
**Candidate Wind Turbine
Generator Site Cumulative
Meteorological Data Summary
and Data for January 1982
Through September 1982**

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August 1983

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**Pacific Northwest Laboratory
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Richland, Washington 99352

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SUMMARY

Summarized cumulative hourly meteorological data for 20 "new" sites selected in early 1980 as part of the expanded candidate site program are presented. The reporting period is July 1980 through September 1982. 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 to provide data that could be considered representative of longer-term meteorological conditions at each site. For each site, data are given in eight tables and in a topographic map showing the approximated location of the meteorological tower and turbine, if applicable. Use of the information from these tables, along with information about specific wind turbines, should allow the user to estimate the potential for longer-term average wind energy production at each site.

Two appendices of other data are provided. Appendix A contains summarized data collected at "new" and "original" sites during the period January 1982 through September 1982. Appendix B contains cumulative summarized data for those "original" sites selected in 1976 with data collection programs continuing into 1982.



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INTRODUCTION

This report presents summarized hourly meteorological data for sites selected in early 1980 as part of the expanded candidate site program. They are listed in Table 1 and geographically located in Figure 1. The summaries are for the entire data collection program at each site, and ranged from 12 to 27 months in length. Summaries for the period January 1982 through September 1982 are provided in Appendix A. Other summarized data for these sites are available from the 1981 annual data report (Sandusky et al. 1982a).

The data were collected from sensors at three levels on a meteorological tower. The data were recorded digitally at the site on a data cassette recording system with an instantaneous sample of data recorded every two minutes. At five of the sites (Big Sable Point, Michigan; Finley, North Dakota; Livingston, Montana; Minot, North Dakota; and San Geronio Pass, California) the cassette recording system was supplemented with a Remote Telephone Dial-Up System (RTDS). This system electronically averaged all meteorological parameters over each hour and continually stored the last 32 hours of data. This information was retrieved via telephone dial-up through a computer system. If data from the cassette recording system wasn't available because of data logger failure, hourly data from the RTDS was substituted into the data base. The maximum amount of data used from the RTDS was four months for any one site (Big Sable Point). This occurred during the last part of the measurement program.

Other sites that were part of the Candidate Site Program were those chosen in the spring of 1976 by the Department of Energy (then known as the Energy Research and Development Administration) to receive meteorological measuring equipment. Summarized data for these "original" sites are available in a series of annual data reports (Sandusky and Renné 1981a, 1981b; and Sandusky et al. 1982a) and a cumulative data report through December 1981 (Sandusky et al. 1982b). For those "original" sites with data collection programs continuing into 1982, cumulative data reports are provided in

TABLE 1. Site Identification and Location

<u>Site</u>	<u>Identifi- cation Code</u>	<u>Date Collection Began</u>	<u>Total Months of Data</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Elevation (meters)</u>
Big Sable Point, MI	SP	1/7/81	21	44°03'N	86°31'W	179
Bridger Butte, WY	WY	9/10/80	25	41°17'N	110°29'W	2292
Cape Blanco, OR	CB	11/5/80	12	42°50'N	124°31'W	30
Diablo Dam, WA	DD	12/2/80	19	48°43'N	97°52'W	500
Finley, ND	ND	10/18/80	24	47°31'N	97°52'W	472
Fort Sill, OK	OK	9/17/80	16	34°39'N	98°27'W	366
Goodnoe Hills, WA	WA	7/17/80	22	45°45'N	120°30'W	805
Ilio Point, Molokai, HI	IP	1/29/81	17	21°13'N	157°15'W	61
Kahua Ranch, Hawaii, HI	KR	2/7/81	13	20°07'N	155°47'W	1030
Kahuku MOD-OA, Oahu, HI	KU	9/25/80	22	21°42'N	157°60'W	108
Livingston, MT	MT	9/9/80	25	45°40'N	110°30'W	1420
Meade, KS	MK	7/25/80	27	37°18'N	100°19'W	756
Minot, ND	MR	10/15/80	24	48°00'N	101°18'W	675
Nantucket Island, MA	NI	11/24/80	14	41°15'N	70°00'W	12
Provincetown, MA	PT	1/15/81	20	42°03'N	70°12'W	10
Romero Overlook, CA	RO	10/7/80	24	37°04'N	121°13'W	458
San Augustin Pass, NM	EP	11/5/80	23	32°26'N	106°33'W	1805
Stratton Mountain, VT	VT	1/15/81	12	43°05'N	72°50'W	1183
Tucumcari, NM	TU	11/8/80	22	35°10'N	103°50'W	1354
Wells, NV	NV	10/8/80	15	41°02'N	114°34'W	2268

- ▲ ACTIVE TURBINE SITES
- ACTIVE CANDIDATE SITES
- DECOMMISSIONED CANDIDATE SITES

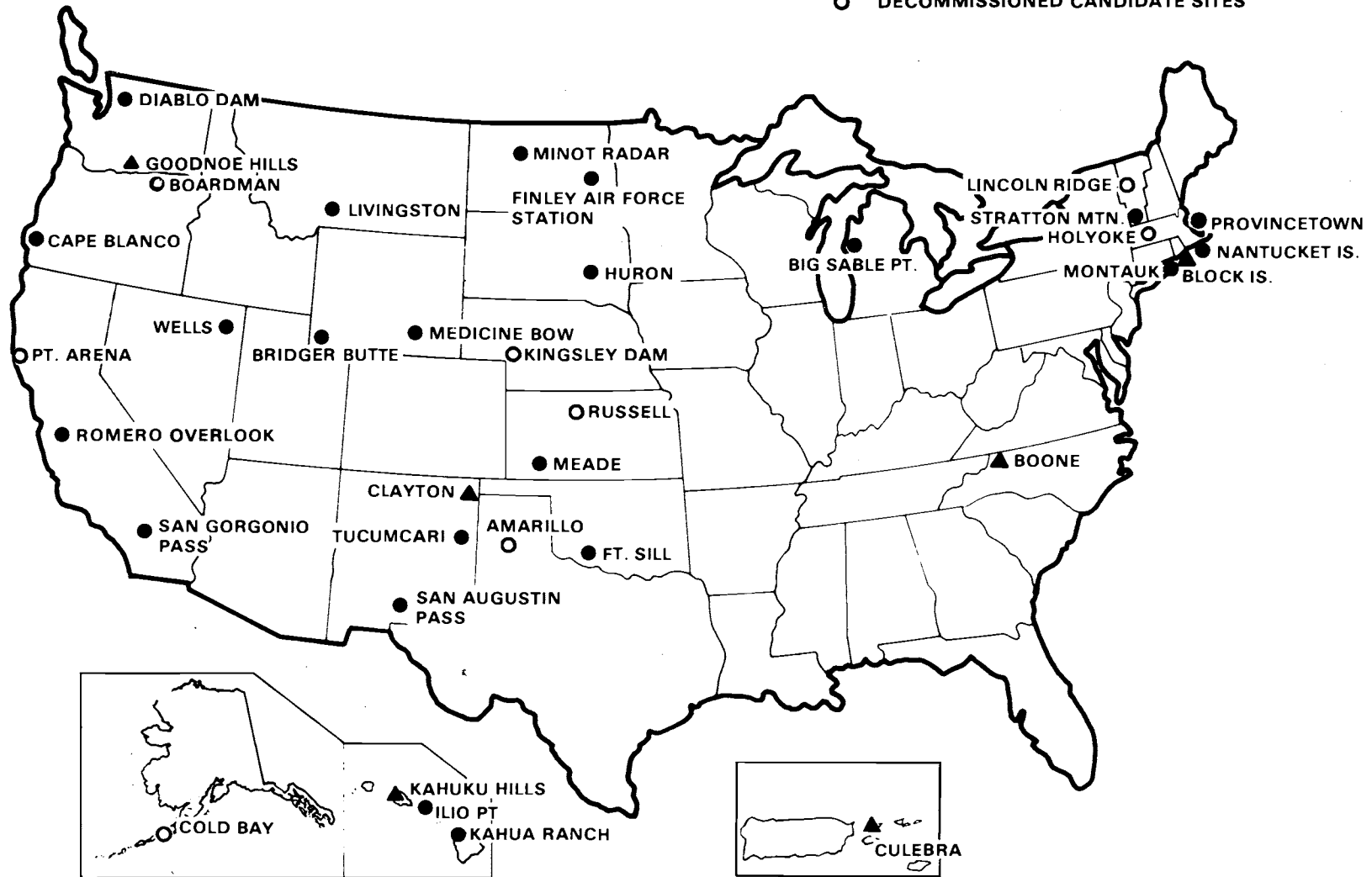


FIGURE 1. Candidate and Wind Turbine Generator Installation Sites

Appendix B with data reports for the period January 1982 through September 1982 contained in Appendix A.

The heights of the sensors at each site are given in Table 2. In that table and in the later summary tables, the upper sensor is noted by the letter "A", the mid-level is noted by the letter "B", and the lower sensor is noted by the letter "C". The sensor levels were chosen to correspond to the height of the upper blade tip, hub, and lower blade tip of MOD-0A turbines or MOD-2 turbines (Goodnoe Hills, Washington).

Tables 3, 4 and 5 provide an all-site summary of data recovery rates and wind speed characteristics for each sensor level for the data collection program at each site. Data under the column "Maximum" represent maximum hourly average values during the data collection program. Data under the column "Power" represent the available power calculated from the wind data.

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.

It should be noted that data are checked for reasonableness prior to being summarized. The data have not been statistically evaluated or compared to data collected at nearby sites. Thus, the summarized data that are presented in this report are intended to provide information on the general climatology of the site and to provide information for an initial evaluation of wind turbine performance at the site.

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>
Big Sable Point, MI	9.1	30.0	45.7
Bridger Butte, WY	9.1	30.0	45.7
Cape Blanco, OR	9.1	30.0	45.7
Diablo Dam, WA	9.1	30.0	45.7
Finley, ND	9.1	30.0	45.7
Fort Sill, OK	9.1	30.0	45.7
Goodnoe Hills, WA	15.2	60.9	105.1
Ilio Point, Molokai, HI	9.1	30.0	45.7
Kahua Ranch, Hawaii, HI	9.1	30.0	45.7
Kahuku Hills, Oahu, HI	9.1	30.0	45.7
Livingston, MT	9.1	30.0	45.7
Meade, KS	9.1	30.0	45.7
Minot, ND	9.1	30.0	45.7
Nantucket Island, MA	9.1	30.0	45.7
Provincetown, MA	9.1	30.0	42.7
Romero Overlook, CA	9.1	30.0	45.7
San Augustin Pass, NM	9.1	30.0	45.7
Stratton Mountain, VT	9.1	30.0	45.7
Tucumcari, NM	9.1	30.0	45.7
Wells, NV	9.1	30.0	45.7

(a) Meters above ground level

TABLE 3. Summary of Hourly Data for the Site Data Collection Programs at the Lower Level

<u>Site Code</u>	<u>Sensor Level</u>	<u>% Sample Recovery</u>	<u>Wind Speed (m/s)</u>		<u>Power Watts/M²</u>
			<u>Mean</u>	<u>Max.</u>	
SP	9.1	53.7	5.7	18.5	210.82
WY	9.1	82.6	7.0	25.7	371.99
CB	9.1	74.6	4.7	16.7	128.05
DD ^(a)	9.1	73.7	1.7	8.1	5.77
ND	9.1	79.5	6.1	21.6	235.03
OK	9.1	38.6	5.6	21.3	212.69
WA (1)	15.2	52.1	5.4	23.6	174.31
IP	9.1	30.4	7.3	17.2	369.67
KR	9.1	35.7	8.6	27.3	733.22
KU (0)	9.1	42.7	7.6	23.7	465.67
MT	9.1	76.4	6.8	26.5	457.81
MK	9.1	76.7	5.7	19.8	214.60
MR	9.1	82.8	6.5	20.4	271.89
NI	9.1	61.2	6.2	22.1	359.64
PT	9.1	29.4	4.5	20.6	109.77
RO	9.1	86.3	4.8	15.6	126.86
EP	9.1	64.2	7.6	30.1	508.47
VT	9.1	29.5	6.2	19.4	215.86
TU	9.1	68.9	6.4	22.5	254.92
NV	9.1	68.6	6.8	24.6	304.51

(a) Sensor is within a dense forest canopy and is not representative of open terrain conditions.

(0) MOD-0A Turbine Site

(1) MOD-2 Turbine Site

TABLE 4. Summary of Hourly Data for the Site Data Collection Program at the Middle Level

<u>Site Code</u>	<u>Sensor Level</u>	<u>% Sample Recovery</u>	<u>Wind Speed (m/s)</u>		<u>Power Watts/M²</u>
			<u>Mean</u>	<u>Max.</u>	
SP	30.0	66.3	7.0	24.3	382.53
WY	30.0	82.0	8.2	28.0	542.74
CB	30.0	77.3	6.1	23.9	260.57
DD ^(a)	30.0	67.3	3.7	15.9	78.49
ND	30.0	71.3	7.7	23.8	450.61
OK	30.0	51.5	6.6	22.4	316.78
WA (1)	60.9	50.2	6.7	29.5	341.21
IP	30.0	22.3	8.1	16.0	489.20
KR	30.0	33.0	9.2	33.2	974.43
KU (0)	30.0	42.7	8.0	22.7	539.36
MT	30.0	74.2	7.8	29.8	671.65
MK	30.0	64.0	7.1	24.2	363.18
MR	30.0	85.3	7.8	23.2	439.69
NI	30.0	32.8	8.1	26.9	631.75
PT	30.0	49.6	7.5	22.6	441.70
RO	30.0	88.9	5.3	16.4	165.60
EP	30.0	60.6	8.1	33.3	569.73
VT	30.0	9.5	9.4	29.9	856.08
TU	30.0	57.7	7.6	24.8	403.98
NV	30.0	85.3	7.2	24.3	338.10

(a) Sensor is within a dense forest canopy and is not representative of open terrain conditions.

(0) MOD-OA Turbine Site

(1) MOD-2 Turbine Site

TABLE 5. Summary of Hourly Data for the Site Data Collection Program at the Upper Level

<u>Site Code</u>	<u>Sensor Level</u>	<u>% Sample Recovery</u>	<u>Wind Speed (m/s)</u>		<u>Power Watts/M²</u>
			<u>Mean</u>	<u>Max.</u>	
SP	45.7	62.8	8.6	25.5	592.88
WY	45.7	82.0	8.4	29.8	589.39
CB	45.7	68.6	7.9	25.6	450.99
DD	45.7	83.0	5.1	18.7	160.19
ND	45.7	77.5	9.1	24.5	738.18
OK	45.7	48.0	9.3	25.8	706.82
WA (1)	105.1	52.9	7.1	30.7	403.43
IP	45.7	25.8	10.9	19.9	1032.77
KR	45.7	28.5	11.3	27.5	1528.71
KU (0)	45.7	36.1	8.1	23.5	567.59
MT	45.7	71.0	8.4	33.1	794.89
MK	45.7	69.4	8.3	24.6	484.74
MR	45.7	84.8	8.4	23.4	533.58
NI	45.7	71.8	9.1	28.1	698.11
PT	42.7	43.5	9.8	26.3	769.18
RO	45.7	88.9	6.4	22.2	266.99
EP	45.7	64.1	9.3	33.1	759.02
VT	45.7	20.1	11.4	30.4	1306.27
TU	45.7	57.2	8.6	25.6	518.59
NV	45.7	85.8	7.8	24.6	409.41

(0) MOD-OA Turbine Site
(1) MOD-2 Turbine Site

The recovery rates for all sensor levels for the sites in Hawaii and Vermont were lower than what is normally considered acceptable. These sites were located in remote areas and were affected by an extremely hostile environment of salt spray and moisture (Hawaii) or severe icing (Vermont) that affected the operation of sensors and data logger. However, the estimated available wind power at these sites is consistent with values estimated in the national wind energy resource assessment (Elliott and Barchet 1981).

The candidate site meteorological data acquisition program was completed as of September 30, 1982. Most of the equipment that was in the field at that time was turned over to the participating utilities for their own use.

1982 DATA

Summarized meteorological data collected at operational sites during the period January 1982 through September 1982 are provided in Appendix A. Annual data reports for sites operational in previous years are reported elsewhere (Sandusky and Renné 1981a, 1981b; and Sandusky et al. 1982a).

CUMULATIVE SUMMARY FOR THE "ORIGINAL" SITES

Cumulative data summaries for those "original" sites that had ongoing measurement programs in 1982 are provided in Appendix B. Data are provided for Block Island, Rhode Island; Clayton, New Mexico; Culebra, Puerto Rico; Huron, South Dakota; Montauk, New York; and San Geronio, California. Cumulative summaries for data collected at the "original" sites through December 1981 are provided elsewhere (Sandusky et al. 1982b).

SUMMARY TABLES

Summarized hourly data for each site are presented in eight tables. The hourly data are obtained by averaging the 2-min instantaneous data or the RTDS data that are routinely collected at the site. A valid hourly value was calculated from at least 10 valid 2-min values acquired during the hour.

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 "% On-Line" 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 during the reporting period. The value for wind direction indicates the direction from which the wind blows with 0° and 360° being true north, 90° being east, 180° being south, and 270° being west. Thus, a mean wind direction of 220° indicates winds that blow primarily from the southwest. This represents the "resultant" wind direction at the site. 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 (Watts/m²)

ρ = density of air at each sensor level (kg/m³), a constant value

V_i = the wind speed (in m/s) at the ith observation time

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 kg/m³, for the elevation of the site (in meters). A standard atmosphere density profile was then assumed to estimate air density at the height of the sensor above ground level. 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 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 $0.5 < \text{wind speed (m/s)} \leq 1.0$. 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 or 0.0.

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 speed between 4 and 5 m/s that lasted for two 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 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.

