOOP.BZ.2) GO TO 175
    LMO=I+LENGTH-1
    DO 172 I=1,6
    IF(LMO.LE.12*I) GO TO 173
172  CONTINUE
173  IKC=I-1
    LYR=YR+IKC
    LMO=MOD(LMO,12)
    IF(LMO.EQ.0)LMO=12
    TYPE 174,LMO,LYR
174  FORMAT(5X,'LAST MONTH=',I2,3X,'LAST YEAR=',I4)
    CMOL=((LYR-IYR1)*12+LMO)-M1+1
    IF(CMOL.LT.0.OR.CMOL.GT.MOMAX) GO TO 176
175  IF(CMO.GT.0.AND.CMO.LE.MOMAX) GO TO 190
176  TYPE 180
730  FORMAT(' >>> ERROR: SAMPLE PERIOD OUT OF RANGE.'/
    TRY AGAIN? ',$,)
    ACCEPT 20,ANS
    IF(ANS.EQ.'Y') GO TO 110
    STOP
190  DO 200 I=1,5
    CHON(I)=MONTHS(I,I)
    IF(LOOP.NE.2) GO TO 200
    CHON(I+5)=MONTHS(I,13)
    CHON(I+10)=MONTHS(I,LMO)
200  CONTINUE
    CYR=YR
    FEXT=10*M+MOD(YR,10)
C >>>
C >>> OPEN FILES AFTER CONVERTING FILE NAMES (USING FEXT),
C >>> AND INPUT FIRST SAMPLE RECORD.
C >>>
    TYPE 2C1
201  FORMAT(/' WIND> ENTER FILE NAME (OPTIONAL): ',$,)
    ACCEPT 202,INFILE
    TYPE 203,(INFILE(I),I=1,16)
202  FORMAT(16A2)
203  FORMAT(2X,'INFILE=',16A2)
    INFILE(16)=0
    IF(INFILE(1).NE.' ') GO TO 240
    IF(FEXT.GE.100) GO TO 220
    ENCODE(10,210,INFILE) FEXT,0
210  FORMAT('WIND.0',I2,A2)
    GO TO 240
220  ENCODE(10,230,INFILE) FEXT,0

```

```

230 FORMAT('WIND.',I3,A2)
240 OPEN(UNIT=1,NAME=INFILE,STATUS='OLD',READONLY,ERR=310)
NCH=6
TYPE 943
943 FORMAT(/' DOES THIS SITE HAVE TURBINE DATA? ',\$)
ACCZPT 20,ANS
IF(ANS.EQ.'Y') NCH=10
CALL SINPUT
IF(ENDFIL) GO TO 330
OPEN(UNIT=6,NAME='WIND.RPT',STATUS='NEW',
*CARRIAGECONTROL='FORTRAN')
GO TO 348
310 TYPE 320,(INFILE(I),I=1,16)
320 FORMAT(/' >>> ERROR: INPUT FILE '' ,16A2,'" UNAVAILABLE.',
-           TRY AGAIN? ',\$)
ACCEPT 20,ANS
IF(ANS.EQ.'Y') GO TO 105
STOP
330 TYPE 340
340 FORMAT(/' >>>ERROR: IMMEDIATE EOF ENCOUNTERED ON INPUT.'//)
CALL EXIT
STOP
C >>>
C >>> PROMPT FOR SAMPLE RATE AND COMPUTE TOTAL POSSIBLE SAMPLES.
C >>> VERIFY AND (OPTIONALLY) ALTER SITE DATA AND LOCATIONS.
C >>> INPUT AND VERIFY NWS DATA FOR THE CURRENT MONTH (EACH SITE).
C >>>
348 IF(LOOP.NE.2) GO TO 350
YRX=YR
TPSMPL=0
DO 349 I=M,M+LENGTH-1
MO=MOD(I,12)
IF(MO.EQ.0) MO=12
IF(I.EQ.1 .AND.MO.EQ.1) GO TO 688
IF(MO.EQ.1) YRX=YRX+1
688 CONTINUE
TYPE 958,YRX,MO
953 FORMAT(/' YEAR=',I5,2X,' MONTH=',I3)
CALL MODAYS(MO,YRX,NDAYS,E)
TYPE 963,NDAYS
963 FORMAT(/' NDAYS=',I5)
TPSMPL=TPSMPL+24*NDAYS
349 CONTINUE
TYPE 964,TPSMPL
964 FORMAT(/' TPSMPL=',I5)
GO TO 365
350 TPSMPL=30
TYPE 360
360 FORMAT(/' WIND> ENTER SAMPLE RATE (PER HOUR): ',\$)
ACCEPT #,TPSMPL
CALL MODAYS(M,CYR,NDAYS,I)
TPSMPL=TPSMPL*24*NDAYS

```

```

365 CONTINUE
20 630 S=1,20
IF(SITCOD(S).NE.INFILE(3)) GO TO 630
C >>> TYPE SITE DATA
370 TYPE 380, SITCOD(S),(SITLOC(I,S),I=1,10),INT(SITDAT(4,S)),
- (SITDAT(I,S),I=1,3)
380 FORMAT(/' WIND> SITE NUMBER:      ',A2/
-        7X,'SITE LOCATION:      ',10A2/
-        7X,'ELEVATION (M):     ',I8/
-        7X,'SENSOR LEVELS:    (A)',F5.1/
-        24X,'(B)',F5.1/24X,'(C)',F5.1)
C >>> PROMPT FOR ALTERED SITE DATA IF REQUESTED
TYPE 390
390 FORMAT(7X,'OKAY? ',$,)
ACCEPT 20,ANS
IF(ANS.NE.'N') GO TO 500
TYPE 400
400 FORMAT(/7X,'ENTER SITE CODE (OR "/"): ',$,)
ACCEPT 410,ANS
410 FORMAT(A2)
IF(ANS.NE.'/'.AND.ANS.NE.' ') SITCOD(S)=ANS
TYPE 420
420 FORMAT(/7X,'ENTER SITE LOCATION (OR "/"): ',$,)
ACCEPT 430,TEXT
430 FORMAT(10A2)
IF(TEXT(1).EQ.'/') GO TO 450
DO 440 I=1,10
    SITLOC(I,S)=TEXT(I)
440 CONTINUE
450 TYPE 460
460 FORMAT(7X,'ENTER SITE ELEVATION (OR "/"): ',$,)
ACCEPT *,SITDAT(4,S)
TYPE 470
470 FORMAT(7X,'ENTER SENSOR LEVEL (OR "/"): (A) = ',$,)
ACCEPT *,SITDAT(1,S)
TYPE 480
480 FORMAT(37X,'(B) = ',$,)
ACCEPT *,SITDAT(2,S)
TYPE 490
490 FORMAT(37X,'(C) = ',$,)
ACCZPT *,SITDAT(3,S)
GO TO 370
500 CONTINUE
RHO(1)=1.225-(1.19E-4)*(SITDAT(1,S)+SITDAT(4,S))
RHO(2)=1.225-(1.19E-4)*(SITDAT(2,S)+SITDAT(4,S))
RHO(3)=1.225-(1.19E-4)*(SITDAT(3,S)+SITDAT(4,S))
630 CONTINUE
RETURN
END
SUBROUTINE STINIT
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C

```

C >>>  
C >>> 03-NOV-78  
C >>> G R JOHNSON  
C >>> BATTELLE NORTHWEST  
C >>> PO BOX 999  
C >>> RICHLAND, WN. 99352  
C >>>  
C >>> 31-DEC-81 (LAST MODIFICATION)  
C >>> W F SANDUSKY  
C  
C THIS SUBROUTINE INITIALIZES ALL PERTINENT VARIABLES PRIOR TO DATA  
C COLLECTION. THE ROUTINE ALSO APPENDS CUMULATIVE SITE DATA TO THE  
C APPROPRIATE FILE. THE PROCEDURX ASSUMES THE FILE IS POSITIONED  
C AT ITS END-OF-FILXMARK. THIS ROUTINE SHOULD BE CALLED FOR EACH  
C SITE PRIOR TO IIIITIATIIJG DATA COLLECTION FOR THAT SITE (AS DEFINED  
C BY THE PARAMETER "INSIT").  
C  
C DESCRIPTIONS OF THE VARIABLES INITIALIZED AND I/O FILES UTILIZED  
C BY THE ROUTINE CAN BE FOUND 111 THE PROGRAM DOCUMENTATION FILE,  
C ("WIND.DOC").  
C  
CC  
C *i>i*  
C >>> MONTH CODES ARE EVALUATED SO THAT CMO=1 DEFINES  
C >>> THE MONTH M1,IYR1 (ZG: 01 = OCTOBER 1978). THE  
C >>> PARAMETERS M1 AND MOMAX (MAXIMUM NUMBER OF DATA  
C >>> MONTHS HANDLED BY THE PROGRAM) ARE INITIALIZED  
C >>> HERE FOR USE IN CONVERTING SITS EISTORICAL NWS  
C >>> DATA INTO THE ABOVE FORMAT.  
PARAMETER M1 = 12  
PARAMETER IYR1 = 1976  
PARAMETER MOMAX = 75  
C >>>  
COMMON /CUMDAT/CUMDAT,CHOCUM  
INCLUDE 'DISDXT.FTN'  
INCLUDE 'PERSIS.FTN'  
COMMON /INPDAT/INSIT,INDAY,INTIM,INWS,INWD,INTEMP,ENDFIL  
COMMON /MAXDAT/MAXDAT  
COMMON /NWSDAT/NWSDAT  
COMMON /RPFORM/CSITE,CSITEA,CSITLO,CMO,CMON,CYR,CLEV,PAGE,LINE,PLT  
COMMON /SITDAT/SITCOD,SITDAT  
COMMON /SITLOC/SITLOC  
COMMON /TIMDAT/TIMDAT  
COMMON /WINDAT/TPSMPL,WINDAT  
COMMON /WSHEAR/WSHEAR  
INCLUDE 'WSVSWD.FTN'  
COMMON /PWS/PWS  
COMMON /POWER/POWER,RHO  
COMMON /LOOP/LOOP,LYR,LENGTH  
REAL CLEV(3)  
REAL POWER(3),RHO(3)  
REAL CUMDAT(3,MOMAX,6)