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BIG SABLE POINT, MICHIGAN

SITE ID: SP
 SITE LOCATION: BIG SABLE PT., MI.
 DATA : JANUARY 1981 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 15312

SENSOR	% ON-LINE	% RECOVERED
WS(A)	87.7	62.8
WD(A)	87.7	64.7
WS(B)	87.7	66.3
WD(B)	87.7	66.7
WS(C)	87.7	53.7
WD(C)	87.7	66.3

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	8.6	220.3	592.88
(B)	30.0	7.0	182.4	382.53
(C)	9.1	5.7	197.3	210.82

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	25.5	329.1	01/04/82	16:00	(B) 23.2 (C) -999.9
(B) 30.0	24.3	152.1	05/20/82	11:00	(A) -999.9 (C) 18.5
(C) 9.1	18.5	145.8	05/20/82	10:00	(A) -999.9 (B) 23.9

 NOTES:

1. SITE ELEVATION: 179 METERS ABOVE SEA LEVEL.

SITE ID: SP
 SITE LOCATION: BIG SABLE PT., MI.
 DATA : JANUARY 1981 THROUGH SEPTEMBER 1982

 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	8.6	118.0	6.9	128.6	5.4	143.6
01:00	8.6	111.0	6.9	127.2	5.4	144.7
02:00	8.6	113.0	6.9	127.7	5.5	147.3
03:00	8.5	118.8	6.9	132.3	5.5	150.6
04:00	8.5	123.9	6.9	132.6	5.5	148.0
05:00	8.4	121.3	6.8	132.0	5.3	148.7
06:00	8.3	124.3	6.7	125.7	5.4	147.4
07:00	8.4	141.2	6.8	134.2	5.5	160.2
08:00	8.3	149.6	6.8	145.4	5.6	175.4
09:00	8.3	175.4	6.9	175.8	5.8	198.9
10:00	8.4	219.8	7.0	208.2	5.9	219.7
11:00	8.6	244.6	7.2	230.3	6.0	233.0
12:00	8.7	251.2	7.2	243.1	6.0	237.1
13:00	8.9	257.7	7.3	252.6	6.0	242.7
14:00	8.9	267.7	7.4	260.3	6.1	246.7
15:00	8.9	269.1	7.4	260.5	6.2	245.7
16:00	8.8	268.0	7.4	263.2	6.2	245.5
17:00	8.7	268.3	7.2	262.8	6.0	242.7
18:00	8.8	259.3	7.2	245.7	5.9	236.3
19:00	8.7	246.0	7.1	194.1	5.8	220.0
20:00	8.7	202.4	7.0	153.2	5.6	191.8
21:00	8.7	130.3	7.0	124.0	5.4	152.8
22:00	8.6	111.6	6.9	121.7	5.5	141.8
23:00	8.7	119.6	6.9	128.7	5.4	148.0

SITE ID: SP
 SITE LOCATION: BIG SABLE PT., MI.
 DATA : JANUARY 1981 THROUGH SEPTEMBER 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL C %
0.0- 0.5	0	0.0	0	0.0
0.5- 1.0	25	0.3	17	0.2
1.0- 1.5	56	0.6	51	0.5
1.5- 2.0	49	0.5	132	1.3
2.0- 2.5	109	1.1	270	2.7
2.5- 3.0	142	1.5	356	3.5
3.0- 3.5	193	2.0	554	5.5
3.5- 4.0	220	2.3	619	6.1
4.0- 4.5	231	2.4	699	6.9
4.5- 5.0	291	3.0	743	7.3
5.0- 5.5	382	4.0	676	6.7
5.5- 6.0	399	4.1	616	6.1
6.0- 6.5	604	6.3	564	5.6
6.5- 7.0	798	8.3	519	5.1
7.0- 7.5	669	7.0	453	4.5
7.5- 8.0	583	6.1	477	4.7
8.0- 8.5	520	5.4	399	3.9
8.5- 9.0	448	4.7	374	3.7
9.0- 9.5	451	4.7	339	3.3
9.5-10.0	407	4.2	320	3.2
10.0-11.0	813	8.4	574	5.7
11.0-12.0	621	6.5	417	4.1
12.0-13.0	492	5.1	336	3.3
13.0-14.0	368	3.8	219	2.2
14.0-15.0	267	2.8	144	1.4
15.0-16.0	166	1.7	102	1.0
16.0-17.0	112	1.2	67	0.7
17.0-18.0	82	0.9	59	0.6
18.0-19.0	55	0.6	25	0.2
19.0-20.0	30	0.3	9	0.1
20.0-21.0	22	0.2	9	0.1
>21.0	18	0.2	9	0.1

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 62.8 66.3 53.7

SITE ID: SP
 SITE LOCATION: BIG SABLE PT., MI.
 DATA : JANUARY 1981 THROUGH SEPTEMBER 1982

 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	0	0.00	0	0.00	0	0.00
1.0	25	0.26	17	0.17	49	0.60
1.5	81	0.84	68	0.67	228	2.78
2.0	130	1.35	200	1.97	568	6.91
2.5	239	2.48	470	4.63	1057	12.87
3.0	381	3.96	826	8.14	1561	19.00
3.5	574	5.96	1380	13.60	2107	25.65
4.0	794	8.25	1999	19.70	2650	32.25
4.5	1025	10.65	2698	26.59	3261	39.69
5.0	1316	13.68	3441	33.91	3801	46.26
5.5	1698	17.65	4117	40.57	4362	53.09
6.0	2097	21.79	4733	46.64	4886	59.47
6.5	2701	28.07	5297	52.20	5372	65.38
7.0	3499	36.36	5816	57.31	5820	70.84
7.5	4168	43.31	6269	61.78	6182	75.24
8.0	4751	49.37	6746	66.48	6549	79.71
8.5	5271	54.78	7145	70.41	6830	83.13
9.0	5719	59.43	7519	74.09	7082	86.20
9.5	6170	64.12	7858	77.43	7298	88.83
10.0	6577	68.35	8178	80.59	7505	91.35
11.0	7390	76.80	8752	86.24	7771	94.58
12.0	8011	83.25	9169	90.35	7949	96.75
13.0	8503	88.36	9505	93.66	8070	98.22
14.0	8871	92.19	9724	95.82	8130	98.95
15.0	9138	94.96	9868	97.24	8172	99.46
16.0	9304	96.69	9970	98.25	8188	99.66
17.0	9416	97.85	10037	98.91	8208	99.90
18.0	9498	98.70	10096	99.49	8213	99.96
19.0	9553	99.27	10121	99.73	8216	100.00
20.0	9583	99.58	10130	99.82	8216	100.00
21.0	9605	99.81	10139	99.91	8216	100.00
>21.0	9623	100.00	10148	100.00	8216	100.00

SITE ID: SP
 SITE LOCATION: BIG SABLE PT., MI.
 DATA : JANUARY 1981 THROUGH SEPTEMBER 1982

 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	76	177	268	369	474	337	121	5
2	34	57	62	97	119	88	25	1
3	13	18	27	26	46	59	20	2
4	8	8	3	15	23	44	13	1
5	2	6	2	3	21	35	10	0
6	2	0	0	0	7	27	13	0
7	1	0	0	2	8	20	4	0
8	1	0	0	1	3	20	6	1
9	1	0	0	1	2	15	5	0
10	1	0	0	0	0	17	4	0
11	0	0	0	0	1	8	3	1
12	1	0	0	0	0	11	1	0
13	0	0	0	0	0	7	1	0
14	0	0	0	0	1	3	1	0
15	0	0	0	0	0	10	2	0
16	1	0	0	0	0	4	0	0
17	0	0	0	0	0	6	1	0
18	0	0	0	0	0	1	0	0
19	0	0	0	0	0	0	1	0
20	0	0	0	0	0	0	1	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: SP
 SITE LOCATION: BIG SABLE PT., MI.
 DATA : JANUARY 1981 THROUGH SEPTEMBER 1982

 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION

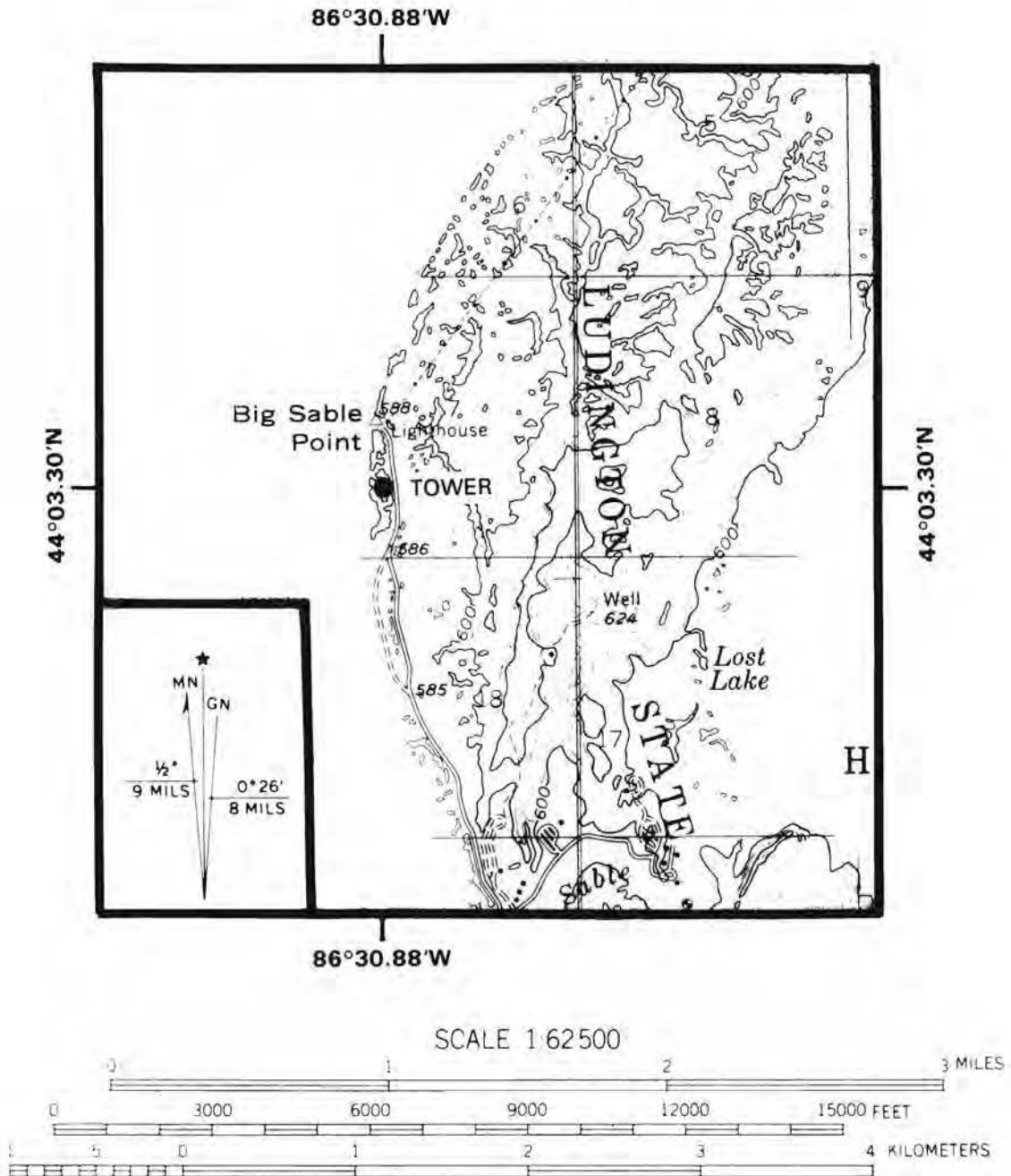
WIND DIR (ELEV A)	ALPHA (A,B)	ALPHA (B,C)	ALPHA (A,C)	ALPHA (A,B,C)	%A	%B	%C
N	0.39	0.23	0.27	0.26	9.97	7.86	7.19
NNE	0.28	0.09	0.14	0.13	9.31	10.41	11.45
NE	0.58	0.16	0.27	0.25	4.19	4.94	5.82
ENE	0.43	0.13	0.21	0.19	2.82	3.11	3.16
E	0.88	0.03	0.25	0.20	2.98	2.84	3.66
ESE	0.74	0.21	0.35	0.32	4.84	4.85	6.52
SE	0.55	0.26	0.34	0.32	5.26	6.21	5.68
SSE	0.68	0.22	0.34	0.31	7.26	7.02	6.06
S	0.39	0.16	0.22	0.21	13.43	14.51	18.48
SSW	0.44	0.24	0.29	0.28	7.57	8.77	6.46
SW	0.32	0.17	0.21	0.20	5.22	5.14	4.31
WSW	0.35	0.15	0.20	0.19	4.34	3.99	3.31
W	0.36	0.17	0.22	0.20	4.71	4.27	3.76
WNW	0.31	0.10	0.15	0.14	5.15	4.31	3.65
NW	0.30	0.17	0.21	0.20	5.94	5.01	3.65
NNW	0.44	0.24	0.30	0.28	7.00	6.54	5.15

 NOTES:

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

$$2. ALPHA = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{matrix} Z = \text{ELEVATION} \\ WS = \text{WIND SPEED} \end{matrix}$$

BIG SABLE POINT, MI



CONTOUR INTERVAL 20 FEET
 DOTTED LINES REPRESENT 10-FOOT CONTOURS
 DATUM IS MEAN SEA LEVEL
 DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS 578 FEET

BRIDGER BUTTE, WYOMING

SITE ID: WY
 SITE LOCATION: BRIDGER BUTTE, WY..
 DATA : SEPTEMBER 1980 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 18240

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	82.0
WD(A)	100.0	89.0
WS(B)	100.0	82.0
WD(B)	100.0	87.6
WS(C)	100.0	82.6
WD(C)	100.0	88.9

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	8.4	235.4	589.39
(B)	30.0	8.2	240.1	542.74
(C)	9.1	7.0	234.2	371.99

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	29.8	326.5	10/20/81	19:00	(B) 28.0 (C) 24.5
(B) 30.0	28.0	341.2	10/20/81	19:00	(A) 29.8 (C) 24.5
(C) 9.1	25.7	332.4	10/24/81	11:00	(A) 27.4 (B) 26.6

 NOTES:

1. SITE ELEVATION: 2290 METERS ABOVE SEA LEVEL.

SITE ID: WY
 SITE LOCATION: BRIDGER BUTTE, WY..
 DATA : SEPTEMBER 1980 THROUGH SEPTEMBER 1982

 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	8.2	230.1	7.9	235.3	6.5	231.7
01:00	8.1	231.9	7.9	237.2	6.5	234.0
02:00	8.1	229.9	7.9	235.8	6.5	232.6
03:00	8.1	230.3	7.8	235.9	6.4	232.0
04:00	8.0	229.7	7.7	235.9	6.3	233.1
05:00	7.8	227.4	7.5	234.6	6.2	231.8
06:00	7.6	228.6	7.4	234.9	6.1	232.0
07:00	7.5	226.2	7.2	232.6	6.0	229.0
08:00	7.2	226.7	7.0	232.3	6.1	224.8
09:00	7.3	230.5	7.3	234.5	6.5	226.3
10:00	7.7	239.2	7.7	242.1	7.0	232.4
11:00	8.1	241.8	8.1	244.0	7.3	234.6
12:00	8.5	241.5	8.5	244.4	7.7	233.7
13:00	8.9	245.1	8.9	248.1	8.1	237.9
14:00	9.2	245.3	9.1	247.9	8.3	238.3
15:00	9.4	243.2	9.4	246.7	8.5	237.1
16:00	9.4	243.9	9.4	247.7	8.4	238.6
17:00	9.5	243.6	9.4	247.3	8.3	239.8
18:00	9.2	243.1	9.0	246.7	7.9	239.7
19:00	8.9	241.0	8.7	245.4	7.5	239.0
20:00	8.7	240.1	8.5	245.0	7.1	239.8
21:00	8.5	237.3	8.2	241.9	6.8	236.4
22:00	8.3	233.2	8.1	238.0	6.7	232.9
23:00	8.3	230.8	8.0	235.6	6.5	231.3

SITE ID: WY
 SITE LOCATION: BRIDGER BUTTE, WY..
 DATA : SEPTEMBER 1980 THROUGH SEPTEMBER 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL C %
0.0- 0.5	0	0.0	5	0.0
0.5- 1.0	47	0.3	36	0.2
1.0- 1.5	247	1.7	229	1.5
1.5- 2.0	456	3.0	512	3.4
2.0- 2.5	561	3.8	689	4.6
2.5- 3.0	656	4.4	700	4.7
3.0- 3.5	744	5.0	665	4.4
3.5- 4.0	771	5.2	579	3.9
4.0- 4.5	646	4.3	614	4.1
4.5- 5.0	610	4.1	586	3.9
5.0- 5.5	524	3.5	525	3.5
5.5- 6.0	511	3.4	510	3.4
6.0- 6.5	478	3.2	494	3.3
6.5- 7.0	514	3.4	554	3.7
7.0- 7.5	511	3.4	614	4.1
7.5- 8.0	510	3.4	527	3.5
8.0- 8.5	464	3.1	549	3.7
8.5- 9.0	471	3.1	523	3.5
9.0- 9.5	474	3.2	539	3.6
9.5-10.0	486	3.2	557	3.7
10.0-11.0	959	6.4	985	6.6
11.0-12.0	876	5.9	829	5.5
12.0-13.0	741	5.0	714	4.8
13.0-14.0	635	4.2	610	4.1
14.0-15.0	542	3.6	459	3.1
15.0-16.0	425	2.8	402	2.7
16.0-17.0	322	2.2	302	2.0
17.0-18.0	250	1.7	222	1.5
18.0-19.0	178	1.2	137	0.9
19.0-20.0	89	0.6	93	0.6
20.0-21.0	89	0.6	78	0.5
>21.0	172	1.1	117	0.8

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 82.0 82.0 82.6

SITE ID: WY
 SITE LOCATION: BRIDGER BUTTE, WY..
 DATA : SEPTEMBER 1980 THROUGH SEPTEMBER 1982

 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	0	0.00	5	0.03	5	0.03
1.0	47	0.31	41	0.27	129	0.86
1.5	294	1.97	270	1.81	549	3.64
2.0	750	5.01	782	5.23	1266	8.41
2.5	1311	8.76	1471	9.84	2128	14.13
3.0	1967	13.15	2171	14.52	2998	19.90
3.5	2711	18.12	2836	18.96	3833	25.45
4.0	3482	23.28	3415	22.84	4597	30.52
4.5	4128	27.60	4029	26.94	5227	34.70
5.0	4738	31.67	4615	30.86	5840	38.77
5.5	5262	35.18	5140	34.37	6434	42.72
6.0	5773	38.59	5650	37.78	7066	46.91
6.5	6251	41.79	6144	41.08	7669	50.92
7.0	6765	45.22	6698	44.79	8234	54.67
7.5	7276	48.64	7312	48.89	8781	58.30
8.0	7786	52.05	7839	52.42	9380	62.28
8.5	8250	55.15	8388	56.09	9982	66.27
9.0	8721	58.30	8911	59.59	10537	69.96
9.5	9195	61.47	9450	63.19	11041	73.30
10.0	9681	64.72	10007	66.91	11477	76.20
11.0	10640	71.13	10992	73.50	12325	81.83
12.0	11516	76.98	11821	79.04	12996	86.28
13.0	12257	81.94	12535	83.82	13565	90.06
14.0	12892	86.18	13145	87.90	13988	92.87
15.0	13434	89.81	13604	90.97	14326	95.11
16.0	13859	92.65	14006	93.65	14605	96.97
17.0	14181	94.80	14308	95.67	14773	98.08
18.0	14431	96.47	14530	97.16	14890	98.86
19.0	14609	97.66	14667	98.07	14952	99.27
20.0	14698	98.26	14760	98.70	14994	99.55
21.0	14787	98.85	14838	99.22	15019	99.71
>21.0	14959	100.00	14955	100.00	15062	100.00

SITE ID: WY
 SITE LOCATION: BRIDGER BUTTE, WY..
 DATA : SEPTEMBER 1980 THROUGH SEPTEMBER 1982

 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	278	591	624	627	577	563	303	40
2	131	195	142	117	124	225	98	14
3	77	58	48	23	33	135	52	10
4	44	27	19	8	7	85	37	5
5	32	14	4	3	3	69	33	4
6	20	15	6	1	0	51	32	1
7	10	3	0	0	0	40	19	0
8	6	0	1	0	1	25	16	0
9	7	1	1	1	0	15	9	0
10	6	0	0	0	0	11	11	1
11	1	0	0	0	0	12	7	0
12	3	1	0	0	0	3	2	1
13	2	0	0	0	0	4	3	0
14	1	0	0	0	0	3	1	0
15	0	0	0	0	0	6	1	0
16	0	0	0	0	0	1	3	0
17	1	0	0	0	0	0	0	0
18	0	0	0	0	0	1	2	1
19	0	0	0	0	0	0	2	0
20	0	0	0	0	0	0	1	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: WY
 SITE LOCATION: BRIDGER BUTTE, WY..
 DATA : SEPTEMBER 1980 THROUGH SEPTEMBER 1982

 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	-1.02	0.49	0.10	0.18	0.96	1.38	1.15
NNE	-0.20	0.10	0.02	0.04	0.76	0.79	1.20
NE	0.31	0.06	0.12	0.11	2.09	1.69	3.31
ENE	-0.01	0.18	0.13	0.14	5.21	4.31	4.89
E	-0.04	0.14	0.09	0.10	4.50	4.63	3.54
ESE	0.14	0.08	0.10	0.09	3.07	3.14	2.53
SE	-0.08	0.12	0.07	0.08	2.34	2.53	2.10
SSE	-0.05	0.08	0.05	0.06	2.59	2.19	2.04
S	1.16	-0.22	0.14	0.06	5.71	2.80	4.70
SSW	0.35	0.04	0.12	0.10	7.93	5.82	8.75
SW	-0.08	0.10	0.05	0.06	9.99	13.56	13.58
WSW	0.09	0.13	0.12	0.12	26.65	28.79	29.90
W	0.08	0.21	0.17	0.18	16.33	16.73	11.84
WNW	-0.04	0.16	0.11	0.12	5.64	5.46	4.20
NW	0.66	-0.07	0.12	0.08	2.97	2.39	2.81
NNW	-0.42	0.21	0.04	0.08	1.72	2.02	1.81