```

REAL INWS(3),INWD(3),INTEMP(3)
REAL MAXDAT(3,6)
REAL NWSDAT(MOMAX,4)
REAL SITDAT(4,20)
REAL TIMDAT(3,24,6)
REAL WINDAT(3,3)
REAL WSHEAR(3,2,13)
    REAL PWS(3,17)
INTEGER CSITE,CSITEA,CSITLO(10),CMO,CION(15),CYR,PAGE,LIME,PLT
ISTEGER INSIT,INDAY,INTIM
INTEGER SITCOD(20)
INTEGER SITLOC(10,20)
INTEGER TPSMPL
LOGICAL CMOCUM
LOGICAL ENDFIL
C >>> WORKING SPACE
INTEGER SITE,M,M2,N3,RT,L,I
REAL WX(6,3),NWSWS,NWSWD,DWX(2)
C >>> DOWNLOAD CUMULATIVE SITE DATA
IF(CSITE.LE.0) GO TO 10
IF(CMOCUM) GO TO 10
10 IF(ENDFIL) RETURN
REWIND 3
REWIND 4
ICOR=0
C >>> INITIALIZE DATA COMPIRATION ARRAYS
DO 20 I=1,1683
DISDAT(I,1,1)=0
20 CONTINUE
DO 21 I=1,576
PERSIS(I,1,1)=0
21 CONTINUE
DO 22 I=1,432
TIMDAT(I,1,1)=0
22 CONTINUE
DO 23 I=1,24
WINDAT(I,1)=0.0
23 CONTINUE
DO 24 I=1,78
WSHEAR(I,1,1)=0.0
24 CONTINUE
DO 25 I=1,144
WSVSWD(I,1,1)=0.0
25 CONTINUE
DO 26 I=1,4*MOMAX
NWSDAT(I,1)=0.0
26 CONTINUE
DO 27 I=1,18*MOMAX
CUMDAT(I,1,1)=0.0
27 CONTINUE
    DO 28 I=1,3
POWER(I)=0.0

```

```

        DO 28 J=1,17
        PWS(I,J)=0.0
28    CONTINUE
C >>> CHECK FOR VALID SITS NUMBER AND UPDATE CURRENT SITE POINTER
      DO 30 CSITE=1,20
          IF(INSIT.EQ.SITCOD(CSITE)) GO TO 50
30    CONTINUE
      TYPE 40,INSIT
40    FORMAT(' >>>ERROR: INVALID SITE NUMBER ''',A2,''' ENOUNTERED.')
      CALL EXIT
      STOP
50    TYPE 60,INSIT
60    FORMAT(/  WIND> COMPILING DATA FOR SITE ',A2,'')
C >>> INITIALIZE CURRENT SITE DATA (RPFORM)
      CSITEA=INSIT
      DO 70 I=1,10
          CSITLO(I)=SITLOC(I,CSITE)
70    CONTINUE
      CLEV(1)=SITDAT(1,CSITE)
      CLEV(2)=SITDAT(2,CSITE)
      CLEV(3)=SITDAT(3,CSITE)
      PAGE=0
C >>> INPUT CUMULATIVE WIND DATA
C >>> INITIALIZE "PERSISTANCE" VARIABLES
140   DO 150 L=1,3
      IF(CLEV(L).LE.0) GO TO 150
      S=3
      IF(INWS(L).LE.20) S=7
      IF(INWS(L).LE.12) S=6
      IF(INWS(L).LE.7) S=5
      IF(INWS(L).LE.6) S=4
      IF(INWS(L).LE.5) S=3
      IF(INWS(L).LE.4) S=2
      IF(INWS(L).LT.3) S=1
      IF(INWS(L).LT.0) S=99
      LS(L)=S
      LTIM(L)=(INTIM/100)*60+MOD(INTIM,100)
      LDAY(L)=INDAY
      PTIM(L)=0.0
150   CONTINUE
C >>> INITIALIZE MAX AND MIN "WIND SHEAR" VARIABLES
      DO 170 L=1,3
          LL=2
          LU=1
          IF(L.GT.1) LL=3
          IF(L.EQ.2) LU=2
          IF((CLEV(LL).LE.0).OR.(CLEV(LU).LE.0)) GO TO 170
          IF((INWS(LL).LT.0).OR.(INWS(LU).LT.0)) GO TO 170
          IF((INWD(LL).LT.0).OR.(INWD(LU).LT.0)) GO TO 170
          DWX(1)=INWS(LU)-INWS(LL)
          DWX(2)=INWD(LU)-INWD(LL)
          IF(ABS(DWX(2)).GT.180.0) ICOR=1

```

```

IF(DWX(2).LT.-180.0) DWX(2)=DWX(2)+360.0
IF(DWX(2).GT.180.0) DWX(2)=DWX(2)-360.0
AWS=(INWS(LU)+INWS(LL))/2.0
AWD=(INWD(LU)+INWD(LL))/2.0
IF(ICOR.EQ.1) AWD=AWD+180.0
IF(AWD.GT.360.0) AWD=AWD-360.0
DO 160 X=1,2
WSHEAR(L,X,4)=DWX(X)
WSHEAR(L,X,5)=AWS
WSHEAR(L,X,6)=AWD
WSHEAR(L,X,7)=INDAY
WSHEAR(L,X,8)=INTIM
WSHEAR(L,X,9)=DWX(X)
WSHEAR(L,X,10)=AWS
WSHEAR(L,X,11)=AWD
WSHEAR(L,X,12)=INDAY
WSHEAR(L,X,13)=INTIM
163  CONTINUE
170  CONTINUE
C >>>RETURN
      RETURN
      END
      SUBROUTINE COMDAT
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                         C
C   >>>
C   >>> Q3-NOV-78                                     C
C   >>> G R JOHNSON                                   C
C   >>> BATTELLE NORTHWEST                           C
C   >>> PO BOX 999                                    C
C   >>> RICHLAND, WN. 99352                           C
C   >>>
C   >>> 31-DEC-1981 (LAST MODIFICATION)           C
C   W F SANDUSKY                                     C
C                                         =
C THIS ROUTINE COMPILES INPUT DATA INTO THE COMPONENTS NECESSARY          C
C FOR REPORT GENERATION. DESCRIPTIONS OF THE VARIABLES COMPILED CAN      C
C BE FOUND IN THE PROGRAM DOCUMENTATION FILE, ("WIND.DCC").               C
C                                         =
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C   >>>
C   >>> MONTH CODES ARE EVALUATED SO THAT CMO=1 DEFINES THE MONTH M1, IYR1  C
C   >>> (EG: 01 = OCTOBER 1978). MOMAX IS THE MAXIMUM NUMBER OF SAMPLE    C
C   >>> MONTHS HANDLED BY THE SYSTEM.                                     C
      PARAMETER      M1      = 12
      PARAMETER      IYR1     = 1976
      PARAMETER      MOMAX    = 75
C   >>>
      COMMON /CUMDAT/CUMDAT,CMOCUM
      COMMON /INPDAT/INSIT,INDAY,INTIM,INWS,INWD,INTEMP,ENDFIL
      COMMON /MAXDAT/MAXDAT
      COMMON /NWSDAT/NWSDAT

```

```

COMMON /RPFORM/CSITE, CSITEA, CSITLO, CMO, CMON, CYR, CLEV, PAGE, LINE, PLT
COMMON /SITDAT/SITCOD,SITDAT
COMMON /SITLOC/SITLOC
COMMON /TIMDAT/TIMDAT
COMMON /WINDAT/TPSMPL,WINDAT
COMMON /WSHEAR/WSHEAR
COMMON /PWS/PWS
COMMON /NCH/NCH
COMMON /LOOP/LOOP,LYR,LENGTH
  COMMON /POWER/POWER,RHO
    REAL POWER(3),RHO(3)
COMMON /SPDALL/ SPDALL(3,30),DIRALL(3,30)
INCLUDE 'GISDAT.FTN'
INCLUDE 'PERSIS.FTN'
INCLUDE 'WSVSWD.FTN'
INCLUDE 'SPEEDS.FTN'
REAL MWD
REAL CLEV(3)
REAL CUMDAT(3,MOMAX,6)
REAL INWS(3),INWD(3),INTEMP(3)
REAL MAXDAT(3,6)
REAL NWSDAT(MOMAX,4)
REAL SITDAT(4,20)
REAL TIMDAT(3,24,6)
REAL WINDAT(3,8)
REAL WSHEAR(3,2,13)
REAL PWS(3,17)
INTEGER CSITE, CSITEA, CSITLO(10),CMO,CMON(15),CYR,PAGE,LINE,PLT
INTEGER INSIT,INDAY,INTIM
INTEGER SITCOD(20)
INTEGER SITLOC(10,20)
INTEGER TPSMPL,OR
LOGICAL CMOCUM
LOGICAL ENDFIL
DIMENSION SUMS(3),wdx(3),SUMDIY(3),SUMDIX(3),SUMAV(3),SUMSD(3)
DIMENSION ISUM(3),YADD(3),XADD(3)
C >>> WORKING SPACE
  INTEGER S,D,L,LL,LU,X,T,HR,JHR
  REAL DWX(2)
C
  DATA WSRNG/4.,12.,20.,100./
  DATA OR/'OR'/
  DATA PI/3.1415926535/
C >>>
C >>> EVALUATE AND STORE SAMPLE DATA
C >>>
C >>> 'DISDAT'
10  DO 60 L=1,3
      IF(CLEV(L).LE.0) GO TO 60
      IF(INWS(L).LT.0) GO TO 60
C      IF(INWD(L).LT.0) GO TO 60
      ANGR=INWD(L)*PI/180.0

```

```

XADD(L)=SIN(ANGR)
YADD(L)=COS(ANGR)
SP=0.
DO 20 S=1,31
SP=SP+.5
IF(S.GT.20) SP=SP+.5
IF(INWS(L).LE.SP) GO TO 30
20 CONTINUE
30 CONTINUE
IF(INWD(L).LT.0) GO TO 55
DO 40 D=1,16
IF(INWD(L).LE.(D#22.5-11.25)) GO TO 50
40 CONTINUE
IF(INWD(L).GT.348.75) D=1
50 DISDAT(L,S,D)=DISDAT(L,S,D)+1
DISDAT(L,33,D)=DISDAT(L,33,D)+1
55 DISDAT(L,S,17)=DISDAT(L,S,17)+1
DISDAT(L,33,17)=DISDAT(L,33,17)+1
IF(INWD(L).LT.0) GO TO 60
PWS(L,D)=INWS(L)+PWS(L,D)
60 CONTINUE
ICOR=0
C >>>
C >>> "MAXDAT"
DO 80 L=1,3
IF(CLEV(L).LE.0) GO TO 80
IF(INWS(L).LT.0) GO TO 80
IF(MAXDAT(L,L).GE.INWS(L)) GO TO 80
DO 70 LL=1,3
MAXDAT(L,LL)=INWS(LL)
70 CONTINUE
MAXDAT(L,4)=INWD(L)
MAXDAT(L,5)=INDAY
MAXDAT(L,6)=INTIM
80 CONTINUE
C >>>
C >>> "PERSIS"
DO 120 L=1,3
IF(CLEV(L).LE.0) GO TO 120
S=8
IF(INWS(L).LE.20) S=7
IF(INWS(L).LE.12) S=6
IF(INWS(L).LE.7) S=5
IF(INWS(L).LE.6) S=4
IF(INWS(L).LE.5) S=3
IF(INWS(L).LE.4) S=2
IF(INWS(L).LT.3) S=1
IF(INWS(L).LT.0) S=99
ITIM=(INTIM/100)*60+MOD(INTIM,100)
T=ITIM-LTIM(L)
C T=T+(INDAY-LDAY(L))#1440
IF(LWS(L).EQ.99) GO TO 102

```

```

IF(S.EQ.LWS(L)) GO TO 110
IF(LOOP.EQ.2) GO TO 620
IF(TPSMPL.LE.744) GO TO 620
IF(PTIM(L).GT.60) GO TO 89
HR=1+(PTIM(L)-1)/6
IF(PTIM(L).GT.18) HR=3
IF(PTIM(L).GT.24) HR=4+PTIM(L)/49
GO TO 100
89    CONTINUE
DO 90 HR=6,13
JHR=HR-3
IF(PTIM(L).LE.JHR*30) GO TO 103
90    CONTINUE
GO 92 HR=14,18
JHR=HR-8
IF(PTIM(L).LE.JHR*60) GO TO 100
92    CONTINUE
JHR=10
DO 94 HR=19,23
JHR=JHR+2
IF(PTIM(L).LE.JHR*60) GO TO 100
94    CONTINUE
HR=24
100   PERSIS(L,HR,LWS(L))=PERSIS(L,HR,LWS(L))+1
      GO TO 699
620   CONTINUE
C >>>
C >>>    REDEFINE W/S PERSISTENCE FOR ANNUAL RUNS
C >>i
      DO 625 HR=1,23
      IF(PTIM(L).LE.HR*60) GO TO 535
625   CONTINUE
HR=24
635   PERSIS(L,HR,LWS(L))=PERSIS(L,HR,LWS(L))+1
699   CONTINUE
102   LWS(L)=3
      PTIM(L)=0.0
110   PTIM(L)=PTIM(L)+T
      LTIM(L)=ITIM
      LDAY(L)=INDAY
120   CONTINUE
C >>>
C >i>"TIMDAT"
      T=INTIM/100+1
      IF(T.GT.24) TYPE 21,INDAY,INTIM
21    FORMAT(5X,'INDAY=',I4,2X,'INTIM=',I4)
      DO 140 L=1,3
      IF(CLEV(L).LE.0) GO TO 140
      IF(INWS(L).LT.0) GO TO 130
      TIMDAT(L,T,1)=TIMDAT(L,T,1)+INWS(L)
      TIMDAT(L,T,2)=TIMDAT(L,T,2)+INWS(L)**2
      TIMDAT(L,T,3)=TIMDAT(L,T,3)+1

```