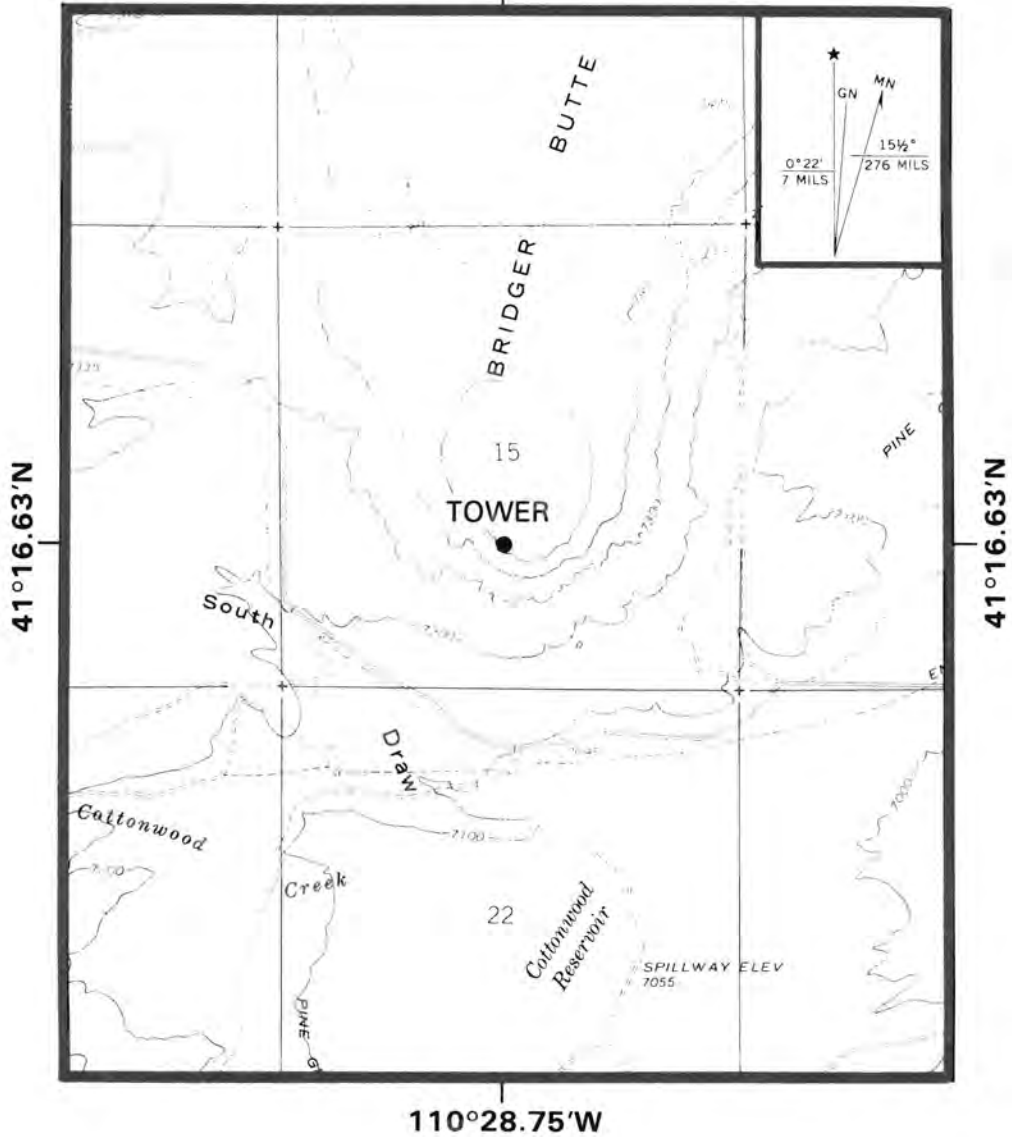
 NOTES:

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

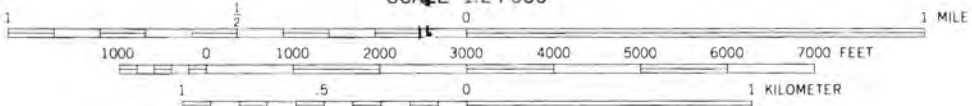
$$2. \text{ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{matrix} Z=\text{ELEVATION} \\ WS=\text{WIND SPEED} \end{matrix}$$

BRIDGER BUTTE, WY

110°28.75'W



SCALE 1:24 000



CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929



CAPE BLANCO, OREGON

SITE ID: CB
 SITE LOCATION: CAPE BLANCO, OR.
 DATA : NOVEMBER 1980 THROUGH OCTOBER 1981

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 8760

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	68.6
WD(A)	100.0	74.2
WS(B)	100.0	77.3
WD(B)	100.0	74.7
WS(C)	100.0	74.6
WD(C)	100.0	80.0

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 45.7	7.9	45.5	450.99
	(B) 30.0	6.1	63.6	260.57
	(C) 9.1	4.7	60.0	128.05

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	25.6	171.8	11/28/80	00:00	(B) 23.9 (C)-999.9
(B) 30.0	23.9	166.6	11/28/80	00:00	(A) 25.6 (C)-999.9
(C) 9.1	16.7	142.2	12/21/80	12:00	(A)-999.9 (B) 20.1

 NOTES:

1. SITE ELEVATION: 30 METERS ABOVE SEA LEVEL.

SITE ID: CB
 SITE LOCATION: CAPE BLANCO, OR.
 DATA : NOVEMBER 1980 THROUGH OCTOBER 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	7.7	65.9	5.5	74.5	4.0	83.2
01:00	7.7	71.2	5.5	74.0	4.0	82.5
02:00	7.7	68.9	5.5	72.6	4.0	82.7
03:00	7.6	76.8	5.4	76.6	3.9	84.2
04:00	7.6	75.2	5.4	76.4	4.0	83.6
05:00	7.5	79.1	5.4	79.3	4.0	83.5
06:00	7.4	75.5	5.4	76.5	4.0	82.8
07:00	7.4	79.5	5.5	78.2	4.2	78.1
08:00	7.3	73.7	5.6	79.3	4.4	68.6
09:00	7.5	29.7	6.0	65.4	4.8	39.1
10:00	7.9	332.8	6.6	324.4	5.3	358.2
11:00	8.1	302.3	6.9	279.1	5.5	336.5
12:00	8.5	297.7	7.2	273.8	5.8	323.6
13:00	8.8	299.1	7.4	267.9	6.0	328.0
14:00	8.9	304.9	7.4	274.9	6.0	334.2
15:00	8.8	309.8	7.2	281.5	5.9	336.3
16:00	8.5	318.1	6.9	288.7	5.5	346.6
17:00	8.3	339.0	6.5	337.8	5.2	4.2
18:00	8.2	11.7	6.3	23.1	4.9	31.3
19:00	8.1	34.6	6.0	46.9	4.5	52.4
20:00	7.9	44.2	5.7	51.7	4.3	61.0
21:00	7.8	52.4	5.6	66.2	4.1	73.4
22:00	7.9	62.3	5.6	68.0	4.1	76.2
23:00	7.8	67.3	5.6	72.9	4.1	78.1

SITE ID: CB
 SITE LOCATION: CAPE BLANCO, OR.
 DATA : NOVEMBER 1980 THROUGH OCTOBER 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	0	0.0	0	0.0	0	0.0
0.5- 1.0	2	0.0	87	1.3	69	1.1
1.0- 1.5	7	0.1	20	0.3	265	4.1
1.5- 2.0	9	0.1	110	1.6	517	7.9
2.0- 2.5	32	0.5	278	4.1	613	9.4
2.5- 3.0	67	1.1	475	7.0	629	9.6
3.0- 3.5	164	2.7	426	6.3	522	8.0
3.5- 4.0	157	2.6	490	7.2	464	7.1
4.0- 4.5	235	3.9	501	7.4	464	7.1
4.5- 5.0	336	5.6	483	7.1	402	6.2
5.0- 5.5	304	5.1	428	6.3	396	6.1
5.5- 6.0	374	6.2	435	6.4	394	6.0
6.0- 6.5	397	6.6	393	5.8	365	5.6
6.5- 7.0	368	6.1	403	6.0	311	4.8
7.0- 7.5	457	7.6	398	5.9	231	3.5
7.5- 8.0	499	8.3	317	4.7	205	3.1
8.0- 8.5	407	6.8	276	4.1	162	2.5
8.5- 9.0	351	5.8	235	3.5	118	1.8
9.0- 9.5	291	4.8	196	2.9	102	1.6
9.5-10.0	245	4.1	135	2.0	68	1.0
10.0-11.0	366	6.1	253	3.7	95	1.5
11.0-12.0	305	5.1	133	2.0	54	0.8
12.0-13.0	253	4.2	78	1.2	40	0.6
13.0-14.0	165	2.7	67	1.0	23	0.4
14.0-15.0	69	1.1	50	0.7	16	0.2
15.0-16.0	58	1.0	36	0.5	7	0.1
16.0-17.0	44	0.7	24	0.4	3	0.0
17.0-18.0	22	0.4	17	0.3	0	0.0
18.0-19.0	8	0.1	11	0.2	0	0.0
19.0-20.0	9	0.1	7	0.1	0	0.0
20.0-21.0	3	0.0	5	0.1	0	0.0
>21.0	5	0.1	3	0.0	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 68.6 77.3 74.6

SITE ID: CB
 SITE LOCATION: CAPE BLANCO, OR.
 DATA : NOVEMBER 1980 THROUGH OCTOBER 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	0	0.00	0	0.00	0	0.00
1.0	2	0.03	87	1.29	69	1.06
1.5	9	0.15	107	1.58	334	5.11
2.0	18	0.30	217	3.21	851	13.02
2.5	50	0.83	495	7.31	1464	22.40
3.0	117	1.95	970	14.33	2093	32.03
3.5	281	4.68	1396	20.62	2615	40.02
4.0	438	7.29	1886	27.86	3079	47.12
4.5	673	11.20	2387	35.26	3543	54.22
5.0	1009	16.79	2870	42.39	3945	60.37
5.5	1313	21.85	3298	48.71	4341	66.43
6.0	1687	28.07	3733	55.14	4735	72.46
6.5	2084	34.68	4126	60.95	5100	78.04
7.0	2452	40.81	4529	66.90	5411	82.80
7.5	2909	48.41	4927	72.78	5642	86.34
8.0	3408	56.71	5244	77.46	5847	89.47
8.5	3815	63.49	5520	81.54	6009	91.95
9.0	4166	69.33	5755	85.01	6127	93.76
9.5	4457	74.17	5951	87.90	6229	95.32
10.0	4702	78.25	6086	89.90	6297	96.36
11.0	5068	84.34	6339	93.63	6392	97.81
12.0	5373	89.42	6472	95.60	6446	98.64
13.0	5626	93.63	6550	96.75	6486	99.25
14.0	5791	96.37	6617	97.74	6509	99.60
15.0	5860	97.52	6667	98.48	6525	99.85
16.0	5918	98.49	6703	99.01	6532	99.95
17.0	5962	99.22	6727	99.36	6535	100.00
18.0	5984	99.58	6744	99.62	6535	100.00
19.0	5992	99.72	6755	99.78	6535	100.00
20.0	6001	99.87	6762	99.88	6535	100.00
21.0	6004	99.92	6767	99.96	6535	100.00
>21.0	6009	100.00	6770	100.00	6535	100.00

SITE ID: CB
 SITE LOCATION: CAPE BLANCO, OR.
 DATA : NOVEMBER 1980 THROUGH OCTOBER 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	37 104 196 254 241 205 67 3
2	14 31 48 72 88 48 18 0
3	2 7 17 22 25 39 10 0
4	2 1 12 14 13 27 7 0
5	2 6 2 6 7 21 8 0
6	1 1 1 3 9 17 3 0
7	1 2 4 3 2 11 1 0
8	0 0 2 0 0 12 3 0
9	1 0 1 0 3 9 2 0
10	0 0 2 1 1 13 1 0
11	0 0 0 0 0 2 2 0
12	0 0 0 0 0 5 0 0
13	0 0 0 0 0 3 2 0
14	0 0 0 0 0 7 0 0
15	0 0 0 0 0 1 0 0
16	0 0 0 0 0 5 0 0
17	0 0 0 0 0 0 0 0
18	0 0 0 0 0 1 0 0
19	0 0 0 0 0 0 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 0 0
23	0 0 0 0 0 0 0 0
>23	0 0 0 0 0 0 0 0

SITE ID: CB
 SITE LOCATION: CAPE BLANCO, OR.
 DATA : NOVEMBER 1980 THROUGH OCTOBER 1981

 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION

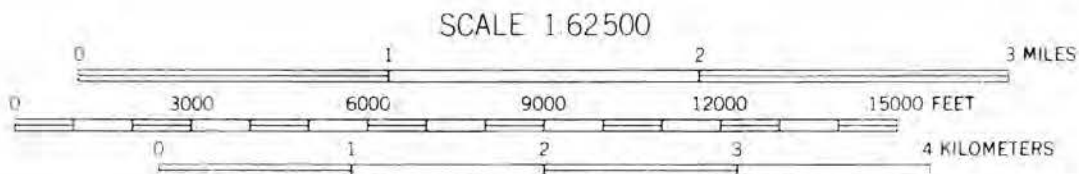
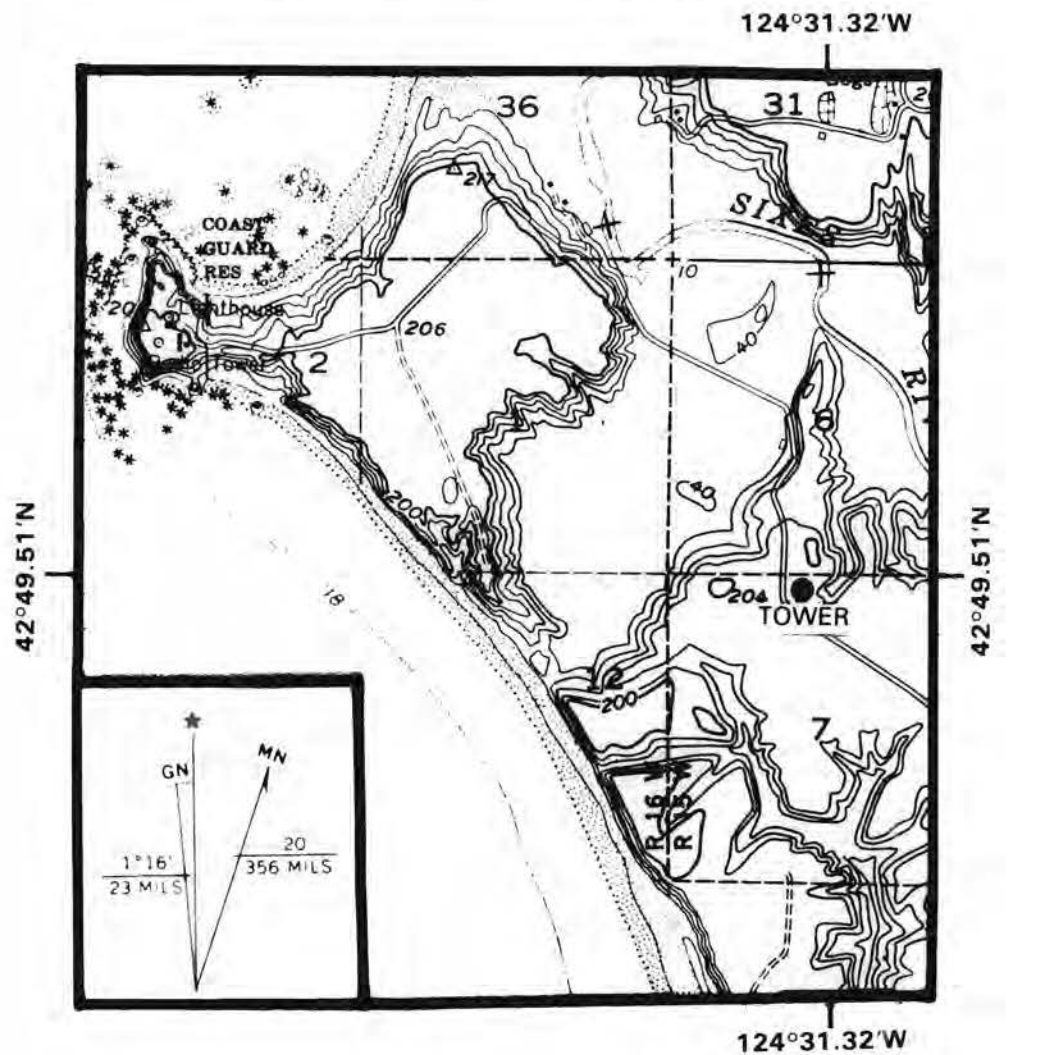
WIND DIR (ELEV A)	ALPHA (A,B)	ALPHA (B,C)	ALPHA (A,C)	ALPHA (A,B,C)	%A	%B	%C
N	0.61	0.09	0.22	0.19	19.27	19.63	25.39
NNE	0.71	0.13	0.28	0.25	12.07	10.96	12.85
NE	1.53	0.39	0.69	0.63	3.46	2.41	2.20
ENE	1.12	0.56	0.71	0.68	2.30	1.99	1.70
E	1.05	0.47	0.62	0.59	4.84	6.56	4.79
ESE	1.07	0.37	0.55	0.51	3.89	4.30	8.28
SE	1.02	0.18	0.40	0.35	2.36	2.79	3.69
SSE	0.29	0.19	0.22	0.21	9.02	12.22	11.20
S	0.64	0.25	0.35	0.33	14.93	11.76	11.34
SSW	0.88	0.19	0.37	0.33	3.44	3.34	3.92
SW	1.04	0.24	0.45	0.41	1.61	1.54	1.55
WSW	0.98	0.41	0.56	0.53	1.93	1.67	1.18
W	1.20	0.45	0.65	0.60	1.16	1.27	0.99
WNW	1.06	0.43	0.59	0.56	1.07	1.27	0.69
NW	0.80	0.27	0.41	0.38	1.46	2.26	1.45
NNW	0.80	0.21	0.37	0.33	6.57	7.24	7.16

 NOTES:

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

$$2. \text{ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{array}{l} Z=\text{ELEVATION} \\ WS=\text{WIND SPEED} \end{array}$$

CAPE BLANCO, OR



CONTOUR INTERVAL 40 FEET
 DATUM IS MEAN SEA LEVEL
 DEPTH CURVES IN FEET—DATUM IS MEAN LOWER LOW WATER
 SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
 THE AVERAGE RANGE OF TIDE IS APPROXIMATELY 5 FEET





DIABLO DAM, WASHINGTON

SITE ID: DD
 SITE LOCATION: DIABLO DAM, WA.
 DATA : DECEMBER 1980 THROUGH JUNE 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 13848

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	83.0
WD(A)	100.0	85.8
WS(B)	100.0	67.3
WD(B)	100.0	81.8
WS(C)	100.0	73.7
WD(C)	100.0	75.2

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 45.7	5.1	228.6	160.19
	(B) 30.0	3.7	248.5	78.49
	(C) 9.1	1.7	103.7	5.77

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	18.7	276.0	12/27/80	02:00	(B) 12.8 (C) -999.9
(B) 30.0	15.9	297.0	04/15/81	12:00	(A) 5.6 (C) 1.4
(C) 9.1	8.1	278.9	12/11/80	05:00	(A) 9.9 (B) 9.1

NOTES:

1. SITE ELEVATION: 500 METERS ABOVE SEA LEVEL.

SITE ID: DD
 SITE LOCATION: DIABLO DAM, WA.
 DATA : DECEMBER 1980 THROUGH JUNE 1982

 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	4.4	171.6	2.9	142.7	1.4	80.6
01:00	4.3	165.5	2.9	132.2	1.4	78.4
02:00	4.3	155.0	2.9	124.1	1.4	77.5
03:00	4.4	154.7	2.9	122.0	1.5	76.9
04:00	4.4	149.4	3.0	121.7	1.4	78.8
05:00	4.4	147.0	2.9	124.8	1.5	78.0
06:00	4.4	148.1	2.9	122.2	1.4	80.6
07:00	4.4	153.3	2.9	141.5	1.5	98.5
08:00	4.4	167.5	3.0	172.1	1.5	114.6
09:00	4.7	198.4	3.4	209.0	1.6	149.5
10:00	5.2	220.5	3.9	229.8	1.7	195.0
11:00	5.6	239.1	4.4	247.4	1.9	210.3
12:00	6.1	254.2	4.9	260.5	2.0	231.5
13:00	6.3	262.0	5.2	266.0	2.1	239.3
14:00	6.5	265.6	5.4	272.7	2.1	247.7
15:00	6.5	269.5	5.4	276.1	2.1	256.6
16:00	6.4	272.8	5.2	279.0	2.0	263.3
17:00	6.1	270.7	4.8	279.2	1.9	267.4
18:00	5.7	268.6	4.3	281.6	1.8	339.6
19:00	5.4	265.5	3.9	283.7	1.7	46.1
20:00	5.1	251.8	3.5	273.1	1.6	70.4
21:00	4.8	240.0	3.2	265.8	1.5	78.8
22:00	4.6	210.1	3.1	225.7	1.5	80.2
23:00	4.5	188.6	3.0	167.6	1.5	81.5