```

130  IF(INWD(L).LT.0) GO TO 140
      TIMDAT(L,T,4)=TIMDAT(L,T,4)+YADD(L)
      TIMDAT(L,T,5)=TIMDAT(L,T,5)+XADD(L)
      TIMDAT(L,T,6)=TIMDAT(L,T,6) + 1
140  CONTINUE
C >>>
C >>> "WINDAT"
      DO 170 L=1,3
      IF(CLEV(L).LE.0) GO TO 170
      IF(INWS(L).LT.0) GO TO 150
      WINDAT(L,1)=WINDAT(L,1)+INWS(L)
      WINDAT(L,2)=WINDAT(L,2)+INWS(L)**2
      WINDAT(L,4)=WINDAT(L,4)+1
150  WINDAT(L,3)=WINDAT(L,3)+1
      IF(INWD(L).LT.0) GO TO 160
C
C      FIND AND ACCUMULATE X AND Y COMPONENTS OF WIND MOVEMENT
C
      WINDAT(L,5)=WINDAT(L,5)+ YADD(L)
      WINDAT(L,6)=WINDAT(L,6)+ XADD(L)
      WINDAT(L,8)=WINDAT(L,8) + 1
160  WINDAT(L,7)=WINDAT(L,7)+1
C
C >>>>> SUM THE POWER ESTIMATES
      IF(INWS(L).LT.0.0) GO TO 170
C
      POWER(L)=POWER(L)+0.5*RHO(L)*INWS(L)**3
170  CONTINUE
C >>>
C >>> "WSHEAR"
      DO 200 L=1,3
      LL=2
      LU=1
      IF(L.GT.1) LL=3
      IF(L.EQ.2) LU=2
      IF((CLEV(LL).LE.0).OR.(CLEV(LU).LE.0)) GO TO 200
      IF((INWS(LL).LT.0).OR. (INWS(LU).LT.0)) GO TO 200
      IF((INWD(LL).LT.0).OR.(INWD(LU).LT.0)) GO TO 200
      DWX(1)=INWS(LU)-INWS(LL)
      DWX(2)=INWD(LU)-INWD(LL)
      IF(ABS(DWX(2)).GT.180.0) ICOR=1
      IF(DWX(2).LT.-180.0) DWX(2)=DWX(2)+360.0
      IF(DWX(2).GT.180.0) DWX(2)=DWX(2)-360.0
      AWS=(INWS(LU)+INWS(LL))/2.0
      AWD=(INWD(LU)+INWD(LL))/2.0
      IF(ICOR.EG.1) AWD=AWD+180.0
      IF(AWD.GT.360) AWD=AWD-360.0
      DO 190 X=1,2
      WSHEAR(L,X,1)=WSHEAR(L,X,1)+DWX(X)
      WSHEAR(L,X,2)=WSHEAR(L,X,2)+DWX(X)**2
      WSHEAR(L,X,3)=WSHEAR(L,X,3)+1
      IF(DWX(X).LE.WSHEAR(L,X,4)) GO TO 180

```

```

IF(DWX(X).LT.4.) GO TO 180
WSHEAR(L,X,4)=DWX(X)
WSHEAR(L,X,5)=AWS
WSHEAR(L,X,6)=AWD
WSHEAR(L,X,7)=INDAY
WSHEAR(L,X,8)=INTIM
180 IF(DWX(X).GE.WSHEAR(L,X,9)) GO TO 190
IF(DWX(X).GT.20.) GO TO 190
WSHEAR(L,X,9)=DWX(X)
WSHEAR(L,X,10)=AWS
WSHEAR(L,X,11)=AWD
WSHEAR(L,X,12)=INDAY
WSHEAR(L,X,13)=INTIM
190 CONTINUE
200 CONTINUE
C >>>
C >>> "WSVSWD"
C
C      COLLECT 1 HOUR'S WIND DATA, FIND IT'S MEAN AND STANDARD DEVIATION
C      OF WIND SPEED, IT'S MEAN DIRECTION AND ACCUMULATE THEM BY DIRECTION
C
IF(INSIT.EQ.OR) GO TO 267
IF(LOOP.NE.2) GO TO 208
267 CONTINUE
DO 277 L=1,3
IF(CLEV(L).LE.0) GO TO 277
IF(INWS(L).LE.0) GO TO 277
IF(INWD(L).LE.0) GO TO 277
DO 278 D=1,16
IF(INWD(L).LE.D#22.5-11.25) GO TO 204
278 CONTINUE
IF(INWD(L).GT.348.75) D=1
204 WSVSWD(L,D,2)=WSVSWD(L,D,2)+1
WSVSWD(L,D,3)=WSVSWD(L,D,3)+INWS(L)
IF(LENGTH.LT.6) GO TO 277
DO 593 JS=1,3
IF(INWS(L).LE.WSRNG(JS)) GO TO 695
693 CONTINUE
IF(INWS(L).GT.WSRNG(3)) JS=4
695 CONTINUE
DO 697 D=1,16
IF(INWD(L).LE.D#22.5-11.25) GO TO 698
697 CONTINUE
IF(INWD(L).GT.348.75) D=1
698 DETCNT(JS,D,L)=DETCNT(JS,D,L)+1
277 CONTINUE
208 COGTINUE
INHOLD=INH
INH= INTIM/100+1
IT = MOD(INTIM,100)/2 + 1
DO 230 L=1,3
IF(INHOLD.EQ.0.AND.INH.EQ.1) GO TO 233

```

```

IF(INH.EQ.INHOLD) GO TO 233
IF(ISUM(L).LE.0) GO TO 230
CALL STATEX(SUMS(L),ISUM(L),SUMAV(L),SUMSD(L),L)
CALL GMWD(SUMDIY(L),SUMDIX(L),WDX(L),MWD)
30 210 D=1,16
IF(MWD.LE.D#22.5-11.25) GO TO 220
210 CONTINUE
IF(MWD.GT.348.75) D=1
220 WSVSWD(L,D,1)=SUMSD(L)/SUMAV(L) + WSVSWD(L,D,1)
WSVSWD(L,D,2)=WSVSWD(L,D,2) + 1
WSVSWD(L,D,3)=WSVSWD(L,D,3) + SUMAV(L)
233 CONTINUE
IF(CLEV(L).LE.0) GO TO 230
IF(INWS(L).LE.0) GO TO 230
IF(INWD(L).LE.0) GO TO 230
232 CONTINUE
SUMS(L)=SUMS(L)+INWS(L)
ISUM(L)=ISUM(L)+1
SPDALL(L,IT)=INWS(L)
DIRALL(L,IT)=INWD(L)
WDX(L)=WDX(L)+1
500 FORMAT(3F10.3)
SUMDIY(L)=SUMDIY(L)+YADD(L)
SUMDIX(L)=SUMDIX(L)+XADD(L)
502 CONTINUE
DO 202 JS=1,3
IF(INWS(L).LE.WSRNG(JS)) GO TO 203
202 CONTINUE
IF(INWS(L).GT.WSRNG(3)) JS=4
203 CONTINUE
DO 205 D=1,16
IF(INWD(L).LE.D#22.5-11.25) GO TO 206
205 CONTINUE
IF(INWD(L).GT.348.75) D=1
206 DETCNT(JS,D,L)=DETCNT(JS,D,L)+1
230 CONTINUE
C >>>
C >>>INPUT NEXT RECORD, TEST FOR SITE CODE
C >>>
CALL SINPUT
IF(.NOT.ENDFIL.AND.INSIT.EQ.CSITEA) GO TO 10
IF(LOOP.EG.2) GO TO 330
IF(INSIT.EQ.OR) GO TO 330
DO 330 L=1,3
IF(ISUM(L).LE.0) GO TO 330
CALL STATEX(SUMS(L),ISUM(L),SUMAV(L),SUMSD(L),L)
CALL GMWD(SUMDIY(L),SUMDIX(L),WDX(L),MWD)
DO 310 D=1,16
IF(MWD.LE.D#22.5-11.25) GO TO 320
310 CONTINUE
IF(MWD.GT.348.75) D=1
320 WSVSWD(L,D,1)=SUMSD(L)/SUMAV(L) + WSVSWD(L,D,1)

```

```
WSVSWD(L,D,2)=WSVSWD(L,D,2) + 1  
WSVSWD(L,D,3)=WSVSWD(L,D,3) + SUMAV(L)  
330 CONTINUE  
RETURN  
END  
SUBROUTINE CONSUM  
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC  
C C  
C >>> C  
C >>> 03-NOV-78 C  
C >>> G R JOHNSON C  
C >>> BATTXLLE SORTHUEST C  
C >>> PO BOX 999 C  
C >>> RICHLAND, WN. 99352 C  
C >>> C  
C  
C THIS SUBROUTINE COMPILES SUMMARY DATA FOR EACH SITE TO BE USED IN C  
C AN "ALL-SITE-SUMMARY" REPORT (RP0301). DESCRIPTIONS OF THE VARI- C  
C ABLES DEFINED IN THE ROUTINE MAY BE FOUND IN THE PROGRAM DOCU- C  
C MENTATION FILE ("WIND.DOC"). C  
C  
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC  
COMMON /RPFORM/CSITE, CSITEA, CSITLO, CMO, CMON, CYR, CLEV, PAGE, LINE, PST  
COMMON /MAXDAT/MAXDAT  
COMMON /SUMDAT/SUMDAT  
COMMON /WINDAT/TPSMPL, WINDAT  
REAL CLEV(3)  
REAL MAXDAT(3,6)  
REAL SUMDAT(8,3,20)  
REAL WINDAT(3,8)  
INTEGER CSITE, CSITEA, CSITLO(10), CMO, CMON(15), CYR, PAGE, LINE, PLT  
INTEGER TPSMPL  
C >>>  
C >>> WORKING SPACE  
C >>>  
REAL TSF, SUM, SSQ, MEAN, STDSV  
REAL ZA, ZB, ZC, WSA, WSB, WSC, AAB, SAC, ABC  
C >>>  
C i>>COMPILE AND STORE SUMMARY VALUES  
C >i/i  
TSF=100.0/TPSMPL  
DO 10 L=1,3  
IF(CLEV(L).LE.0) GO TO 10  
SUMDAT(1,L,CSITE)=WINDAT(L,4)*TSF  
SUM=WINDAT(L, 1)  
SSQ=WINDAT(L, 2)  
N=WINDAT(L, 4)  
CALL STATSS(SUM, SSQ, N, MEAN, STDEV)  
SUMDAT(2,L,CSITE)=MEAN  
SUMDAT(3,L,CSITE)=STDEV  
SUMDAT(4,L,CSITE)=MAXDAT(L,L)  
IF(MEAN.LE.0) GO TO 10
```

```

        SUMDAT(5,L,CSITE)=STDEV/MEAN
10      CONTINUE
C >>> COMPUTE ALPHA'S
      WSA=0.0
      WSB=0.0
      WSC=0.0
      IF(WINDAT(1,4).LE.0.0) GO TO 20
      WSA=WINDAT(1,1)/WINDAT(1,4)
20      IF(WINDAT(2,4).LE.0.0) GO TO 30
      WSB=WINDAT(2,1)/WINDAT(2,4)
30      IF(WINDAT(3,4).LE.0.0) GO TO 40
      WSC=WINDAT(3,1)/WINDAT(3,4)
40      ZA=CLEV(1)
      ZB=CLEV(2)
      ZC=CLEV(3)
      AAB=ALPHA(ZA,ZB,WSA,WSB)
      AAC=ALPHA(ZA,ZC,WSA,WSC)
      ABC=ALPHA(ZB,ZC,WSB,WSC)
C >i>RETURN
      XRETURN
      END
      SUBROUTINE RP0101
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                         C
C >>>
C >>> 03-NOV-78
C >>> G R JOHNSON
C >>> BATTZLLE NORTHWEST
C >>> PO BOX 999
C >>> RICHLAND, WA. 99352
C >i>
C >>> 31-DEC-81 (LAST MODIFICATION)
C >>> W S SANDUSKY
C
C THIS ROUTINE GENERATES WIND REPORT 1.1 -- "SENSOR PERFORMANCE".
C
C DESCRIPTIONS OF THE VARIABLES INITIALIZED AND I/O FILES UTILIZED
C BY THE ROUTINE CAN BE FOUND IN THE PROGRAM DOCUMENTATION FILE,
C ("WIND.DOC") .
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
      COMMON /RPFORM/CSITE,CSITEA,CSITLO,CNO,CMON,CYR,CLEV,PAGE,LINE,PLT
      COMMON /SITDAT/SITCOD,SITDAT
      COMMON /WINDAT/TPSNPL,WINDAT
      COMMON /LOOP/LOOP,LYR,LENGTH
      COMMON /POWER/POWER,RHO
      REAL POWER(3),RHO(3)
      INCLUDE 'REWS.FTN'
      REAL CLEV(3)
      REAL SITDAT(4,20)
      REAL WINDAT(3,8)
      INTEGER CSITE,CSITEA,CSITLO(10),CNO,CMON(15),CYR,PAGE,LINE,PLT

```



```

C >>> BATTELLE NORTHWEST
C >>> PO BOX 999
C >>> RICHLAND, WN. 99352
C >>>
C >>> 31-DEC-81 (LAST MODIFICATION)
C >>> W F SANDUSKY
C
C THIS ROUTINE GENERATES WIND REPORT 1.2 -- "MONTHLY MEANS AND STAN-
C DARD DEVIATIONS".
C
C DESCRIPTIONS OF THE VARIABLES INITIALIZED AND I/O FILES UTILIZED
C BY THE ROUTINE CAN BE FOUND IN THE PROGRAM DOCUMENTATION FILE,
C ("WIND.DOC").
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C >>>
C i>>MONTH CODES ARE EVALUATED SO THAT CMO=1 DEFINES
C i>>THE MONTH M1,IYR1 (EG: 01 = OCTOBER 1978). THE
2 >>> PARAMETERS "M1" AND "IYR1" ARE INITIALIZED HERE.
C >>> MOMAX DEFINES THE MAXIMUM ALLOWABLE MONTH CODE.
      PARAMETER      M1      = 12
      PARAMETER      IYR1     = 1976
      PARAMETER      MOMAX   = 75
C ii>
COMMON /CUMDAT/CUMDAT,CMOCUM
COMMON /NWSDAT/NWSDAT
COMMON /RPFORM/CSITEA,CSITLO,CMO,CMON,CYR,CLEV,PAGE,LINE,PLT
COMMON /WINDAT/TPSMPL,WINDAT
COMMON /LOOP/LOOP,LYR,LENGTH
COMMON /POWER/POWER,RHO
REAL POWER(3),RHO(3)
REAL CLEV(3)
REAL CUMDAT(3,MOMAX,6)
REAL NWSDAT(MOMAX,4)
REAL WINDAT(3,8)
INTEGER CSITE,CSITEA,CSITLO(10),CMO,CMON(15),CYR,PAGE,LINE,PLT
INTEGER TPSMPL
LOGICAL CMOCUM
C >>> WORKING SPACE
REAL SUMWS,SSQWS,SUMWD,SSQWD,MWS,SDWS,IWD,SDWD
REAL CNWS,CNWD
LOGICAL FIRST
IF(LOOP.NE.2) GO TO 15
WRITE(6,13)
13 FORMAT(8X,42('-')/
         -           8X,'1.2 ANNUAL MEANS AND STANDARD DEVIATIONS'/
         -           8X,42('-')//'
         -           22X,'HEIGHT ',2(5X,'MEAN'),6X,'POWER'/
         -           21X,'(METERS)',7X,'WS',7X,'WD',4X,'WATTS/M**2'/
         -           8X,64('-')/)

GO TO 50
15 WRITE(6,10)

```

```

10      FORMAT(8X,42('-')/
-          8,' 12 MONTHLY MEANS AND STANDARD DEVIATIONS'/
-          8X,42('-')//)
-          221,'HEIGHT ',2(5X,'MEAN'),6X,'POWER'/
-          21X,(METERS)',7X,'WS',7X,'WD',4X,'WATTS/M**2'/
-          8X,64('-')/)