SITE ID: DD
 SITE LOCATION: DIABLO DAM, WA.
 DATA : DECEMBER 1980 THROUGH JUNE 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL C %
0.0- 0.5	0	0.0	0	0.0
0.5- 1.0	177	1.5	344	3.7
1.0- 1.5	431	3.8	1169	12.5
1.5- 2.0	479	4.2	1304	14.0
2.0- 2.5	740	6.4	1195	12.8
2.5- 3.0	1073	9.3	868	9.3
3.0- 3.5	1208	10.5	568	6.1
3.5- 4.0	1022	8.9	460	4.9
4.0- 4.5	877	7.6	361	3.9
4.5- 5.0	773	6.7	385	4.1
5.0- 5.5	551	4.8	406	4.4
5.5- 6.0	424	3.7	406	4.4
6.0- 6.5	384	3.3	356	3.8
6.5- 7.0	384	3.3	327	3.5
7.0- 7.5	348	3.0	278	3.0
7.5- 8.0	334	2.9	235	2.5
8.0- 8.5	401	3.5	180	1.9
8.5- 9.0	426	3.7	154	1.7
9.0- 9.5	390	3.4	104	1.1
9.5-10.0	309	2.7	76	0.8
10.0-11.0	395	3.4	69	0.7
11.0-12.0	215	1.9	46	0.5
12.0-13.0	84	0.7	21	0.2
13.0-14.0	42	0.4	4	0.0
14.0-15.0	13	0.1	2	0.0
15.0-16.0	8	0.1	2	0.0
16.0-17.0	0	0.0	0	0.0
17.0-18.0	2	0.0	0	0.0
18.0-19.0	1	0.0	0	0.0
19.0-20.0	0	0.0	0	0.0
20.0-21.0	0	0.0	0	0.0
>21.0	0	0.0	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 83.0 67.3 73.7

SITE ID: DD
 SITE LOCATION: DIABLO DAM, WA.
 DATA : DECEMBER 1980 THROUGH JUNE 1982

 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	0	0.00	0	0.00	1	0.01
1.0	177	1.54	344	3.69	2990	29.31
1.5	608	5.29	1513	16.23	5466	53.59
2.0	1087	9.46	2817	30.23	7070	69.31
2.5	1827	15.90	4012	43.05	8309	81.46
3.0	2900	25.24	4880	52.36	9202	90.22
3.5	4108	35.75	5448	58.45	9786	95.94
4.0	5130	44.64	5908	63.39	10006	98.10
4.5	6007	52.28	6269	67.26	10102	99.04
5.0	6780	59.00	6654	71.39	10163	99.64
5.5	7331	63.80	7060	75.75	10183	99.83
6.0	7755	67.49	7466	80.11	10189	99.89
6.5	8139	70.83	7822	83.93	10189	99.89
7.0	8523	74.17	8149	87.44	10189	99.89
7.5	8871	77.20	8427	90.42	10196	99.96
8.0	9205	80.11	8662	92.94	10199	99.99
8.5	9606	83.60	8842	94.87	10200	100.00
9.0	10032	87.30	8996	96.52	10200	100.00
9.5	10422	90.70	9100	97.64	10200	100.00
10.0	10731	93.39	9176	98.45	10200	100.00
11.0	11126	96.82	9245	99.20	10200	100.00
12.0	11341	98.69	9291	99.69	10200	100.00
13.0	11425	99.43	9312	99.91	10200	100.00
14.0	11467	99.79	9316	99.96	10200	100.00
15.0	11480	99.90	9318	99.98	10200	100.00
16.0	11488	99.97	9320	100.00	10200	100.00
17.0	11488	99.97	9320	100.00	10200	100.00
18.0	11490	99.99	9320	100.00	10200	100.00
19.0	11491	100.00	9320	100.00	10200	100.00
20.0	11491	100.00	9320	100.00	10200	100.00
21.0	11491	100.00	9320	100.00	10200	100.00
>21.0	11491	100.00	9320	100.00	10200	100.00

SITE ID: DD
 SITE LOCATION: DIABLO DAM, WA.
 DATA : DECEMBER 1980 THROUGH JUNE 1982

 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	392	625	574	452	408	186	36	0
2	137	202	152	97	92	71	13	0
3	54	70	75	28	25	40	7	0
4	39	32	38	15	6	49	4	0
5	30	16	15	8	4	37	9	0
6	19	13	8	3	0	25	0	0
7	13	3	5	1	0	23	0	0
8	8	4	2	1	1	11	0	0
9	10	3	2	0	0	20	0	0
10	6	0	0	0	0	14	0	0
11	6	0	0	0	1	11	0	0
12	2	1	0	0	0	14	0	0
13	0	0	0	0	0	8	0	0
14	0	0	0	0	0	2	0	0
15	0	0	0	0	0	1	0	0
16	1	0	0	0	0	3	0	0
17	0	0	0	0	0	2	0	0
18	0	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	1	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: DD
 SITE LOCATION: DIABLO DAM, WA.
 DATA : DECEMBER 1980 THROUGH JUNE 1982

 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	1.61	0.32	0.66	0.58	0.30	0.49	2.24
NNE	1.43	0.26	0.57	0.50	0.48	0.69	2.09
NE	1.54	0.31	0.63	0.56	0.70	0.70	2.89
ENE	1.73	0.38	0.73	0.65	1.71	2.38	6.45
E	1.19	0.38	0.59	0.54	5.31	6.50	10.99
ESE	1.03	0.41	0.57	0.53	13.02	15.31	11.19
SE	1.08	0.32	0.52	0.47	15.78	11.70	6.99
SSE	1.14	0.25	0.48	0.43	5.61	4.29	5.79
S	0.78	0.15	0.32	0.28	2.31	1.97	4.62
SSW	1.19	0.13	0.41	0.35	1.61	1.37	2.35
SW	1.28	0.17	0.46	0.40	1.96	1.45	1.75
WSW	0.76	0.41	0.50	0.48	5.97	3.71	3.27
W	0.56	0.54	0.54	0.54	15.14	11.38	7.98
WNW	0.76	0.79	0.78	0.78	25.67	28.08	10.10
NW	0.45	0.78	0.70	0.71	3.70	8.47	5.79
NNW	0.80	0.53	0.60	0.59	0.68	1.46	3.07

 NOTES:

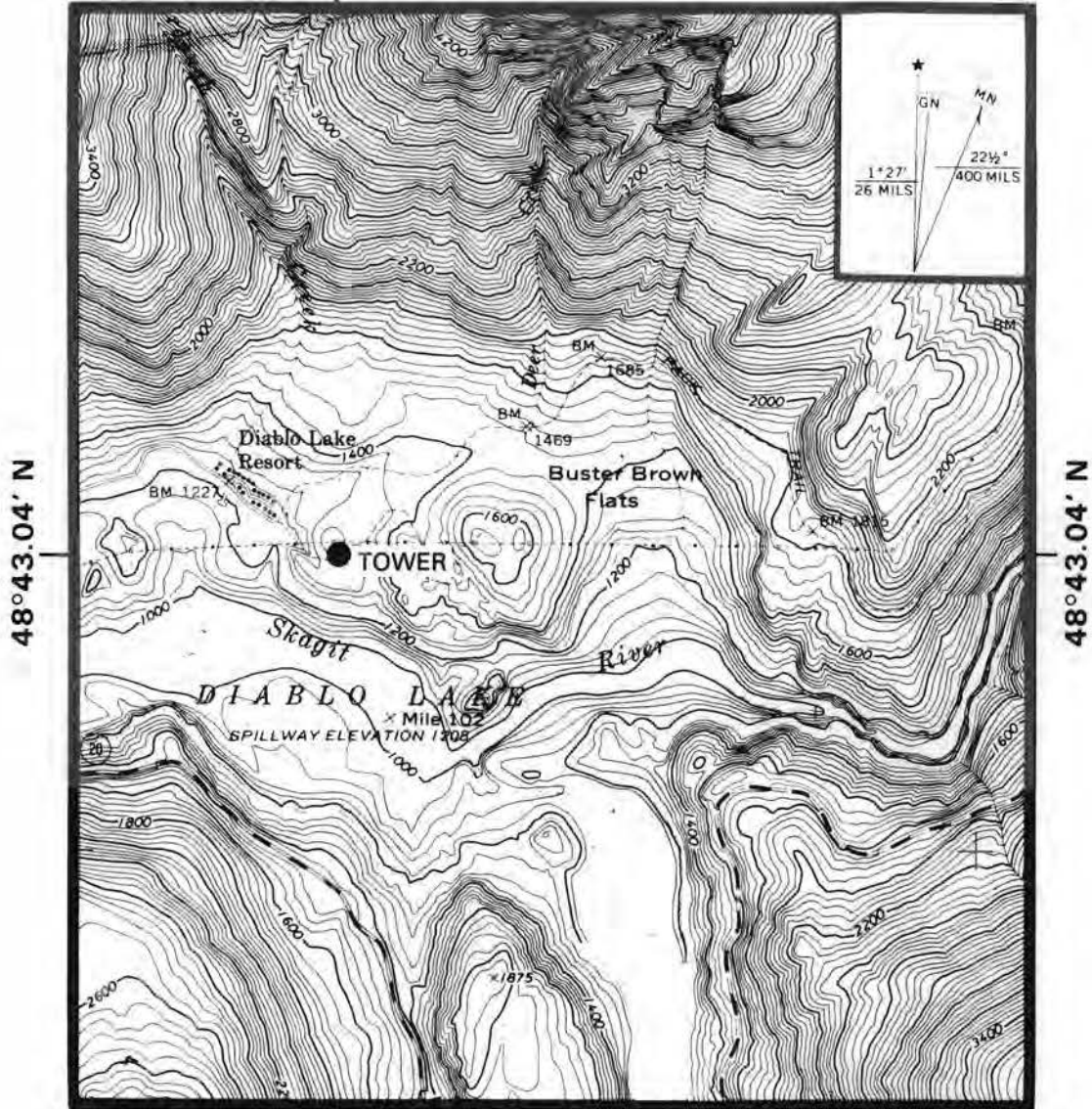
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)^{ALPHA}}{Z(LO)^{ALPHA}}$$

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

DIABLO DAM, WASHINGTON

121°6.78' W

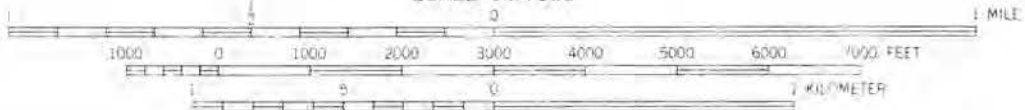


48°43.04' N

48°43.04' N

121°6.78' W

SCALE 1:24 000



CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL



FINLEY, NORTH DAKOTA



SITE ID: ND
 SITE LOCATION: FINLEY, ND.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 17520

SENSOR	% ON-LINE	% RECOVERED
WS(A)	98.6	77.5
WD(A)	98.6	79.9
WS(B)	98.6	71.3
WD(B)	98.6	75.9
WS(C)	98.6	79.5
WD(C)	98.6	80.0

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 45.7	9.1	290.1	738.18
	(B) 30.0	7.7	309.1	450.61
	(C) 9.1	6.1	293.4	235.03

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	24.5	280.1	03/12/82	22:00	(B) 23.3 (C) 20.5
(B) 30.0	23.8	280.5	03/12/82	21:00	(A) 24.1 (C) 21.6
(C) 9.1	21.6	283.1	03/12/82	21:00	(A) 24.1 (B) 23.8

NOTES:

1. SITE ELEVATION: 472 METERS ABOVE SEA LEVEL.

SITE ID: ND
 SITE LOCATION: FINLEY, ND.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 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	9.5	286.6	7.8	307.4	5.7	282.4
01:00	9.5	283.9	7.7	303.8	5.6	280.0
02:00	9.4	279.7	7.7	297.7	5.6	282.3
03:00	9.3	280.0	7.6	297.2	5.5	281.8
04:00	9.2	280.8	7.5	296.3	5.5	279.7
05:00	9.2	279.8	7.5	295.0	5.5	279.7
06:00	9.1	283.4	7.5	299.4	5.5	283.8
07:00	8.9	286.5	7.5	304.6	5.6	288.1
08:00	8.8	286.2	7.6	304.3	5.9	289.6
09:00	8.8	283.1	7.7	303.0	6.3	290.2
10:00	8.8	287.5	7.8	304.0	6.6	294.5
11:00	8.9	287.9	7.9	307.3	6.9	299.6
12:00	9.1	291.1	8.1	308.8	7.1	302.7
13:00	9.2	289.5	8.2	308.9	7.2	303.0
14:00	9.2	289.4	8.2	306.8	7.2	301.2
15:00	9.2	287.1	8.1	306.4	7.1	299.6
16:00	9.1	290.8	8.1	309.3	6.9	301.3
17:00	9.0	295.9	7.8	314.7	6.5	306.1
18:00	8.9	300.6	7.6	320.4	6.2	306.2
19:00	8.9	307.6	7.4	325.6	5.8	313.0
20:00	9.0	320.1	7.5	337.9	5.6	318.6
21:00	9.1	324.7	7.5	338.4	5.6	314.7
22:00	9.3	309.5	7.7	330.4	5.6	298.9
23:00	9.5	300.5	7.8	322.0	5.7	290.4

SITE ID: ND
 SITE LOCATION: FINLEY, ND.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL C %
0.0- 0.5	0	0.0	0	0.0
0.5- 1.0	6	0.0	28	0.2
1.0- 1.5	29	0.2	54	0.4
1.5- 2.0	74	0.5	82	0.7
2.0- 2.5	132	1.0	147	1.2
2.5- 3.0	227	1.7	169	1.4
3.0- 3.5	288	2.1	253	2.0
3.5- 4.0	335	2.5	431	3.4
4.0- 4.5	484	3.6	611	4.9
4.5- 5.0	574	4.2	760	6.1
5.0- 5.5	741	5.5	901	7.2
5.5- 6.0	734	5.4	999	8.0
6.0- 6.5	709	5.2	1050	8.4
6.5- 7.0	682	5.0	839	6.7
7.0- 7.5	707	5.2	792	6.3
7.5- 8.0	632	4.7	662	5.3
8.0- 8.5	554	4.1	583	4.7
8.5- 9.0	599	4.4	504	4.0
9.0- 9.5	529	3.9	464	3.7
9.5-10.0	476	3.5	359	2.9
10.0-11.0	907	6.7	633	5.1
11.0-12.0	745	5.5	512	4.1
12.0-13.0	677	5.0	390	3.1
13.0-14.0	599	4.4	323	2.6
14.0-15.0	611	4.5	379	3.0
15.0-16.0	505	3.7	304	2.4
16.0-17.0	423	3.1	164	1.3
17.0-18.0	282	2.1	71	0.6
18.0-19.0	160	1.2	14	0.1
19.0-20.0	108	0.8	8	0.1
20.0-21.0	22	0.2	1	0.0
>21.0	19	0.1	7	0.1

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 77.5 71.3 79.5

SITE ID: ND
 SITE LOCATION: FINLEY, ND.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 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	0	0.00	0	0.00	1	0.01
1.0	6	0.04	28	0.22	43	0.31
1.5	35	0.26	82	0.66	160	1.15
2.0	109	0.80	164	1.31	417	2.99
2.5	241	1.78	311	2.49	890	6.39
3.0	468	3.45	480	3.84	1737	12.47
3.5	756	5.57	733	5.87	2807	20.15
4.0	1091	8.04	1164	9.32	3905	28.03
4.5	1575	11.61	1775	14.21	5046	36.22
5.0	2149	15.84	2535	20.29	6003	43.09
5.5	2890	21.30	3436	27.50	6860	49.24
6.0	3624	26.71	4435	35.50	7657	54.96
6.5	4333	31.93	5485	43.90	8449	60.65
7.0	5015	36.96	6324	50.62	9163	65.77
7.5	5722	42.17	7116	56.96	9853	70.73
8.0	6354	46.82	7778	62.25	10438	74.93
8.5	6908	50.91	8361	66.92	11042	79.26
9.0	7507	55.32	8865	70.95	11550	82.91
9.5	8036	59.22	9329	74.67	12027	86.33
10.0	8512	62.73	9688	77.54	12424	89.18
11.0	9419	69.41	10321	82.61	13013	93.41
12.0	10164	74.90	10833	86.71	13371	95.98
13.0	10841	79.89	11223	89.83	13637	97.89
14.0	11440	84.30	11546	92.41	13800	99.06
15.0	12051	88.81	11925	95.45	13863	99.51
16.0	12556	92.53	12229	97.88	13900	99.78
17.0	12979	95.64	12393	99.19	13915	99.89
18.0	13261	97.72	12464	99.76	13920	99.92
19.0	13421	98.90	12478	99.87	13923	99.94
20.0	13529	99.70	12486	99.94	13926	99.96
21.0	13551	99.86	12487	99.94	13929	99.99
>21.0	13570	100.00	12494	100.00	13931	100.00

SITE ID: ND
 SITE LOCATION: FINLEY, ND.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 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	86	233	354	520	567	566	267	14
2	32	66	114	159	163	203	76	0
3	26	43	45	60	50	105	38	0
4	11	6	29	30	22	67	32	2
5	7	10	11	14	13	57	17	0
6	4	3	12	4	11	44	14	1
7	1	2	2	5	3	34	11	0
8	1	0	2	2	1	25	14	0
9	0	0	0	1	1	23	8	0
10	0	0	0	0	0	10	7	0
11	0	0	0	1	0	7	13	0
12	1	0	0	1	1	2	9	0
13	0	0	1	0	1	1	2	0
14	0	0	0	0	0	4	9	0
15	1	0	0	0	0	2	1	0
16	1	0	0	0	0	4	5	0
17	0	0	0	2	0	1	1	0
18	0	0	0	0	0	1	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	1	1	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: ND
 SITE LOCATION: FINLEY, ND.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 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	0.28	0.19	0.22	0.21	6.27	7.37	6.95
NNE	0.32	0.13	0.18	0.17	6.60	6.44	6.65
NE	0.28	0.15	0.18	0.17	4.93	4.75	5.23
ENE	0.34	0.16	0.20	0.19	3.58	3.34	4.02
E	0.28	0.19	0.21	0.20	3.57	3.08	3.29
ESE	0.49	0.24	0.31	0.29	3.87	3.57	3.54
SE	0.61	0.28	0.37	0.35	6.04	4.98	4.76
SSE	0.45	0.19	0.26	0.24	8.13	7.61	8.31
S	0.54	0.18	0.27	0.25	5.76	5.75	6.50
SSW	0.42	0.25	0.29	0.28	4.90	4.29	4.66
SW	0.20	0.26	0.25	0.25	4.52	4.15	4.85
WSW	0.41	0.27	0.31	0.30	5.43	4.77	5.84
W	0.51	0.25	0.32	0.31	8.89	8.38	8.94
WNW	0.36	0.19	0.23	0.22	10.68	10.28	10.31
NW	0.36	0.18	0.23	0.22	8.70	8.43	8.42
NNW	0.26	0.17	0.20	0.19	8.05	8.11	7.75

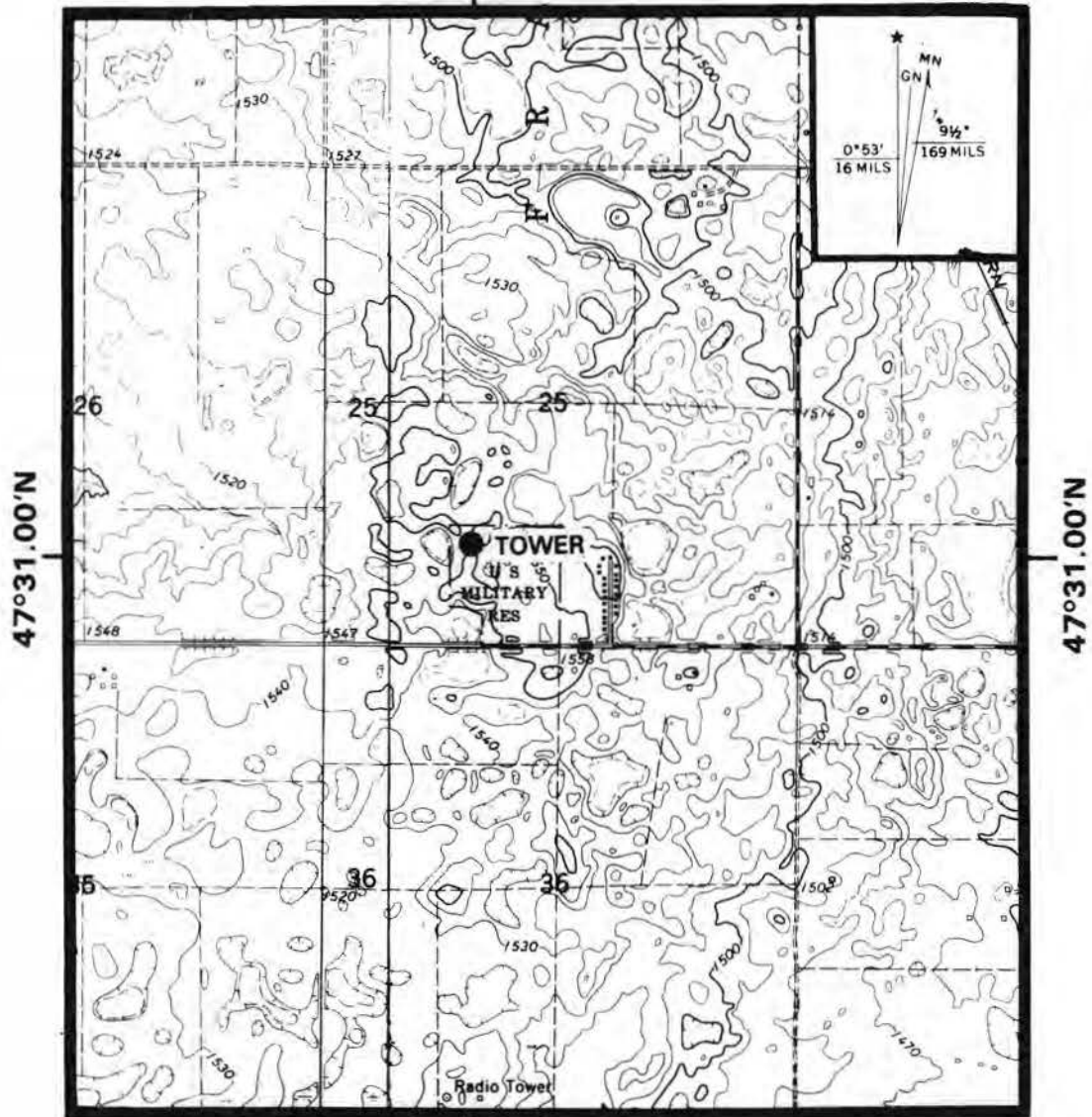
 NOTES:

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

$$2. ALPHA = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{matrix} Z = \text{ELEVATION} \\ WS = \text{WIND SPEED} \end{matrix}$$

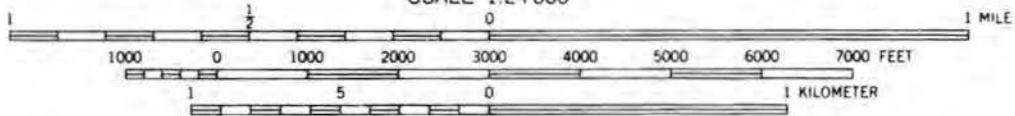
FINLEY AIR FORCE BASE, NORTH DAKOTA

97°52.39'W



97°52.39'W

SCALE 1:24000



CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

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FORT SILL, OKLAHOMA



SITE ID: OK
 SITE LOCATION: FT. SILL, OK.
 DATA : SEPTEMBER 1980 THROUGH DECEMBER 1981

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 11688

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	48.0
WD(A)	100.0	53.3
WS(B)	100.0	51.5
WD(B)	100.0	53.3
WS(C)	100.0	38.6
WD(C)	100.0	60.7

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 45.7	9.3	135.3	706.82
	(B) 30.0	6.6	139.0	316.78
	(C) 9.1	5.6	146.2	212.69

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	25.8	132.2	10/23/81	18:00	(B) 18.4 (C) 12.3
(B) 30.0	22.4	223.1	10/21/81	14:00	(A)-999.9 (C) 9.3
(C) 9.1	21.3	143.4	10/24/81	12:00	(A) 23.5 (B) 19.4

NOTES:

1. SITE ELEVATION: 366 METERS ABOVE SEA LEVEL.

SITE ID: OK
 SITE LOCATION: FT. SILL, OK.
 DATA : SEPTEMBER 1980 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	8.7	125.4	5.8	126.6	5.2	124.1
01:00	8.6	124.0	5.6	121.6	5.0	149.4
02:00	8.5	123.9	5.7	123.4	4.9	128.4
03:00	8.5	120.0	5.6	119.3	5.1	104.4
04:00	8.4	121.8	5.5	118.5	5.0	127.4
05:00	8.3	124.3	5.6	126.4	5.2	121.8
06:00	8.3	124.9	5.6	122.1	5.0	116.8
07:00	8.4	124.5	5.8	124.2	5.2	105.8
08:00	8.9	137.1	6.3	141.1	5.6	133.4
09:00	9.6	142.0	7.1	150.6	6.1	152.9
10:00	10.1	151.1	7.6	158.2	6.5	164.8
11:00	10.3	155.7	7.8	164.5	6.6	169.3
12:00	10.6	159.7	7.9	165.4	6.6	174.1
13:00	10.6	153.9	8.0	161.2	6.6	168.9
14:00	10.8	155.6	8.0	159.2	6.6	169.9
15:00	10.6	155.2	8.0	162.8	6.5	167.7
16:00	10.5	146.7	7.8	151.0	6.3	161.4
17:00	10.2	137.7	7.4	139.5	5.9	147.7
18:00	9.8	130.1	6.8	134.0	5.4	141.4
19:00	9.4	126.9	6.3	128.1	5.3	129.6
20:00	9.2	123.3	6.1	122.8	5.3	123.8
21:00	9.0	124.7	6.1	121.9	5.3	122.4
22:00	8.9	121.7	6.0	121.3	5.2	117.6
23:00	8.7	126.4	5.9	127.3	5.1	136.1

SITE ID: OK
 SITE LOCATION: FT. SILL, OK.
 DATA : SEPTEMBER 1980 THROUGH DECEMBER 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	0	0.0	1	0.0	11	0.2
0.5- 1.0	9	0.2	35	0.6	79	1.8
1.0- 1.5	17	0.3	36	0.6	195	4.3
1.5- 2.0	12	0.2	105	1.7	243	5.4
2.0- 2.5	18	0.3	182	3.0	255	5.7
2.5- 3.0	42	0.7	297	4.9	257	5.7
3.0- 3.5	51	0.9	427	7.1	238	5.3
3.5- 4.0	95	1.7	406	6.7	277	6.1
4.0- 4.5	158	2.8	396	6.6	275	6.1
4.5- 5.0	178	3.2	383	6.4	253	5.6
5.0- 5.5	227	4.0	385	6.4	276	6.1
5.5- 6.0	254	4.5	349	5.8	274	6.1
6.0- 6.5	292	5.2	322	5.3	279	6.2
6.5- 7.0	313	5.6	296	4.9	248	5.5
7.0- 7.5	296	5.3	294	4.9	217	4.8
7.5- 8.0	324	5.8	281	4.7	193	4.3
8.0- 8.5	315	5.6	303	5.0	175	3.9
8.5- 9.0	269	4.8	265	4.4	150	3.3
9.0- 9.5	279	5.0	215	3.6	121	2.7
9.5-10.0	266	4.7	187	3.1	107	2.4
10.0-11.0	504	9.0	262	4.4	160	3.5
11.0-12.0	407	7.3	167	2.8	98	2.2
12.0-13.0	375	6.7	137	2.3	38	0.8
13.0-14.0	283	5.0	107	1.8	31	0.7
14.0-15.0	244	4.3	75	1.2	19	0.4
15.0-16.0	153	2.7	41	0.7	17	0.4
16.0-17.0	100	1.8	21	0.3	12	0.3
17.0-18.0	54	1.0	12	0.2	6	0.1
18.0-19.0	24	0.4	10	0.2	2	0.0
19.0-20.0	19	0.3	14	0.2	4	0.1
20.0-21.0	11	0.2	5	0.1	0	0.0
>21.0	22	0.4	6	0.1	1	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 48.0 51.5 38.6

SITE ID: OK
 SITE LOCATION: FT. SILL, OK.
 DATA : SEPTEMBER 1980 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	0	0.00	1	0.02	11	0.24
1.0	9	0.16	36	0.60	90	2.00
1.5	26	0.46	72	1.20	285	6.32
2.0	38	0.68	177	2.94	528	11.70
2.5	56	1.00	359	5.96	783	17.36
3.0	98	1.75	656	10.89	1040	23.05
3.5	149	2.66	1083	17.98	1278	28.33
4.0	244	4.35	1489	24.73	1555	34.47
4.5	402	7.16	1885	31.30	1830	40.57
5.0	580	10.34	2268	37.66	2083	46.18
5.5	807	14.38	2653	44.06	2359	52.29
6.0	1061	18.91	3002	49.85	2633	58.37
6.5	1353	24.11	3324	55.20	2912	64.55
7.0	1666	29.69	3620	60.11	3160	70.05
7.5	1962	34.97	3914	65.00	3377	74.86
8.0	2286	40.74	4195	69.66	3570	79.14
8.5	2601	46.36	4498	74.69	3745	83.02
9.0	2870	51.15	4763	79.09	3895	86.34
9.5	3149	56.12	4978	82.66	4016	89.03
10.0	3415	60.86	5165	85.77	4123	91.40
11.0	3919	69.84	5427	90.12	4283	94.95
12.0	4326	77.10	5594	92.89	4381	97.12
13.0	4701	83.78	5731	95.17	4419	97.96
14.0	4984	88.83	5838	96.94	4450	98.65
15.0	5228	93.17	5913	98.19	4469	99.07
16.0	5381	95.90	5954	98.87	4486	99.45
17.0	5481	97.68	5975	99.22	4498	99.71
18.0	5535	98.65	5987	99.42	4504	99.84
19.0	5559	99.07	5997	99.58	4506	99.89
20.0	5578	99.41	6011	99.82	4510	99.98
21.0	5589	99.61	6016	99.90	4510	99.98
>21.0	5611	100.00	6022	100.00	4511	100.00

SITE ID: OK
 SITE LOCATION: FT. SILL, OK.
 DATA : SEPTEMBER 1980 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	31	86	125	205	258	247	108	7	
2	10	11	38	42	69	82	36	3	
3	5	7	17	26	31	49	24	0	
4	1	4	4	10	12	35	10	0	
5	1	0	3	4	5	33	14	0	
6	0	0	0	1	1	15	9	0	
7	0	0	0	1	0	16	10	1	
8	0	0	0	0	0	5	5	0	
9	0	0	0	0	0	7	10	0	
10	0	0	0	0	0	9	4	1	
11	0	0	0	0	0	6	2	0	
12	0	0	0	0	0	4	0	0	
13	0	0	0	0	0	3	1	0	
14	0	0	0	0	0	3	2	0	
15	0	0	0	0	0	2	3	0	
16	0	0	0	0	0	2	3	0	
17	0	0	0	0	0	1	0	0	
18	0	0	0	0	0	0	2	0	
19	0	0	0	0	0	0	1	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	1	1	0	
23	0	0	0	0	0	0	0	0	
>23	0	0	0	0	0	0	0	0	

SITE ID: OK
 SITE LOCATION: FT. SILL, OK.
 DATA : SEPTEMBER 1980 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	0.62	0.23	0.33	0.31	7.84	9.61	8.51
NNE	0.80	0.08	0.26	0.22	13.88	12.70	18.00
NE	1.02	-0.02	0.25	0.19	5.45	4.32	6.01
ENE	0.93	0.09	0.31	0.26	3.39	2.97	3.41
E	0.92	0.11	0.32	0.27	2.91	2.64	2.42
ESE	1.31	0.13	0.44	0.37	4.74	3.17	3.30
SE	0.86	0.10	0.30	0.26	8.98	8.30	6.89
SSE	0.82	0.10	0.29	0.25	14.79	16.71	11.22
S	0.75	0.14	0.30	0.26	13.54	15.19	14.54
SSW	0.96	0.15	0.36	0.32	7.68	7.82	7.76
SW	1.12	0.17	0.42	0.37	4.65	4.07	5.76
WSW	1.14	0.18	0.43	0.38	3.17	3.34	3.46
W	1.15	0.23	0.47	0.42	1.69	1.33	1.60
WNW	0.85	0.44	0.54	0.52	1.18	1.41	1.44
NW	0.84	0.24	0.40	0.36	2.23	2.04	1.97
NNW	0.73	0.17	0.31	0.28	3.72	4.12	3.57

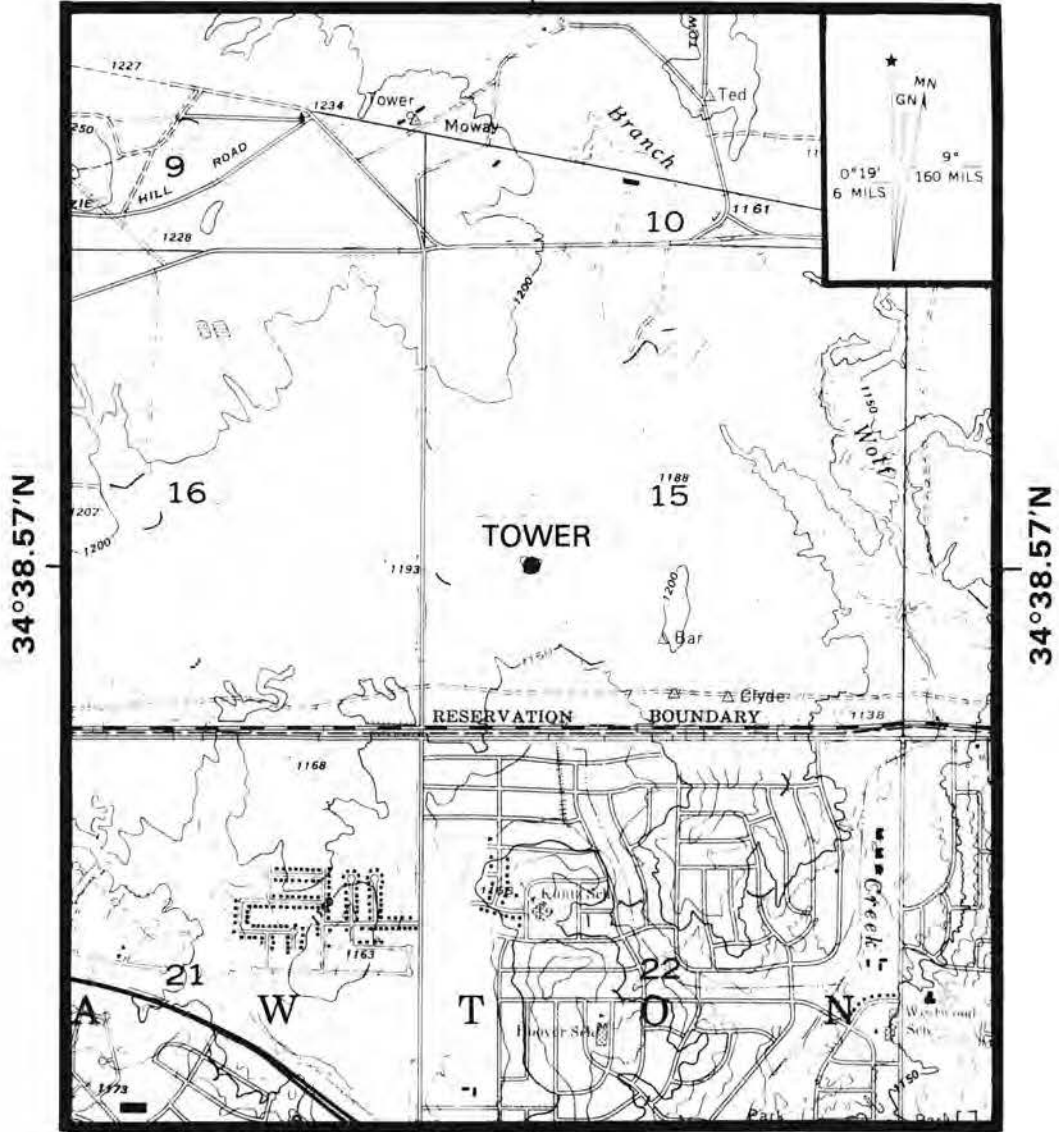
 NOTES:

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

$$2. \text{ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{array}{l} Z=\text{ELEVATION} \\ WS=\text{WIND SPEED} \end{array}$$

FORT SILL, OK

98°27.18'W

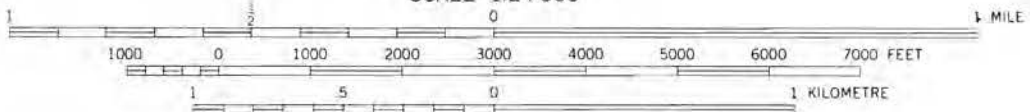


34°38.57'N

34°38.57'N

98°27.18'W

SCALE 1:24 000



CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929



GOODNOE HILLS, WASHINGTON

SITE ID: WA
 SITE LOCATION: GOODNOE HILLS WA.
 DATA : JULY 1980 THROUGH APRIL 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 16056

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	52.9
WD(A)	100.0	54.8
WS(B)	100.0	50.2
WD(B)	100.0	51.5
WS(C)	100.0	52.1
WD(C)	100.0	53.0

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 105.1	7.1	260.0	403.43
	(B) 60.9	6.7	256.9	341.21
	(C) 15.2	5.4	240.4	174.31

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 105.1	30.7	259.1	01/23/82	21:00	(B) 29.5 (C) 23.1
(B) 60.9	29.5	258.9	01/23/82	21:00	(A) 30.7 (C) 23.1
(C) 15.2	23.6	289.4	01/23/82	20:00	(A) 28.7 (B) 29.0

 NOTES:

1. SITE ELEVATION: 805 METERS ABOVE SEA LEVEL.

SITE ID: WA
 SITE LOCATION: GOODNOE HILLS WA.
 DATA : JULY 1980 THROUGH APRIL 1982

 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	277.6	7.0	282.5	5.5	265.1
01:00	7.3	274.6	6.9	277.9	5.4	257.6
02:00	7.4	274.7	6.9	279.2	5.4	259.0
03:00	7.3	274.4	6.9	277.9	5.4	258.7
04:00	7.2	272.8	6.8	273.6	5.3	254.0
05:00	6.9	269.0	6.5	266.0	5.1	247.6
06:00	6.7	264.3	6.3	262.4	4.9	240.0
07:00	6.5	256.8	6.1	253.5	4.8	230.7
08:00	6.3	252.5	5.8	246.3	4.8	227.7
09:00	6.1	242.0	5.7	234.4	5.0	219.8
10:00	6.1	234.7	5.7	226.5	5.0	212.5
11:00	6.3	233.0	6.0	224.5	5.3	208.8
12:00	6.4	234.9	6.2	225.7	5.4	213.6
13:00	6.6	238.6	6.3	228.6	5.5	215.8
14:00	6.7	241.5	6.4	234.0	5.6	222.4
15:00	6.9	248.4	6.6	240.6	5.7	226.3
16:00	7.1	255.4	6.9	252.3	5.7	235.8
17:00	7.5	261.3	7.1	260.9	5.7	243.2
18:00	7.7	268.2	7.3	266.1	5.8	254.2
19:00	7.9	274.5	7.5	270.9	5.9	261.0
20:00	8.0	274.4	7.5	272.7	5.8	260.1
21:00	7.8	276.6	7.4	277.6	5.6	262.8
22:00	7.7	279.7	7.4	283.1	5.6	266.0
23:00	7.5	276.2	7.1	279.2	5.5	262.4

SITE ID: WA
 SITE LOCATION: GOODNOE HILLS WA.
 DATA : JULY 1980 THROUGH APRIL 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL C %
0.0- 0.5	0	0.0	0	0.0
0.5- 1.0	14	0.2	16	0.2
1.0- 1.5	185	2.2	201	2.5
1.5- 2.0	284	3.3	277	3.4
2.0- 2.5	378	4.5	395	4.9
2.5- 3.0	435	5.1	487	6.0
3.0- 3.5	462	5.4	485	6.0
3.5- 4.0	489	5.8	527	6.5
4.0- 4.5	477	5.6	451	5.6
4.5- 5.0	441	5.2	425	5.3
5.0- 5.5	412	4.9	403	5.0
5.5- 6.0	365	4.3	326	4.0
6.0- 6.5	372	4.4	313	3.9
6.5- 7.0	303	3.6	299	3.7
7.0- 7.5	301	3.5	297	3.7
7.5- 8.0	293	3.5	313	3.9
8.0- 8.5	322	3.8	284	3.5
8.5- 9.0	282	3.3	290	3.6
9.0- 9.5	289	3.4	289	3.6
9.5-10.0	427	5.0	426	5.3
10.0-11.0	511	6.0	456	5.7
11.0-12.0	409	4.8	384	4.8
12.0-13.0	338	4.0	260	3.2
13.0-14.0	245	2.9	227	2.8
14.0-15.0	204	2.4	105	1.3
15.0-16.0	102	1.2	44	0.5
16.0-17.0	65	0.8	30	0.4
17.0-18.0	31	0.4	15	0.2
18.0-19.0	22	0.3	12	0.1
19.0-20.0	12	0.1	8	0.1
20.0-21.0	5	0.1	3	0.0
>21.0	17	0.2	14	0.2