60 LINE=LINE+8
C >i>COMPUTE AND PRINT MONTHLY MEANS AND STANDARD DEVIATIONS
FIRST=.TRUE.
DO 100 L=1,3
IF(CLEV(L).LE.0) GO TO 100
S1MWS=WINDAT(L,1)
SSQWS=WINDAT(L,2)
NWS=WINDAT(L,4)
SUMWD=WINDAT(L,5)
SSQWD=WINDAT(L,6)
POWER(L)=POWER(L)/FLOAT(NWS)
TYPE 966, POWER(L),NWS
966 FORMAT(5X,'POWER=',F10.2,2X,'OBS=',I7)
CALL STATSS(S1MWS,SSQWS,NWS,MWS,SDWS)
CALL GMWD(WINDAT(L,5),WINDAT(L,6),WINDAT(L,8),MWD)
IF(.NOT.FIRST) GO TO 80
IF(MWS.LT..001) MWS=-99.9
IF(MWD.LT..001) MWD=-99.9
IF(SDWS.LT..001) SDWS=-99.9
WRITE(6,70) L+64,CLEV(L),MWS,MWD,POWER(L)
70      FORMAT(/8X,'SITE DATA ('',A1,''),F5.1,5X,F5.1,4X,F5.1,
       3X,F9.2)
       LINE=LINE+2
FIRST=.FALSE.
GO TO 100
80      WRITE(6,90) L+64,CLEV(L),MWS,MWD,POWER(L)
90      FORMAT(21X,'('',A1,''),F5.1,5X,F5.1,4X,F5.1,3X,F9.2)
LINE=LINE+1
100     CONTINUE
RETURN
EN3
SUBROUTINE RP0103
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                     C
C    >>>                               C
C    >>>   03-NOV-78                   C
C    ?>>   G R JOHNSON                 C
C    i>>   BATTELLE NORTHWEST           C
C    >>>   PO BOX 999                   C
C    >>>   RICHLAND, WN. 99352         C
C    >>>
C    >>>   31-DEC-81 (LAST MODIFICATION) C
C    >>>   W F SANDUSKY                  C
C
C    THIS ROUTINE GENERATES WIND REPORT 1.3 -- "MAXIMUM WIND SPEED".   C
C

```

```

C DESCRIPTIONS OF TBC VARIABLES INITIALIZED AND I/O FILES UTILIZED      C
C BY THE ROUTINE CAN BE FOUND IN THE PROGRAM DOCUMENTATION FILE,      C
C ("WIND.DOC").      C
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
COMMON /MAXDAT/MAXDAT
COMMON /RPFORM/CSITEA, CSITLO, CNO, CMON, CPR, CLEV, PAGE, LINE, PLT
COMMON /LOOP/LOOP, LYR, LENGTH, LNO, I, YR
REAL CLEV(3)
REAL MAXDAT(3,6)
INTEGER CSITE, CSITEA, CSITLO(10), CNO, CMON(15), CYR, PAGE, LINE, PLT
C >>> WORKING SPACE
CZAL MAXWS, WD, WSL1, WSL2
INTEGER LM, L1, L2, JDATE, MO, DA, YR, TOD, E
C INTEGER#2 HR, MIN
byte hr(2), min(2)
BYTE MDATE(8)
C >>> CALL PAGE ROUTINE (IF NECESSARY) AND PRINT REPORT HEADING
WRITE(6,10)
10 FORMAT(/8X,23(''-
          8X,'1.3  MAXIMUM WIND SPEED'/
          8X,23(''-
          8X,'ELEVATION',6X,'WIND',5X,'WIND'/
          8X,'(METERS)'           SPEZD   DIR.    DATE',
          7X,'TIME     OTHER LEVELS'/8X,9('''),5X,50('''))/
LINE=LINE+9
C >>> OUTPUT VALUES FOR EACH AVAILABLE SENSOR
DO 90 LM=1,3
YR=MOD(CYR,100)
IF(CLEV(LM).LE.0) GO TO 90
MAXWS=MAXDAT(LM,LM)
WD=MAXDAT(LM,4)
JDATE=MAXDAT(LM,5)
IF(LOOP.EQ.1) GO TO 989
YR=JDATE/10000
MO=(JDATE-YR#10000)/100
DA=JDATE-(YR#10000+MO#100)
GO TO 987
989 CALL JULIAN(MO, DA, YR, JDATE, E)
987 CONTINUE
ENCODE(8,20,MDATE) MO, DA, YR
20 FORMAT(I2,'/',I2,'/',I2)
30 30 I=1,8
IF(MDATE(I).EQ.' ') MDATE(I)='0'
30 CONTINUE
TOD=MAXDAT(LM,5)
CALL DAYTIME(HR, MIN, TOD, E)
GO TO (40,50,60),LM
40 L1=2
L2=3
GO TO 70
50 L1=1

```

```

L2=3
GO TO 70 .
60 L1=1
L2=2
70 WSL1=MAXDAT(LM,L1)
WSL2=MAXDAT(LM,52)
IF(MAXWS.LT..001) MAXWS=-999.9
IF(WD.LT..001) WD=-999.9
IF(WSL1.LT..001) WSL1=-999.9
IF(WSL2.LT..001) WSL2=-999.9
WRITE(6,80) LM+64,CLEV(Li!),MAXWS,HD, MDATE,HR,MIN,
- L1+64,WSL1,L2+64,WSL2
80 FORMAT(9X,(' ',A1,''),F5.1,1X,2(3X,F6.1),3X,8A1,
- 4X,2a1,':',2a1,T58,'(',A1,''),F6.1/T58,'(',A1,''),F6.1)
LINE=LINE+5
90 CONTINUE
RETURN
END
SUBROUTINE RP0104
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C C
C >>> C
C >>> 03-NOV-78 C
C >>> G R JOHNSON C
C >>> BATTELLE NORTHWEST C
C >>> PO BOX 999 C
C >>> RICHLAND, WN. 99352 C
C >>> C
C >>> 31-DEC-81 (LAST MODIFICATION) C
C >>> W F SANDUSKY C
C C
C THIS ROUTINE GENERATES WIND REPORT 1.4 -- "WIND SPEED AND DIREC- C
C TION VERSUS TIME-OF-DAY". C
C C
C DESCRIPTIONS OF THE VARIABLES INITIALIZED AND I/O FILES UTILIZED C
C BY THE ROUTINE CAN BE FOUND IN THE PROGRAM DOCUMENTATION FILE, C
C ("WIND.DOC"). C
C C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
COMMON /RPFORM/CSITE,CSITEA,CSITLO,CMO,CHON,CYR,CLEV,PAGE,LINE,PLT
COMMON /TIMDAT/TIMDAT
REAL CLEV(3)
REAL TIMDAT(3,24,6)
INTEGER CSITE,CSITEA,CSITLO(10),CMO,CHON(15),CYR,PAGE,LINE,PLT
C >>> WORKING SPACE
REAL SUM,SSQ,MMS(3),SDWS,MWD(3),SDWD
INTEGER L,N,TOD,E
C INTEGER*2 HR,MIN
byte hr(2),min(2)
C >>> GENERATE REPORT FOR EACH AVAILXZLE SENSOR
C >>> PRINT REPORT HEADER AT TOP OF NEW PAGE
CALL RPPAGE

```



```

INCLUDE 'REWS.FTN'
DIMENSION FPC(3)
COMMON /RPFORM/CSITE, CSITZA, CSITLO, CNO, CHON, CYR, CLEV, PAGE, LINE, PLT
COMMON /PWS/PWS
DIMENSION PFACT(3)
REAL CLEV(3)
REAL PWS(3,17)
INTEGER CSITE, CSITEA, CSITLO(10), CNO, CHON(15), CYR, PAGE, LINE, PLT
C >>> WORKING SPACE
ZEAL TSAMPL
INTEGER D,S
C >>> SUM MEAN WINDS AND TOTAL
DO 5 J=1,3
IF(CLEV(J).EQ.0) GO TO 5
DO 5 I=1,16
PWS(J,17)=PWS(J,I)+PWS(J,17)
IF(DISDAT(J,33,I).EQ.0) GO TO 5
PWS(J,I)=PWS(J,I)/DISDAT(J,33,I)
5 CONTINUE
DO 6 I=1,3
IF(CLEV(I).EQ.0) GO TO 6
IF(DISDAT(I,33,17).EQ.0) GO TO 6
PWS(I,17)=PWS(I,17)/DISDAT(I,33,17)
6 CONTINUE
C >>> PRINT REPORT HEADER AT TOP OF NEW PAGE
CALL RPPAGE
WRITE(6,10)
10 FORMAT(//'/3X,'--- -----'/
-           8X,'1.5      FREQUENCY DISTRIBUTION OF WIND SPEED'/
-           8X,'--- -----')
C >>> GENERATE REPORT FOR EACH AVAILABLE SENSOR
WRITE(6,20)
20 FORMAT(
-           3X,'WIND',6X,'LEVEL A    LEVEL B    LEVEL C'/
-           8X,'SPEED',5X,3('COUNT    %')/
-           8X,39(' -'))/
C >>> COMPUTE AND PRINT JFD FOR WIND SPEEDS <0-.5> TO <7>
DO 35 L=1,3
TSIPLE(L)=DISDAT(L,33,17)/100.0
PFACT(L)=DISDAT(L,33,17)/100.
35 CONTINUE
DO 40 S=1,14
RS=FLOAT(S)/2.
DO 38 L=1,3
FPC(L)=0.
IF(PFACT(L).LE.0) GO TO 38
FPC(L)=DISDAT(L,S,17)/PFACT(L)
38 CONTINUE
WRITE(6,30) RS-.5,RS,(DISDAT(L,S,17),FPC(L),L=1,3)
30 FORMAT(3X,F4.1,'-',F4.1,1X,3(I5,F5.1))
40 CONTINUE
C >>> COMPUTE AND PRINT JFD FOR WIND STEEDS <7.5> TO <10>

```