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 52.9 50.2 52.1

SITE ID: WA
 SITE LOCATION: GOODNOE HILLS WA.
 DATA : JULY 1980 THROUGH APRIL 1982

 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	0	0.00	0	0.00	2	0.02
1.0	14	0.16	16	0.20	33	0.39
1.5	199	2.34	217	2.69	250	2.99
2.0	483	5.69	494	6.13	705	8.43
2.5	861	10.14	889	11.03	1275	15.24
3.0	1296	15.26	1376	17.07	1955	23.37
3.5	1758	20.70	1861	23.08	2586	30.91
4.0	2247	26.46	2388	29.62	3184	38.06
4.5	2724	32.08	2839	35.21	3732	44.61
5.0	3165	37.27	3264	40.49	4227	50.53
5.5	3577	42.12	3667	45.48	4700	56.18
6.0	3942	46.42	3993	49.53	5148	61.53
6.5	4314	50.80	4306	53.41	5535	66.16
7.0	4617	54.37	4605	57.12	5978	71.46
7.5	4918	57.91	4902	60.80	6516	77.89
8.0	5211	61.36	5215	64.69	6853	81.91
8.5	5533	65.16	5499	68.21	7139	85.33
9.0	5815	68.48	5789	71.81	7402	88.48
9.5	6104	71.88	6078	75.39	7610	90.96
10.0	6531	76.91	6504	80.67	7785	93.06
11.0	7042	82.93	6960	86.33	8045	96.16
12.0	7451	87.74	7344	91.09	8197	97.98
13.0	7789	91.72	7604	94.32	8284	99.02
14.0	8034	94.61	7831	97.13	8316	99.40
15.0	8238	97.01	7936	98.44	8334	99.62
16.0	8340	98.21	7980	98.98	8346	99.76
17.0	8405	98.98	8010	99.35	8353	99.84
18.0	8436	99.34	8025	99.54	8355	99.87
19.0	8458	99.60	8037	99.69	8361	99.94
20.0	8470	99.74	8045	99.79	8363	99.96
21.0	8475	99.80	8048	99.83	8364	99.98
>21.0	8492	100.00	8062	100.00	8366	100.00

SITE ID: WA
 SITE LOCATION: GOODNOE HILLS WA.
 DATA : JULY 1980 THROUGH APRIL 1982

 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	144	374	372	389	351	240	129	5
2	74	110	130	97	75	88	41	1
3	43	47	47	27	26	68	24	2
4	32	18	13	6	16	50	17	1
5	19	8	6	6	1	33	17	1
6	18	2	1	3	1	28	10	0
7	8	4	1	0	0	19	5	0
8	4	1	1	0	0	15	4	0
9	4	0	1	0	0	13	4	0
10	6	0	0	1	0	10	0	0
11	0	0	0	0	0	3	2	0
12	1	0	0	0	0	5	1	0
13	0	0	0	0	0	4	0	0
14	0	0	0	0	0	0	2	0
15	0	0	0	0	0	2	0	0
16	2	0	0	0	0	3	0	0
17	1	0	0	0	0	0	1	0
18	0	0	0	0	0	1	0	0
19	0	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: WA
 SITE LOCATION: GOODNOE HILLS WA.
 DATA : JULY 1980 THROUGH APRIL 1982

 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION

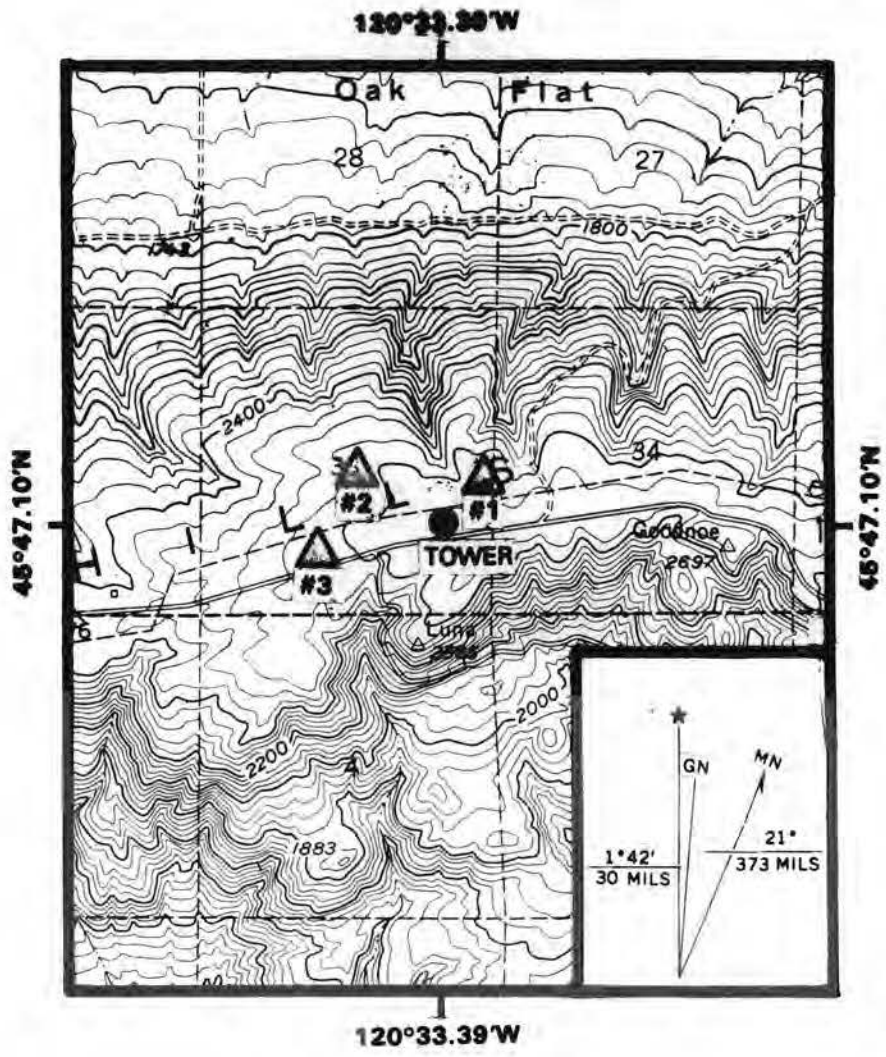
WIND DIR (ELEV A)	ALPHA (A,B)	ALPHA (B,C)	ALPHA (A,C)	ALPHA (A,B,C)	%A	%B	%C
N	0.52	-0.05	0.11	0.08	0.71	1.09	0.72
NNE	-0.01	0.47	0.34	0.36	3.21	3.29	0.79
NE	0.24	0.26	0.25	0.25	3.25	3.36	3.73
ENE	0.05	0.16	0.13	0.13	5.61	5.47	5.14
E	0.16	0.09	0.11	0.11	5.71	5.00	5.65
ESE	0.15	0.11	0.13	0.12	4.59	4.24	4.27
SE	0.04	0.00	0.01	0.01	3.29	3.67	5.20
SSE	0.09	-0.03	0.00	0.00	2.64	3.35	5.33
S	0.10	-0.24	-0.14	-0.16	2.72	3.24	5.30
SSW	0.31	-0.11	0.01	-0.02	3.86	3.76	5.76
SW	0.07	0.03	0.04	0.04	7.32	7.72	9.13
WSW	0.06	0.09	0.08	0.08	13.22	11.76	10.98
W	0.10	0.20	0.17	0.18	23.88	21.95	14.42
WNW	0.11	0.16	0.15	0.15	16.98	15.88	11.27
NW	-0.13	-0.10	-0.11	-0.11	2.43	2.42	5.68
NNW	-0.15	-0.42	-0.35	-0.36	0.55	0.68	3.33

 NOTES:

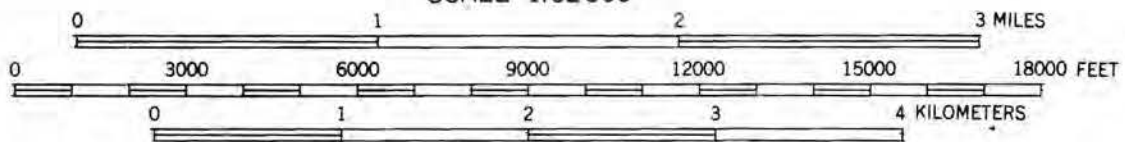
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}^{\text{ALPHA}}$$

$$2. \text{ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{matrix} Z=\text{ELEVATION} \\ WS=\text{WIND SPEED} \end{matrix}$$

GOODNOE HILLS, WA



SCALE 1:62500



CONTOUR INTERVAL 40 FEET



ILIO POINT, HAWAII

SITE ID: IP
 SITE LOCATION: ILIO PT., MOLOKAI, HI
 DATA : JANUARY 1981 THROUGH MAY 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 12384

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	25.8
WD(A)	100.0	23.3
WS(B)	100.0	22.3
WD(B)	100.0	22.3
WS(C)	100.0	30.4
WD(C)	100.0	29.2

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	10.9	85.1	1032.77
(B)	30.0	8.1	84.0	489.20
(C)	9.1	7.3	84.1	369.67

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	19.9	119.1	07/06/81	03:00	(B) 12.7 (C) 8.9
(B) 30.0	16.0	-999.9	05/01/82	02:00	(A) -999.9 (C) 12.4
(C) 9.1	17.2	75.2	02/25/81	17:00	(A) 19.3 (B) 15.7

 NOTES:

1. SITE ELEVATION: 61 METERS ABOVE SEA LEVEL.

SITE ID: IP
 SITE LOCATION: ILIO PT., MOLOKAI, HI
 DATA : JANUARY 1981 THROUGH MAY 1982

 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	10.9	88.7	8.1	87.5	7.0	90.8
01:00	10.7	91.5	7.9	86.9	6.7	91.9
02:00	10.3	89.8	7.8	87.7	6.6	92.5
03:00	10.3	87.9	7.9	86.0	6.6	89.2
04:00	10.3	88.6	7.9	86.4	6.7	89.6
05:00	10.3	93.2	7.7	89.5	6.7	92.1
06:00	10.3	94.8	7.7	91.7	6.7	94.2
07:00	10.4	91.9	8.1	85.2	6.9	87.7
08:00	10.5	84.5	8.3	78.9	7.0	79.5
09:00	10.7	84.0	8.5	78.1	7.3	75.9
10:00	11.0	78.3	8.4	77.4	7.7	74.9
11:00	11.2	78.0	8.5	76.9	7.8	74.7
12:00	11.1	76.9	8.4	79.1	7.8	70.0
13:00	11.2	78.3	8.5	80.4	7.9	73.3
14:00	11.3	75.5	8.3	78.6	7.9	73.8
15:00	11.2	76.0	8.1	80.8	7.8	75.1
16:00	11.3	77.8	8.1	81.4	7.8	77.0
17:00	11.5	81.4	8.3	82.3	7.8	81.2
18:00	11.4	82.3	8.1	82.6	7.7	83.7
19:00	11.3	86.1	8.1	84.4	7.5	87.0
20:00	11.3	85.7	8.1	85.4	7.5	85.7
21:00	11.3	84.6	8.1	85.4	7.3	85.6
22:00	11.1	85.2	8.1	87.7	7.2	87.6
23:00	11.1	88.4	8.1	88.1	7.2	89.1

SITE ID: IP
 SITE LOCATION: ILIO PT., MOLOKAI, HI
 DATA : JANUARY 1981 THROUGH MAY 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL C %
0.0- 0.5	0	0.0	0	0.0
0.5- 1.0	0	0.0	5	0.2
1.0- 1.5	0	0.0	35	1.3
1.5- 2.0	5	0.2	50	1.8
2.0- 2.5	7	0.2	73	2.6
2.5- 3.0	20	0.6	61	2.2
3.0- 3.5	24	0.8	90	3.3
3.5- 4.0	55	1.7	111	4.0
4.0- 4.5	57	1.8	100	3.6
4.5- 5.0	58	1.8	155	5.6
5.0- 5.5	69	2.2	111	4.0
5.5- 6.0	117	3.7	90	3.3
6.0- 6.5	115	3.6	75	2.7
6.5- 7.0	83	2.6	64	2.3
7.0- 7.5	59	1.8	82	3.0
7.5- 8.0	82	2.6	109	3.9
8.0- 8.5	66	2.1	114	4.1
8.5- 9.0	77	2.4	122	4.4
9.0- 9.5	71	2.2	162	5.9
9.5-10.0	107	3.4	157	5.7
10.0-11.0	299	9.4	342	12.4
11.0-12.0	510	16.0	321	11.6
12.0-13.0	438	13.7	207	7.5
13.0-14.0	268	8.4	103	3.7
14.0-15.0	227	7.1	22	0.8
15.0-16.0	184	5.8	4	0.1
16.0-17.0	101	3.2	0	0.0
17.0-18.0	50	1.6	0	0.0
18.0-19.0	26	0.8	0	0.0
19.0-20.0	18	0.6	0	0.0
20.0-21.0	0	0.0	0	0.0
>21.0	0	0.0	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 25.8 22.3 30.4

SITE ID: IP
 SITE LOCATION: ILIO PT., MOLOKAI, HI
 DATA : JANUARY 1981 THROUGH MAY 1982

 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	0	0.00	0	0.00	0	0.00
1.0	0	0.00	5	0.18	12	0.32
1.5	0	0.00	40	1.45	82	2.18
2.0	5	0.16	90	3.25	193	5.12
2.5	12	0.38	163	5.90	341	9.05
3.0	32	1.00	224	8.10	511	13.56
3.5	56	1.75	314	11.36	671	17.81
4.0	111	3.48	425	15.37	797	21.15
4.5	168	5.26	525	18.99	925	24.55
5.0	226	7.08	680	24.59	1064	28.24
5.5	295	9.24	791	28.61	1191	31.61
6.0	412	12.90	881	31.86	1342	35.62
6.5	527	16.50	956	34.58	1479	39.25
7.0	610	19.10	1020	36.89	1629	43.23
7.5	669	20.95	1102	39.86	1817	48.22
8.0	751	23.52	1211	43.80	2013	53.42
8.5	817	25.59	1325	47.92	2231	59.21
9.0	894	28.00	1447	52.33	2454	65.13
9.5	965	30.22	1609	58.19	2695	71.52
10.0	1072	33.57	1766	63.87	2949	78.26
11.0	1371	42.94	2108	76.24	3336	88.54
12.0	1881	58.91	2429	87.85	3571	94.77
13.0	2319	72.63	2636	95.33	3672	97.45
14.0	2587	81.02	2739	99.06	3730	98.99
15.0	2814	88.13	2761	99.86	3756	99.68
16.0	2998	93.89	2765	100.00	3765	99.92
17.0	3099	97.06	2765	100.00	3766	99.95
18.0	3149	98.62	2765	100.00	3768	100.00
19.0	3175	99.44	2765	100.00	3768	100.00
20.0	3193	100.00	2765	100.00	3768	100.00
21.0	3193	100.00	2765	100.00	3768	100.00
>21.0	3193	100.00	2765	100.00	3768	100.00

SITE ID: IP
 SITE LOCATION: ILIO PT., MOLOKAI, HI
 DATA : JANUARY 1981 THROUGH MAY 1982

 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	11	36	51	74	71	116	93	0
2	5	6	13	21	13	36	26	0
3	1	4	3	7	15	19	8	0
4	2	4	3	1	4	22	2	0
5	0	0	0	0	1	7	9	0
6	0	0	0	3	1	10	7	0
7	0	0	1	0	1	6	5	0
8	0	0	0	0	0	0	3	0
9	0	0	0	0	0	3	2	0
10	0	0	0	0	0	5	3	0
11	0	0	0	0	0	3	3	0
12	0	0	0	0	0	2	2	0
13	0	0	0	0	1	2	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	2	0	0
16	0	0	0	0	0	1	0	0
17	0	0	0	0	0	0	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	0	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: IP
 SITE LOCATION: ILIO PT., MOLOKAI, HI
 DATA : JANUARY 1981 THROUGH MAY 1982

 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	1.08	-0.05	0.24	0.18	1.28	0.90	1.06
NNE	1.28	-0.18	0.20	0.12	2.79	1.95	2.23
NE	1.27	-0.32	0.09	0.00	5.79	3.47	7.83
ENE	0.68	0.00	0.18	0.14	22.39	18.08	28.00
E	0.82	0.07	0.27	0.23	29.16	17.83	23.06
ESE	1.00	0.16	0.38	0.33	6.48	7.49	9.55
SE	1.20	0.26	0.50	0.45	2.85	1.95	3.66
SSE	2.12	-0.52	0.17	0.02	1.25	1.05	4.56
S	2.39	-0.29	0.41	0.26	2.25	1.23	2.02
SSW	2.08	-0.10	0.47	0.34	3.16	1.77	2.36
SW	1.90	-0.18	0.36	0.24	3.16	1.66	2.02
WSW	1.89	-0.07	0.44	0.33	1.94	2.06	1.86
W	1.07	0.21	0.43	0.38	1.19	1.19	1.14
WNW	1.26	0.03	0.35	0.28	0.72	0.69	0.66
NW	1.60	-0.07	0.37	0.27	1.16	1.08	0.80
NNW	1.08	-0.13	0.18	0.11	0.88	1.01	0.77

 NOTES:

ALPHA

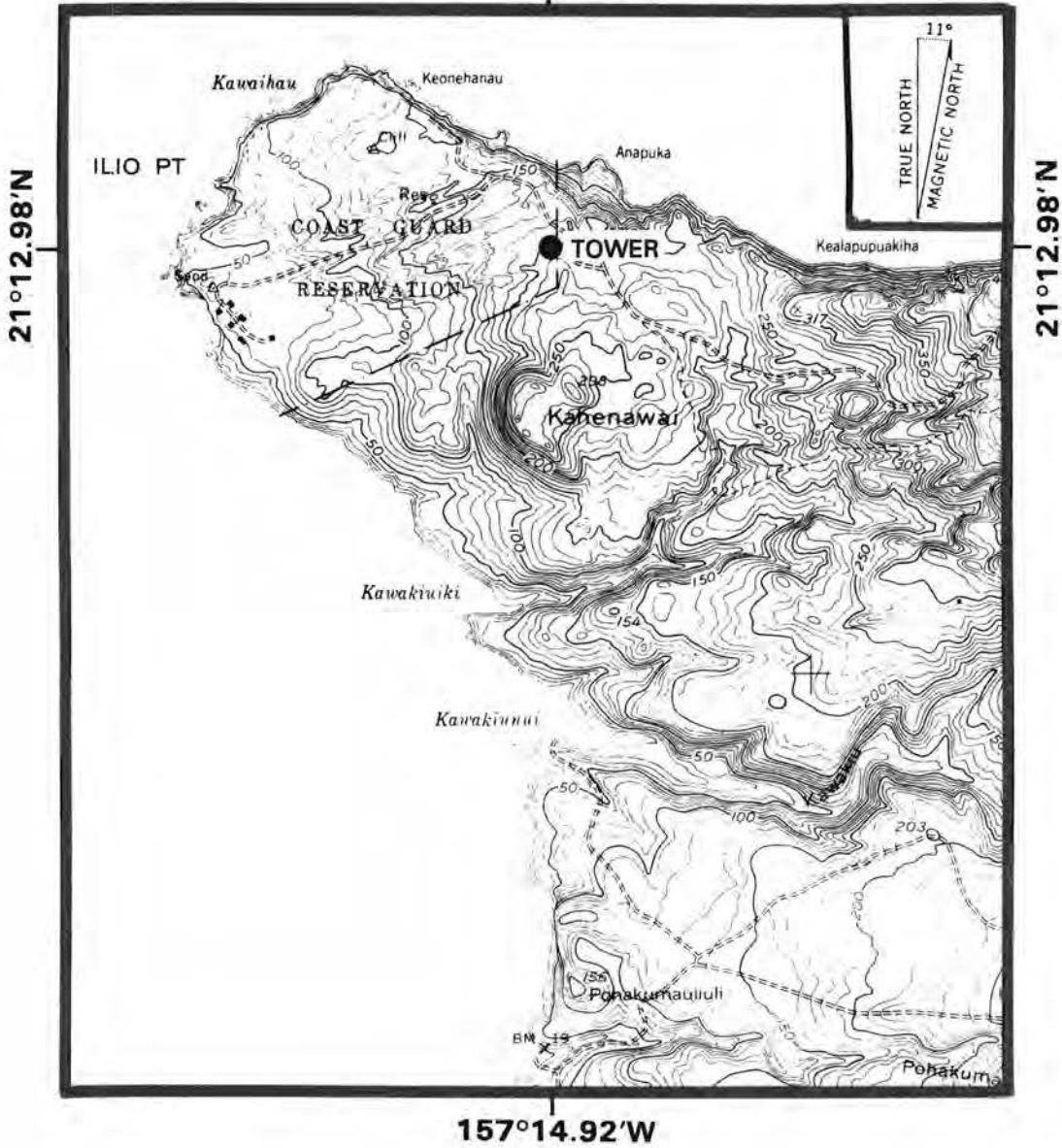
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)}{Z(LO)}$$

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

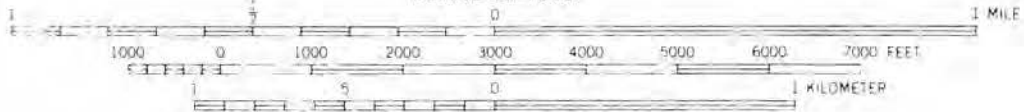
ILIO PT., HAWAII

157°14.92'W



157°14.92'W

SCALE 1:24 000



CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL
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 2 FEET



KAHUA RANCH, HAWAII

SITE ID: KR
 SITE LOCATION: KAHUA RANCH, HI.
 DATA : FEBRUARY 1981 THROUGH FEBRUARY 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 9432

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	28.5
WD(A)	100.0	32.1
WS(B)	100.0	33.0
WD(B)	100.0	25.9
WS(C)	100.0	35.7
WD(C)	100.0	27.7

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	11.3	83.2	1528.71
(B)	30.0	9.2	100.3	974.43
(C)	9.1	8.6	96.8	733.22

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	27.5	81.9	09/21/81	21:00	(B) 18.7 (C) 18.0
(B) 30.0	33.2	-999.9	05/10/81	06:00	(A)-999.9 (C) 21.3
(C) 9.1	27.3	-999.9	11/05/81	05:00	(A)-999.9 (B)-999.9

 NOTES:

1. SITE ELEVATION: 1030 METERS ABOVE SEA LEVEL.

SITE ID: KR
 SITE LOCATION: KAHUA RANCH, HI.
 DATA : FEBRUARY 1981 THROUGH FEBRUARY 1982

 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	11.2	89.4	9.2	101.6	8.5	94.6
01:00	11.4	88.1	9.2	101.9	8.7	97.2
02:00	11.2	88.2	9.2	98.7	8.7	93.4
03:00	11.1	88.0	9.2	95.2	8.6	96.4
04:00	11.2	87.4	9.1	94.7	8.6	99.0
05:00	11.7	83.8	9.5	94.0	9.1	98.0
06:00	11.9	87.2	9.7	96.6	9.0	95.6
07:00	11.9	83.6	9.7	95.1	9.0	95.9
08:00	11.8	87.6	9.1	114.8	8.9	107.8
09:00	11.6	71.7	9.0	97.5	8.4	93.6
10:00	11.4	77.1	8.7	116.2	8.2	114.0
11:00	11.2	73.5	8.7	110.6	8.2	110.3
12:00	10.5	71.8	8.5	196.3	7.8	108.5
13:00	10.3	77.2	8.5	138.3	7.8	92.5
14:00	10.2	77.2	8.4	137.5	7.8	108.4
15:00	10.3	83.4	8.5	144.0	7.8	107.6
16:00	10.6	78.9	8.6	130.3	8.1	91.9
17:00	10.9	85.2	8.9	124.3	8.4	105.1
18:00	11.3	82.0	9.5	103.2	8.7	104.1
19:00	11.9	82.7	10.0	91.4	9.2	93.3
20:00	12.1	82.1	10.0	87.9	9.3	92.0
21:00	12.4	80.0	10.2	87.3	9.3	90.0
22:00	12.0	82.1	10.0	96.0	9.1	90.4
23:00	11.7	87.8	9.7	103.5	9.0	91.6

SITE ID: KR
 SITE LOCATION: KAHUA RANCH, HI.
 DATA : FEBRUARY 1981 THROUGH FEBRUARY 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL C %
0.0- 0.5	9	0.3	0	0.0
0.5- 1.0	17	0.6	28	0.9
1.0- 1.5	24	0.9	39	1.3
1.5- 2.0	28	1.0	53	1.7
2.0- 2.5	32	1.2	84	2.7
2.5- 3.0	38	1.4	132	4.2
3.0- 3.5	59	2.2	133	4.3
3.5- 4.0	93	3.5	134	4.3
4.0- 4.5	95	3.5	114	3.7
4.5- 5.0	85	3.2	122	3.9
5.0- 5.5	72	2.7	126	4.0
5.5- 6.0	76	2.8	103	3.3
6.0- 6.5	78	2.9	110	3.5
6.5- 7.0	87	3.2	100	3.2
7.0- 7.5	90	3.3	103	3.3
7.5- 8.0	73	2.7	91	2.9
8.0- 8.5	79	2.9	78	2.5
8.5- 9.0	64	2.4	90	2.9
9.0- 9.5	72	2.7	97	3.1
9.5-10.0	87	3.2	113	3.6
10.0-11.0	152	5.6	224	7.2
11.0-12.0	165	6.1	171	5.5
12.0-13.0	122	4.5	148	4.7
13.0-14.0	92	3.4	131	4.2
14.0-15.0	82	3.0	109	3.5
15.0-16.0	99	3.7	108	3.5
16.0-17.0	140	5.2	100	3.2
17.0-18.0	92	3.4	70	2.2
18.0-19.0	119	4.4	58	1.9
19.0-20.0	95	3.5	39	1.3
20.0-21.0	77	2.9	26	0.8
>21.0	198	7.4	82	2.6

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 28.5 33.0 35.7

SITE ID: KR
 SITE LOCATION: KAHUA RANCH, HI.
 DATA : FEBRUARY 1981 THROUGH FEBRUARY 1982

 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	9	0.33	0	0.00	0	0.00
1.0	26	0.97	28	0.90	11	0.33
1.5	50	1.86	67	2.15	73	2.17
2.0	78	2.90	120	3.85	168	4.98
2.5	110	4.09	204	6.55	282	8.37
3.0	148	5.50	336	10.78	474	14.06
3.5	207	7.69	469	15.05	672	19.93
4.0	300	11.15	603	19.35	843	25.01
4.5	395	14.68	717	23.01	979	29.04
5.0	480	17.84	839	26.93	1096	32.51
5.5	552	20.51	965	30.97	1199	35.57
6.0	628	23.34	1068	34.27	1289	38.24
6.5	706	26.24	1178	37.80	1363	40.43
7.0	793	29.47	1278	41.01	1449	42.98
7.5	883	32.81	1381	44.32	1530	45.39
8.0	956	35.53	1472	47.24	1644	48.77
8.5	1035	38.46	1550	49.74	1746	51.79
9.0	1099	40.84	1640	52.63	1844	54.70
9.5	1171	43.52	1737	55.74	1958	58.08
10.0	1258	46.75	1850	59.37	2063	61.20
11.0	1410	52.40	2074	66.56	2264	67.16
12.0	1575	58.53	2245	72.05	2475	73.42
13.0	1697	63.06	2393	76.80	2666	79.09
14.0	1789	66.48	2524	81.00	2803	83.15
15.0	1871	69.53	2633	84.50	2948	87.45
16.0	1970	73.21	2741	87.97	3066	90.95
17.0	2110	78.41	2841	91.17	3172	94.10
18.0	2202	81.83	2911	93.42	3243	96.20
19.0	2321	86.25	2969	95.28	3297	97.80
20.0	2416	89.78	3008	96.53	3331	98.81
21.0	2493	92.64	3034	97.37	3353	99.47
>21.0	2691	100.00	3116	100.00	3371	100.00

SITE ID: KR
 SITE LOCATION: KAHUA RANCH, HI.
 DATA : FEBRUARY 1981 THROUGH FEBRUARY 1982

 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	41	78	110	87	107	115	95	25
2	8	25	16	15	17	53	26	8
3	5	5	5	6	6	33	15	7
4	1	0	3	1	1	16	13	2
5	3	0	1	0	0	17	5	7
6	0	0	0	1	0	9	9	4
7	1	0	0	0	0	3	4	1
8	0	0	0	0	0	2	5	1
9	0	0	0	0	0	4	1	1
10	0	0	0	0	0	4	1	1
11	0	0	0	0	0	1	2	0
12	0	0	0	0	0	0	3	0
13	0	0	0	0	0	0	1	0
14	0	0	0	0	0	0	1	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	1	0
18	0	0	0	0	0	0	0	0
19	0	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	1
23	0	0	0	0	0	0	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: KR
 SITE LOCATION: KAHUA RANCH, HI.
 DATA : FEBRUARY 1981 THROUGH FEBRUARY 1982

 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	0.40	-0.08	0.04	0.02	0.82	0.42	0.56
NNE	0.92	-0.30	0.02	-0.05	1.52	1.22	1.25
NE	-0.08	0.18	0.11	0.12	4.91	5.07	3.29
ENE	0.28	0.01	0.08	0.07	28.39	19.83	20.88
E	0.89	0.09	0.30	0.25	24.82	14.70	17.92
ESE	0.93	0.14	0.34	0.30	4.98	4.08	7.42
SE	0.60	0.08	0.22	0.19	3.20	2.44	3.44
SSE	1.43	-0.18	0.24	0.14	2.94	1.99	2.85
S	0.79	0.17	0.33	0.30	3.64	2.18	2.88
SSW	0.30	0.11	0.16	0.15	2.53	2.41	2.76
SW	0.81	0.00	0.21	0.17	4.16	3.95	4.81
WSW	0.90	-0.06	0.19	0.13	3.83	3.02	3.98
W	0.80	0.09	0.28	0.23	2.27	1.77	2.11
WNW	0.90	-0.18	0.10	0.04	1.08	0.61	0.98
NW	0.65	-0.01	0.16	0.12	0.37	0.42	0.33
NNW	0.75	-0.06	0.15	0.11	0.85	0.48	0.30

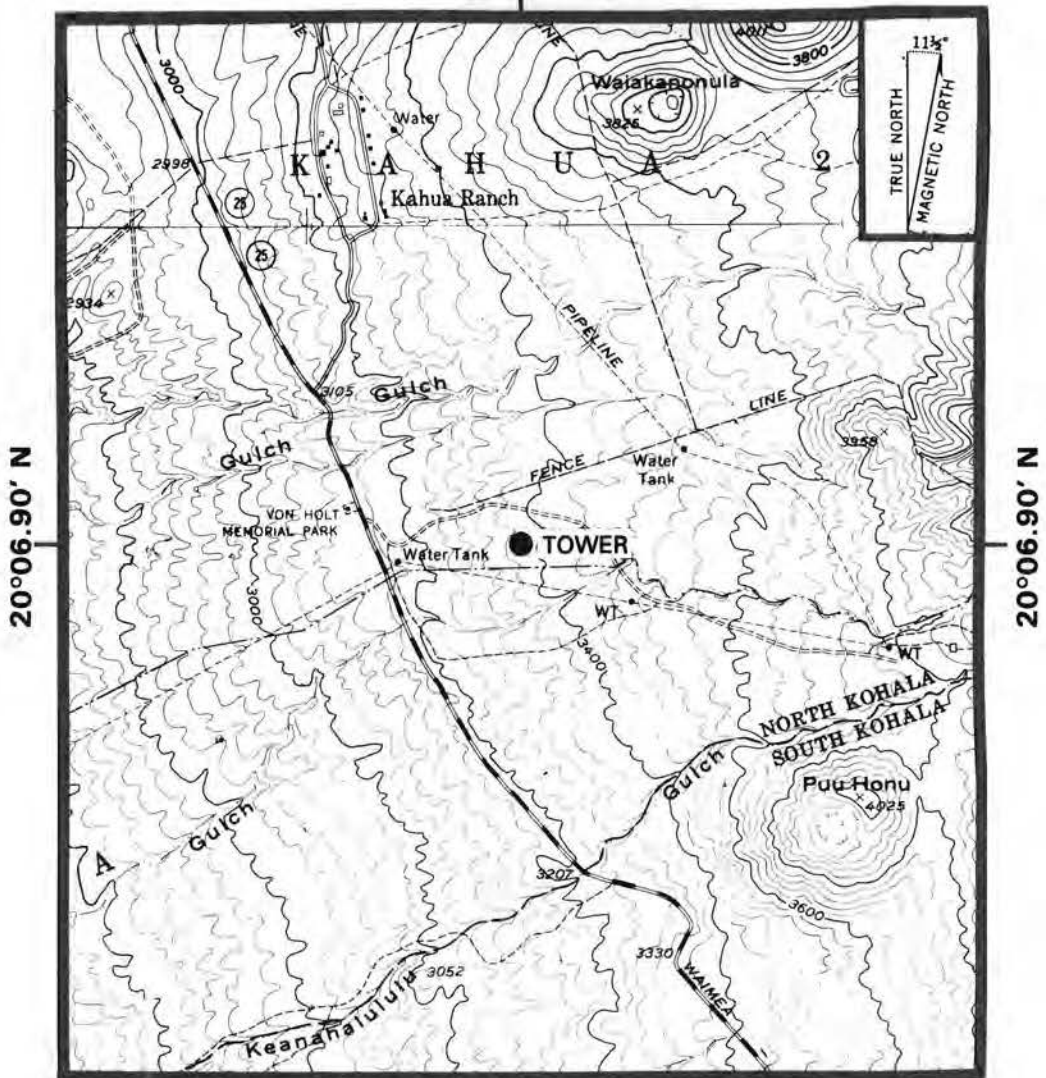
 NOTES:

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

$$2. ALPHA = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))} \quad \text{WHERE; } Z=\text{ELEVATION} \\ \text{WS}=\text{WIND SPEED}$$

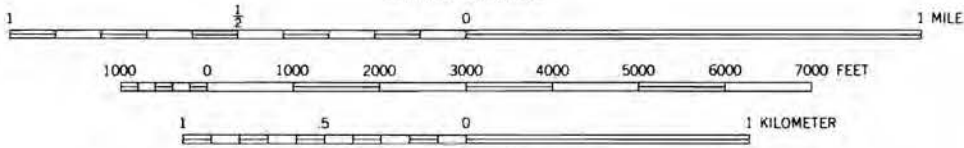
KAHUA RANCH, HAWAII

155°47.03' W

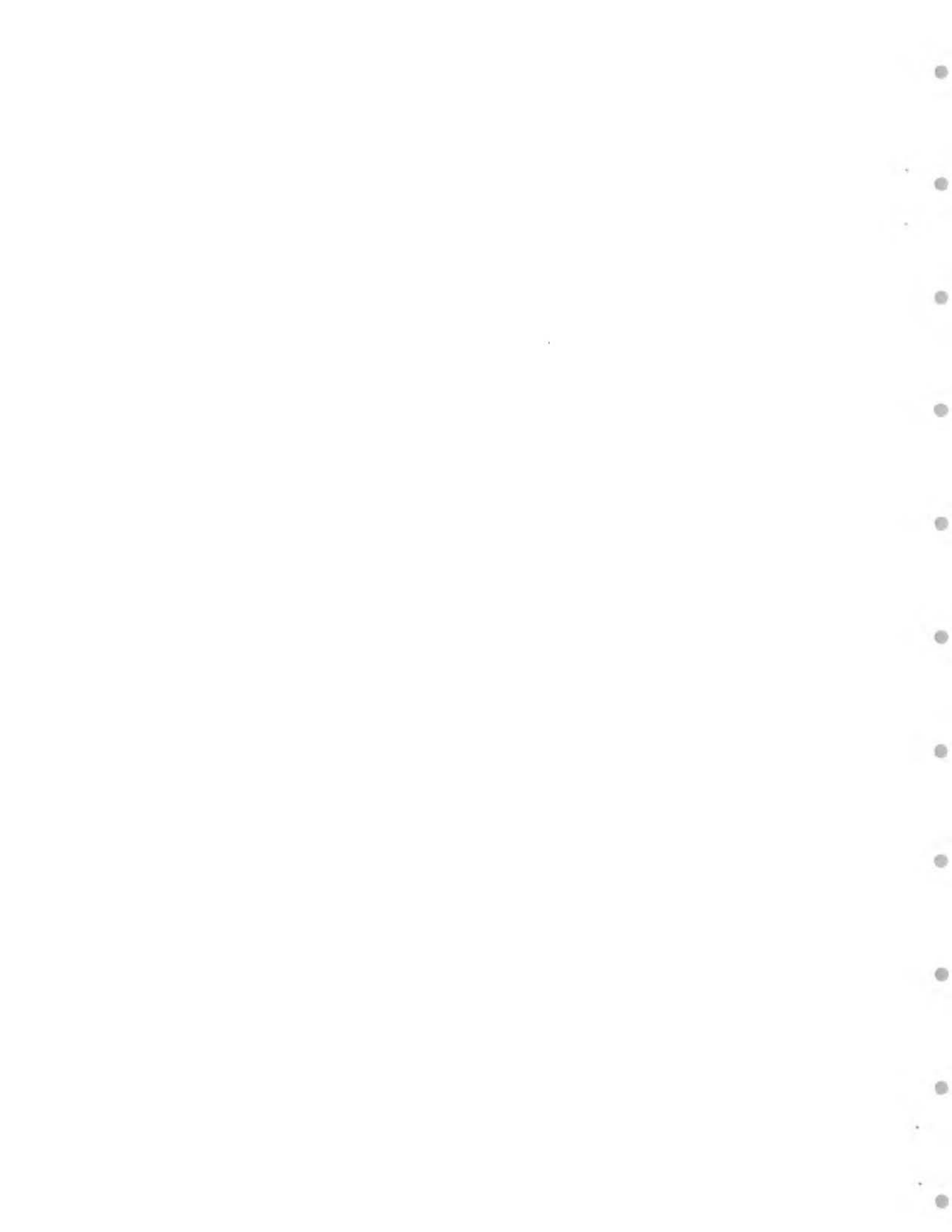


155°47.03' W

SCALE 1:24000



CONTOUR INTERVAL 40 FEET
 DATUM IS MEAN SEA LEVEL
 DEPTH CURVES IN FEET—DATUM IS MEAN LOWER LOW WATER
 SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
 THE AVERAGE RANGE OF TIDE IS APPROXIMATELY 2 FEET



KAHUKU MOD-OA, HAWAII

SITE ID: KU
 SITE LOCATION: KAHUKU MOD-0A, HI.
 DATA : SEPTEMBER 1980 THROUGH JUNE 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 16032

SENSOR	% ON-LINE	% RECOVERED
WS(A)	95.5	36.1
WD(A)	95.5	29.0
WS(B)	95.5	42.7
WD(B)	95.5	35.1
WS(C)	95.5	42.7
WD(C)	95.5	39.2

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	8.1	77.6	567.59
(B)	30.0	8.0	86.0	539.36
(C)	9.1	7.6	90.9	465.67

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	23.5	-999.9	03/05/82	16:00	(B) 22.7 (C) 23.7
(B) 30.0	22.7	181.3	03/05/82	16:00	(A) 23.5 (C) 23.7
(C) 9.1	23.7	185.3	03/05/82	16:00	(A) 23.5 (B) 22.7

 NOTES:

1. SITE ELEVATION: 108 METERS ABOVE SEA LEVEL.

SITE ID: KU
 SITE LOCATION: KAHUKU MOD-0A, HI.
 DATA : SEPTEMBER 1980 THROUGH JUNE 1982

 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	8.1	83.4	7.9	96.4	7.4	100.0
01:00	8.0	85.9	7.9	96.3	7.3	99.7
02:00	7.9	86.2	7.8	96.8	7.2	100.6
03:00	7.8	85.8	7.7	96.3	7.1	100.3
04:00	7.7	85.0	7.6	97.5	7.0	101.9
05:00	7.7	83.3	7.5	95.6	6.9	101.6
06:00	7.7	85.1	7.5	97.2	6.9	104.8
07:00	7.6	86.6	7.5	100.8	7.0	106.0
08:00	7.8	84.7	7.7	94.7	7.3	96.1
09:00	8.0	74.5	8.0	81.3	7.7	84.7
10:00	8.3	68.1	8.4	73.4	8.2	78.3
11:00	8.5	63.1	8.5	67.2	8.3	73.0
12:00	8.5	63.6	8.5	66.7	8.4	73.1
13:00	8.3	64.8	8.5	66.9	8.3	72.8
14:00	8.3	65.8	8.4	69.3	8.2	76.2
15:00	8.2	67.3	8.3	72.7	8.0	76.7
16:00	8.0	68.4	8.0	71.7	7.7	77.3
17:00	8.0	71.1	8.0	75.4	7.6	81.7
18:00	8.0	76.1	7.9	84.1	7.3	86.3
19:00	8.1	79.5	8.0	88.6	7.4	92.8
20:00	8.3	80.9	8.2	91.0	7.5	96.1
21:00	8.3	81.8	8.1	92.1	7.5	97.1
22:00	8.3	82.8	8.2	92.2	7.5	97.4
23:00	8.2	83.6	8.1	94.1	7.4	98.5