```

C
C >>>
C >>> 03-NOV-78
C >>> G R JOHNSON
C >>> BATTELLE NORTHWEST
C >>> PO BOX 999
C >>> RICHLAND, WN. 99352
C >>>
C >>> 31-DEC-81 (LAST MODIFICATION)
C >>> W F SANDUSKY
C
C THIS ROUNTINE GENERATES WIND REPORT 1.6 -- "CUMULATIVE FREQUENCY
C DISTRIBUTION OF WIND SPEED".
C
C DESCRIPTIONS OF THE VARIABLES INITIALIZED AND I/O FILES UTILIZED
C BY THE ROUTINE CAN BE FOUND IN THE PROGRAM DOCUMENTATION FILE,
C ("WIND.DOC").
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
INCLUDE 'DISDAT.FTW'
COMMON /RPFORM/CSITE,CSITEA,CSITLO,CMO,CMON,CYR,CLEV,PAC-2,LINE,PLT
REAL CLZV(3)
INTEGER CSITE,CSITEA,CSITLO(10),CMO,CMON(15),CYR,PAGE,LINE,PLT
C >>> WORKING SPACE
REAL TSMPL(3),CFDPCT(3)
INTEGER CFDABS(3),D,S
C >>> PRINT REPORT HEADER AT TOP OF NEW PAGE
CALL RPPAGE
WRITE(6,10)
10 FORMAT(//>8X,'--- ',47('---')/8X,'1.6',
        2X,'CUMULATIVE FREQUENCY DISTRIBUTION OF WIND SPEED'/
        -     8A,'--- ',47('---')/
        - //19X,'LEVEL A',9X,'LEVEL B',9X,'LEVEL C'/
        -     8X,'-----',3('-----')/
        -     8X,'WIND ',3(:      CFD      CF3 :)/
        -     8X,'SPEED',3(:      (ABS)      (%):})/
        -     '-----',3('-----')/)
C />>COMPUTE AND PRINT CFD'S FGR EACH WS AND EACH LEVEL
DO 20 L=1,3
    TSMPL(L)=DISDAT(L,33,17)/100.0
    CFDABS(L)=0
    CFDPCT(L)=0.0
20 CONTINUE
SP=0.
DO 70 S=1,32
30 30 L=1,3
    IF(CLEV(L).LE.0) GO TO 30
    CFDABS(L)=CFDABS(L)+DISDAT(L,S,17)
    IF(TSMPL(L).GT.0.) GO TO 25
    CFDPCT(L)=0.0
    GO TO 26
25 CONTINUE

```

```

        CFDPCT(L)=CFDABS(L)/TSMPL(L)
26    CONTINUE
30    CONTINUE
IF(S.GT.20) SP=SP+.5
SP=SP+.5
IF(S.EQ.32) GO TO 32
WRITE(6,50) SP,
-          ((CFDABS(L),CFDPCT(L)),L=1,3)
50    FORMAT(8X,F4.1,1X,3(I9,F7.2))
      GO TO 33
32    CONTINUE
      WRITE(6,51) ((CFDABS(L),CFDPCT(L)),L=1,3)
51    FORMAT(7X,'>21.0',1X,3(I9,F7.2))
33    CONTINUE
70    CONTINUE
      LINE=58
C >>> CALL COTE ROUTINE FOR OPTIONAL FOOTNOTES
      CALL RPNOTE(1,'01.06')
      RETURN
      END
SUBROUTINE RP0107
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                         C
C >>>                                         C
C >>> 03-NOV-78                                         C
C >>> G R JOHNSON                                         C
C >>> BATTELLE NORTHWEST                                         C
C >>> PO BOX 999                                         C
C >>> RICHLAND, WN. 99352                                         C
C >>>                                         C
C >>> 31-DEC-81 (LAST MODIFICATION)                                         C
C >>> W F SANDUSKY                                         C
C                                         C
C THIS ROUTINE GENERATES WIND REPORT 1.7 -- "WIND SPEED PERSISTANCE"      2
C FREQUENCY (LEVEL A ONLY)".                                         C
C                                         C
C DESCRIPTIONS OF THE VARIABLES INITIALIZED AND I/O FILES UTILIZED      2
C BY THE ROUTINE CAN BE FOUND IN THE PROGRAM DOCUMENTATION FILE,      C
C ("WIND.DOC").                                         C
C                                         C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
      COMMON /RPFORM/CSITE,CSITEA,CSITLO,CNO,CNOM,CYR,CLEV,PAGE,LINE,PLT
      COMMON /LOOP/LOOP,LYR,LENGTH
      COMMON /WINDAT/TPSMPL,WINDAT
      INCLUDE 'PERSIS.FTM'
      REAL CLEV(3)
      INTEGER CSITE,CSITEA,CSITLO(10),CNO,CNOM(15),CYR,PAGE,LINE,PLT
C >>> WORKING SPACE
C >>> GENERATE REPORT FCR EACH ACTIVE SENSOR*
C >>>
C >>> * AT PRESENT, THIS REPORT IS GENERATED FOR LEVEL "A" ONLY.
C >>> THIS DEFAULT CONDITION MAY BE ALTERED BY CHANGING THE

```

```

C >>>      UPPER LIMIT OF THE FOLLOWING "DO" STATEMENT.
C >>>
30 90 L=1,1
IF(CLEV(L).LE.0) GO TO 90
C >>> COMPLETE PERSISTANCE TALLIZS
C >>> PRINT REPORT HEADING AT TOP OF NEW PAGE
30 CALL RPPAGE
WRITE(6,40) L+64
40 FORMAT(//8X,'1.7 WIND SPEED PERSISTENCE FREQUENCY'/
-          8X,'(LEVEL ',A1,')'/
-          8X,'-----'///
-          18X,'NUMBER OF OCCURENCES'/
-          8X,'-----'///
-          18X,'WIND SPEED CLASS, METERS/SEC'/
-          8X,'HOURS',5X,'< 3 3-4 4-5 5-6 6-7 7-12 12-20 > 20'/
-          8X,'-----'///
C >>> OUTPUT REPORT DETAIL
IF(LOOP.EQ.2) GO TO 620
IF(TPSMPL.LE.744) GO TO 620
WRITE(6,50) (PERSIS(L,1,J),J=1,8)
WRITE(6,51) (PERSIS(L,2,J),J=1,8)
WRITE(6,52) (PERSIS(L,3,J),J=1,8)
WRITE(6,53) (PERSIS(L,4,J),J=1,8)
WRITE(6,54) (PERSIS(L,5,J),J=1,8)
50 FORMAT(10X,'<.1',4X,5(I4),1X,I4,2X,I4,1X,I4)
51 FORMAT(8X,'.1-.2',4X,5(I4),1X,I4,2X,I4,1X,I4)
52 FORMAT(8X,'.2-.4',4X,5(I4),1X,I4,2X,I4,1X,I4)
53 FORMAT(8X,'.4-.3',4X,5(I4),1X,I4,2X,I4,1X,I4)
54 FORMAT(8X,'.8- 1',4X,5(I4),1X,I4,2X,I4,1X,I4)
RI=1
38 70 K=6,23
RI=RI+.5
IF(K.GT.13) RI=RI+.5
IF(K.GT.18) RI=RI+1.
WRITE(6,60) RI,(PERSIS(L,K,J),J=1,8)
60 FORMAT(9X,F4.1,4X,5(I4),1X,I4,2X,I4,1X,I4)
70 CONTINUE
WRITE(6,80) (PERSIS(L,24,J),J=1,8)
80 FORMAT(10X,'>20',4X,5(I4),1X,I4,2X,I4,1X,I4//8X,36(' '))
GO TO 599
520 CONTINUE
30 630 I=1,23
WRITE(6,651) I,(PERSIS(L,I,J),J=1,8)
551 FORMAT(11X,I2,4X,5(I4),1X,I4,2X,I4,1X,I4)
630 CONTINUE
WRITE(6,652) (PERSIS(L,24,J),J=1,8)
652 FORMAT(10X,'>23',4X,5(I4),1X,I4,2X,I4,1X,I4)
699 CONTINUE
LINE=52
90 CONTINUE
C >>> CALL NOTE ROUTINE FOR OPTIONAL FOOTNOTES

```





```

C >>> G R JOHNSON
C >>> BATTELLE NORTHWEST
C >>> PO BOX 999
C >>> RICHLAND, WA. 99350
C >>>
C >>> 31-DEC-81 (LAST MODIFICATION)
C >>> W F SANDUSKY
C
C THIS O TIME GE ERATES WIN REPORT 1.10 -- "TURBULENT INTENSITY"
C
C "DESCRIPTION" OF THE VARIABLES INITIALIZED AND I/O FILES UTILIZED
C IN THE OUT CAN BE FOUND IN THE PROGRAM DOCUMENTATION FILE,
C "WIND. OC".
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC C
COMMON /RPFOM/CSITE,CSITEA,CSITLO,CMO,CNOM,CYR,CLEV,PAGE,LINE,MLT
INCLUDE 'WSVSWD.FTN'
INCLUDE 'SWEEDS.FTN'
REAL CLEV(3)
INTEGER CSITE,CSITEA,CSITLO(10),CMO,CNOM(15),CYR,PAGE,LINE,MLT
C >>> WORKING SPACE
REAL SUM,SSQ,WMS,SMS,IT(3, D
INTEGER N, M
WD=0.0
C >>> PRINT REPORT HEADING AT TOP OF NEW PAGE
CALL RPPAGE
WRITE(6,10)
10 FORMAT(//SH,'-----'/
      -     8X,' 1.9 TURBULENT INTENSITY'/
      -     8X,'-----'//10H,' WIND'/
      -     3X,' DIRECTION IT(A) IT(B) IT(C)'/
      -     8X,9(' -'),7X,25(' -'))/
C >>> PRINT ONE REPORT LINE FOR EACH WIND DIRECTION
DO 60 D=1,16
DO 20 L=1,3
IT(L)=0.0
IF(CLEV(L).LE.0) GO TO 20
IF(WSVSWD(L,D,2).LE.0.) GO TO 20
IT(L)=WSVSWD(L,D,1)/WSVSWD(L,D,2)
CONTINUE
40 WRITE(6,50) SYMBO(M),IT
50 FORMAT(8X,A4,7X,3F10.2)
60 CONTINUE
C >>> PRINT FOOTNOT AND CALL NOTE ROUTINE FOR OTHERS
WRITE(6,70)
70 FORMAT(/8X,41(' -')/8X,'NOTES:'/
      -     11X,'1. IT = S.D.(WS)/MEAN(WS)' )
LINE=44
CALL RPNOTE(2 01 10)
RETURN
END
SUBROUTINE

```



DISTRIBUTION

No. of  
Copies

OFFSITE

<p>Carl Aspliden Battelle Memorial Institute 2030 M Street, N.W. Washington, DC 20036</p> <p>George P. Tennyson Department of Energy Albuquerque Operations Office P.O. Box 5400 Albuquerque, NM 87115</p> <p>Sydney D. Berwager, Program Manager Department of Energy Wind Energy Technology Division 1000 Independence Avenue, S.W. Forrestal Building, Room 5F059 Washington, DC 20585</p> <p>27 DOE Technical Information Center</p> <p>John Slagle Alaska Bussell Electric Company P.O. Box 4-1325 Anchorage, AK 99509</p> <p>Michael Changery Applied Climatology Branch National Climatic Center Federal Building Asheville, NC 28801</p> <p>Larry Campbell Bechtel Power Corporation P.O. Box 60860, Terminal Annex Los Angeles, CA 90060</p> <p>Don McGrew Boeing Engineering &amp; Construction P.O. Box 3707, Mail Stop 9A-67 Seattle, WA 98124</p>	<p>No. of Copies</p> <p>2 Nick Butler Bonneville Power Administration P.O. Box 3621 Portland, OR 97208</p> <p>Merrill E. Slate Block Island Power Company P.O. Box 518 Block Island, RI 02807</p> <p>Grant Ayers Blue Ridge Electric Corporation 1216 Blowing Rock Blvd., N.E. Lenoir, NC 28645</p> <p>Ed Hamilton Central Nebraska Public Power and Irrigation District Inc. P.O. Box 356 Holdrege, NB 68949</p> <p>Eli Garcia City Manager Clayton, NM 88415</p> <p>Ed Browning Consumers Power Company 1945 W. Parnall Road Jackson, MI 49201</p> <p>Ron Calcaterra Consumers Power Company 212 W. Michigan Avenue Jackson, MI 49201</p> <p>Jeffrey Nelson East River Electric Power Co-op, Inc. Madison, SD 57042</p>
--	---

<u>No. of Copies</u>	<u>No. of Copies</u>
	<p>Tom Carlson Environmental Systems Corporation 200 Tech Center Drive Knoxville, TN 37912</p>
	<p>Thad M. Hasbrouck Hamilton Energy Systems United Technologies Hamilton Standard Windsor Locks, CT 06096</p>
	<p>George Leary City of Holyoke Gas and Electric Department 70 Suffolk Street Holyoke, MA 01040</p>
	<p>John H. Matteson Pioneer Valley Air Pollution Control District 1414 State Street Springfield, MA 01709</p>
	<p>Bruce E. Humenik Senior Research and Development Engineer Long Island Lighting Company 175 East Old Country Road Hicksville, NY 11801</p>
2	<p>Frank Porretto/Andrew Matura Long Island Lighting Company 175 East Old Country Road Hicksville, NY 11801</p>
	<p>Tim Richards NASA-Lewis Research Center Mail Stop 500-202 21000 Brookpark Road Cleveland, OH 44135</p>
10	<p>Ronald L. Thomas NASA-Lewis Research Center Mail Stop 500-202 21000 Brookpark Road Cleveland, OH 44135</p>
	<p>Rudi Schoenrnackers Head, Wind Energy Division New Mexico Solar Energy Institute P.O. Box 3SOL Las Cruces, NM 88003</p>
	<p>John C. Baiardi, Director New York Ocean Science Laboratory Montauk, NY 11954</p>
	<p>Tom Hillesland Pacific Gas and Electric Company Department of Engineering Research 3400 Crow Canyon Road San Ramon, CA 94583</p>
	<p>Norman Sanesi Portland General Electric Company 121 S.W. Salmon Street Portland, OR 97204</p>
	<p>Orlando Anglero Puerto Rico Electric Power Authority G.P.O. Box 4267 San Juan, PR 00936</p>
	<p>Earl Homewood City of Russell P.O. Box 112 Russell, KS 67665</p>
	<p>Neil D. Kelley Solar Energy Research Institute 1617 Cole Boulevard Golden, CO 80401</p>
	<p>Rick Mitchell Solar Energy Research Institute 1617 Cole Boulevard Golden, CO 80401</p>
	<p>Robert Scheffler Southern California Edison P.O. Box 800 Rosemead, CA 91770</p>

<u>No. of Copies</u>	<u>No. of Copies</u>
Tim Titus Southwest Public Service Company P.O. Box 1261 Amarillo, TX 79170	50 <u>Pacific Northwest Laboratory</u>
John Goll U.S. Minerals Management Service 12203 Sunrise Valley Drive Mail Stop 640 Reston, VA 22092	W. R. Barchet J. W. Buck C. E. Elderkin D. L. Hadley A. H. Miller E. L. Owczarski D. S. Renne (5) W. F. Sandusky (10) H. L. Wegley L. L. Wendell
W. VanDyke Windfarms, Ltd. 639 Front Street San Francisco, CA 94111	Technical Information - Library (5) Publishing Coordination (2) WPE Project Office (20)

ONSITE

DOE Richland Operations Office

H. E. Ransom/D. R. Segna