SITE ID: KU
 SITE LOCATION: KAHUKU MOD-0A, HI.
 DATA : SEPTEMBER 1980 THROUGH JUNE 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT
0.0- 0.5	5	0.1	3	0.0	7	0.1
0.5- 1.0	27	0.5	26	0.4	27	0.4
1.0- 1.5	52	0.9	96	1.4	99	1.4
1.5- 2.0	130	2.2	171	2.5	208	3.0
2.0- 2.5	142	2.5	183	2.7	238	3.5
2.5- 3.0	241	4.2	239	3.5	284	4.1
3.0- 3.5	250	4.3	267	3.9	268	3.9
3.5- 4.0	232	4.0	256	3.7	275	4.0
4.0- 4.5	194	3.4	253	3.7	312	4.6
4.5- 5.0	193	3.3	279	4.1	333	4.9
5.0- 5.5	262	4.5	279	4.1	291	4.2
5.5- 6.0	260	4.5	300	4.4	323	4.7
6.0- 6.5	279	4.8	286	4.2	297	4.3
6.5- 7.0	266	4.6	298	4.4	250	3.7
7.0- 7.5	269	4.6	293	4.3	268	3.9
7.5- 8.0	262	4.5	289	4.2	310	4.5
8.0- 8.5	260	4.5	323	4.7	330	4.8
8.5- 9.0	221	3.8	298	4.4	294	4.3
9.0- 9.5	249	4.3	294	4.3	303	4.4
9.5-10.0	175	3.0	270	3.9	274	4.0
10.0-11.0	406	7.0	492	7.2	500	7.3
11.0-12.0	364	6.3	456	6.7	427	6.2
12.0-13.0	318	5.5	390	5.7	351	5.1
13.0-14.0	249	4.3	291	4.3	249	3.6
14.0-15.0	179	3.1	244	3.6	170	2.5
15.0-16.0	122	2.1	156	2.3	89	1.3
16.0-17.0	82	1.4	54	0.8	34	0.5
17.0-18.0	49	0.8	24	0.4	16	0.2
18.0-19.0	20	0.3	9	0.1	8	0.1
19.0-20.0	8	0.1	8	0.1	2	0.0
20.0-21.0	8	0.1	4	0.1	3	0.0
>21.0	11	0.2	8	0.1	9	0.1

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 36.1 42.7 42.7

SITE ID: KU
 SITE LOCATION: KAHUKU MOD-0A, HI.
 DATA : SEPTEMBER 1980 THROUGH JUNE 1982

 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	5	0.09	3	0.04	7	0.10
1.0	32	0.55	29	0.42	34	0.50
1.5	84	1.45	125	1.83	133	1.94
2.0	214	3.70	296	4.33	341	4.98
2.5	356	6.15	479	7.00	579	8.45
3.0	597	10.32	718	10.50	863	12.60
3.5	847	14.64	985	14.40	1131	16.51
4.0	1079	18.65	1241	18.15	1406	20.53
4.5	1273	22.01	1494	21.85	1718	25.08
5.0	1466	25.34	1773	25.92	2051	29.95
5.5	1728	29.87	2052	30.00	2342	34.19
6.0	1988	34.36	2352	34.39	2665	38.91
6.5	2267	39.19	2638	38.57	2962	43.25
7.0	2533	43.79	2936	42.93	3212	46.90
7.5	2802	48.44	3229	47.21	3480	50.81
8.0	3064	52.96	3518	51.44	3790	55.34
8.5	3324	57.46	3841	56.16	4120	60.15
9.0	3545	61.28	4139	60.52	4414	64.45
9.5	3794	65.58	4433	64.82	4717	68.87
10.0	3969	68.61	4703	68.77	4991	72.87
11.0	4375	75.63	5195	75.96	5491	80.17
12.0	4739	81.92	5651	82.63	5918	86.41
13.0	5057	87.42	6041	88.33	6269	91.53
14.0	5306	91.72	6332	92.59	6518	95.17
15.0	5485	94.81	6576	96.15	6688	97.65
16.0	5607	96.92	6732	98.44	6777	98.95
17.0	5689	98.34	6786	99.23	6811	99.45
18.0	5738	99.19	6810	99.58	6827	99.68
19.0	5758	99.53	6819	99.71	6835	99.80
20.0	5766	99.67	6827	99.82	6837	99.82
21.0	5774	99.81	6831	99.88	6840	99.87
>21.0	5785	100.00	6839	100.00	6849	100.00

SITE ID: KU
 SITE LOCATION: KAHUKU MOD-0A, HI.
 DATA : SEPTEMBER 1980 THROUGH JUNE 1982

 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	82	161	189	184	195	171	90	5
2	18	61	35	64	60	51	17	0
3	20	24	17	28	25	32	10	1
4	13	12	5	11	11	25	11	0
5	6	6	6	6	4	10	4	1
6	5	5	2	0	4	12	2	0
7	3	0	1	1	1	6	3	0
8	5	0	0	0	2	12	5	0
9	2	0	0	0	0	4	2	0
10	2	0	0	0	0	2	2	0
11	0	0	0	0	0	4	1	0
12	1	0	0	0	0	5	0	0
13	0	0	0	0	0	2	1	0
14	0	0	0	1	0	2	1	0
15	1	0	0	0	0	2	0	0
16	0	0	0	0	0	2	0	0
17	0	0	0	0	0	1	0	0
18	0	0	0	0	0	1	0	0
19	0	0	0	0	0	0	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	0	0
23	0	0	0	0	0	2	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: KU
 SITE LOCATION: KAHUKU MOD-0A, HI.
 DATA : SEPTEMBER 1980 THROUGH JUNE 1982

 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	-0.02	0.05	0.03	0.04	1.73	1.56	1.14
NNE	-0.15	0.05	0.00	0.01	1.76	3.09	2.31
NE	0.30	0.06	0.12	0.11	8.11	5.26	5.59
ENE	-0.03	0.10	0.07	0.08	17.13	19.01	17.77
E	-0.30	-0.02	-0.10	-0.08	11.01	20.73	30.06
ESE	-0.06	-0.01	-0.03	-0.02	4.94	10.15	10.13
SE	0.03	0.01	0.01	0.01	1.64	4.81	5.64
SSE	0.47	0.10	0.20	0.18	1.37	1.89	2.54
S	0.20	0.20	0.20	0.20	1.78	1.54	2.15
SSW	-0.20	0.24	0.12	0.15	1.82	1.75	2.04
SW	0.21	0.13	0.15	0.14	2.18	2.41	2.99
WSW	0.14	0.09	0.11	0.10	2.35	3.13	3.07
W	0.17	0.04	0.07	0.07	1.52	1.83	1.56
WNW	0.34	-0.03	0.07	0.05	1.09	1.35	1.59
NW	0.00	0.20	0.15	0.16	1.71	1.67	1.68
NNW	-0.08	0.10	0.05	0.06	1.28	1.56	1.12

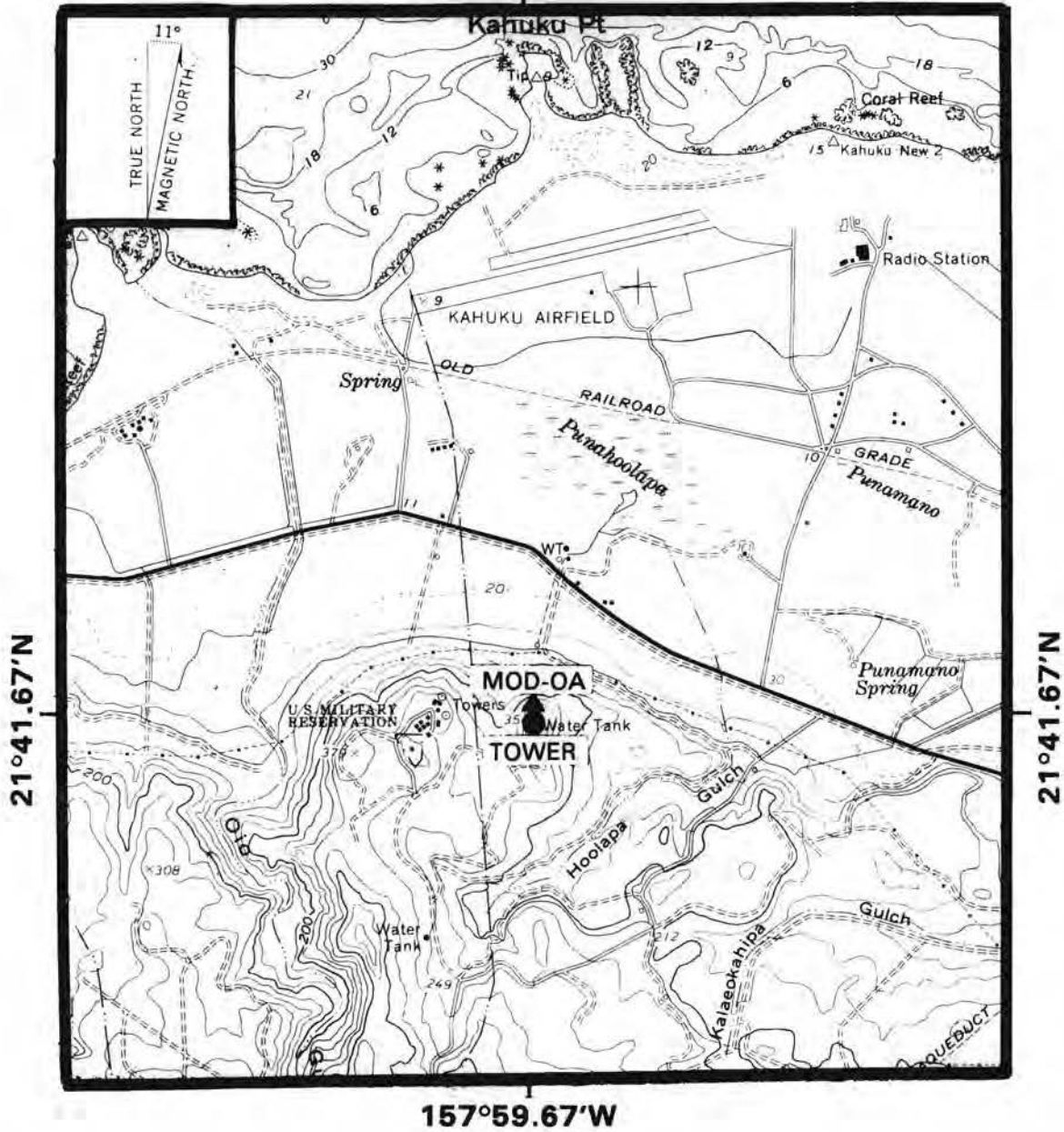
 NOTES:

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

$$2. ALPHA = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))} \quad \text{WHERE; } Z=\text{ELEVATION} \\ \text{WS}=\text{WIND SPEED}$$

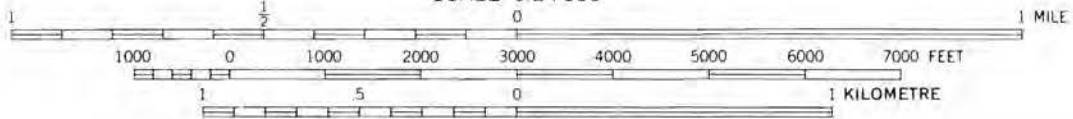
KAHUKU PT, HAWAII

157°59.67'W



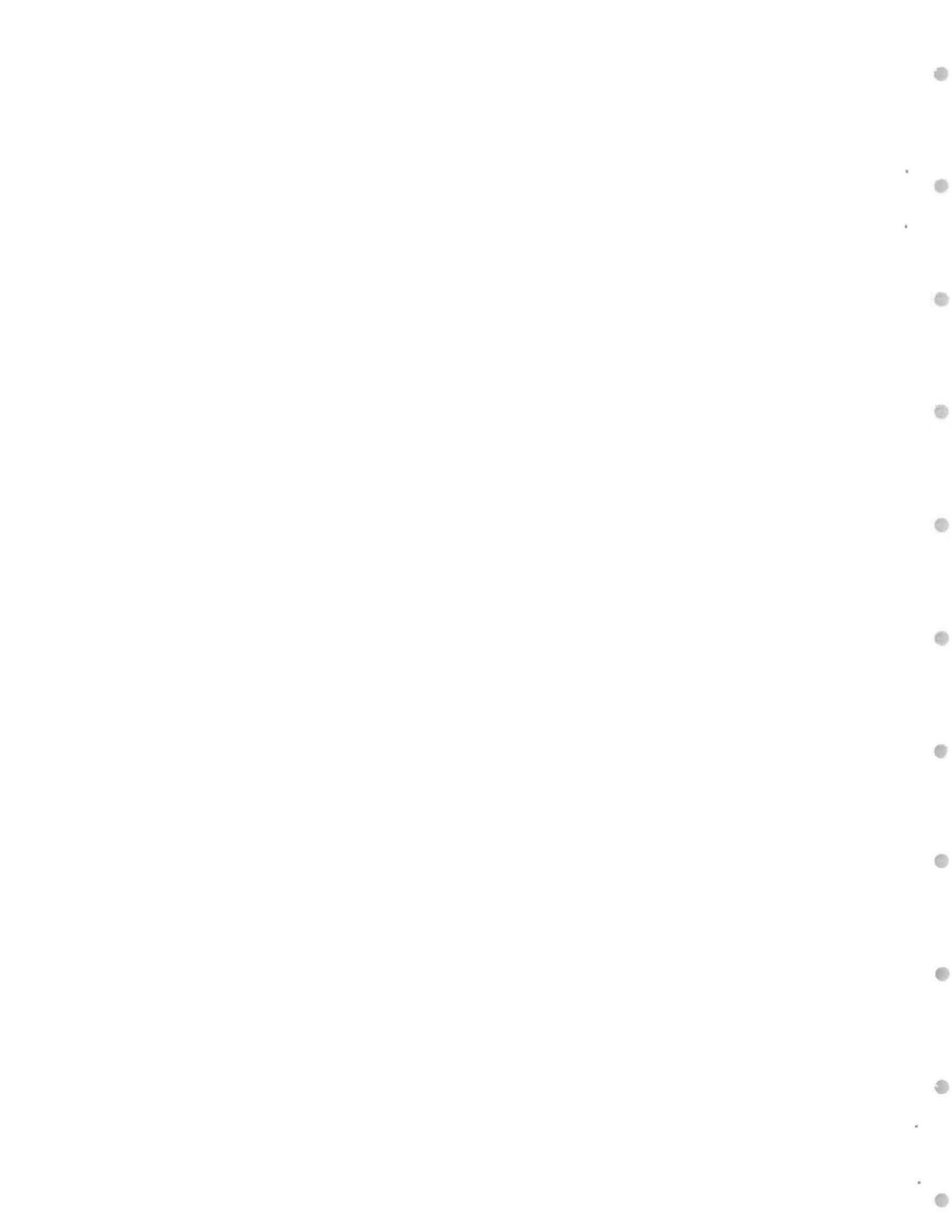
157°59.67'W

SCALE 1:24000





LIVINGSTON, MONTANA



SITE ID: MT
 SITE LOCATION: LIVINGSTON, MT.
 DATA : SEPTEMBER 1980 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 18264

SENSOR	% ON-LINE	% RECOVERED
WS(A)	98.4	71.0
WD(A)	98.4	78.9
WS(B)	98.4	74.2
WD(B)	98.4	77.5
WS(C)	98.4	76.4
WD(C)	98.4	80.3

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	8.4	226.9	794.89
(B)	30.0	7.8	224.8	671.65
(C)	9.1	6.8	217.4	457.81

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	33.1	221.1	01/08/82	03:00	(B) 29.4 (C) 24.3
(B) 30.0	29.8	199.6	12/10/80	08:00	(A) 28.0 (C) 26.4
(C) 9.1	26.5	216.1	01/08/82	04:00	(A) 31.6 (B) 28.5

 NOTES:

1. SITE ELEVATION: 1420 METERS ABOVE SEA LEVEL.

SITE ID: MT
 SITE LOCATION: LIVINGSTON, MT.
 DATA : SEPTEMBER 1980 THROUGH SEPTEMBER 1982

 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	223.3	7.2	220.7	6.1	205.4
01:00	7.9	225.5	7.3	222.8	6.1	206.9
02:00	7.8	223.0	7.3	217.8	6.2	205.5
03:00	7.9	229.0	7.4	222.5	6.3	210.2
04:00	7.9	230.2	7.4	225.7	6.3	211.2
05:00	7.8	226.9	7.3	221.7	6.4	209.1
06:00	8.0	225.7	7.5	219.1	6.5	207.9
07:00	8.2	228.1	7.8	224.1	6.8	218.1
08:00	8.7	227.2	8.2	223.9	7.2	222.3
09:00	9.0	225.6	8.5	223.2	7.6	223.0
10:00	9.1	227.5	8.6	227.1	7.8	227.3
11:00	9.0	230.3	8.5	228.7	7.7	229.6
12:00	9.0	229.7	8.5	230.1	7.7	231.9
13:00	9.0	231.3	8.4	233.2	7.7	235.5
14:00	8.9	234.2	8.3	238.2	7.6	240.8
15:00	9.0	236.5	8.4	241.0	7.6	243.7
16:00	8.9	238.9	8.2	241.6	7.4	240.7
17:00	8.8	232.3	8.1	233.3	7.2	231.1
18:00	8.7	227.3	8.0	227.5	6.9	221.4
19:00	8.4	219.9	7.7	218.8	6.6	211.9
20:00	8.2	220.0	7.6	215.6	6.4	206.4
21:00	8.1	217.1	7.4	214.0	6.2	204.6
22:00	7.9	220.8	7.3	217.4	6.1	201.7
23:00	7.7	221.3	7.1	218.2	6.0	204.9

SITE ID: MT
 SITE LOCATION: LIVINGSTON, MT.
 DATA : SEPTEMBER 1980 THROUGH SEPTEMBER 1982

 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	0	0.0	5	0.0	2	0.0
0.5- 1.0	159	1.2	57	0.4	157	1.1
1.0- 1.5	357	2.8	433	3.2	718	5.1
1.5- 2.0	512	3.9	768	5.7	960	6.9
2.0- 2.5	540	4.2	758	5.6	870	6.2
2.5- 3.0	554	4.3	752	5.5	790	5.7
3.0- 3.5	505	3.9	636	4.7	696	5.0
3.5- 4.0	454	3.5	590	4.4	592	4.2
4.0- 4.5	458	3.5	523	3.9	596	4.3
4.5- 5.0	423	3.3	495	3.7	563	4.0
5.0- 5.5	438	3.4	470	3.5	569	4.1
5.5- 6.0	443	3.4	465	3.4	545	3.9
6.0- 6.5	461	3.6	486	3.6	548	3.9
6.5- 7.0	556	4.3	473	3.5	510	3.7
7.0- 7.5	583	4.5	490	3.6	540	3.9
7.5- 8.0	620	4.8	472	3.5	479	3.4
8.0- 8.5	507	3.9	481	3.5	494	3.5
8.5- 9.0	478	3.7	466	3.4	482	3.5
9.0- 9.5	450	3.5	420	3.1	438	3.1
9.5-10.0	440	3.4	419	3.1	401	2.9
10.0-11.0	739	5.7	738	5.4	614	4.4
11.0-12.0	640	4.9	605	4.5	472	3.4
12.0-13.0	467	3.6	419	3.1	385	2.8
13.0-14.0	359	2.8	376	2.8	288	2.1
14.0-15.0	296	2.3	314	2.3	265	1.9
15.0-16.0	246	1.9	233	1.7	235	1.7
16.0-17.0	177	1.4	219	1.6	176	1.3
17.0-18.0	169	1.3	200	1.5	163	1.2
18.0-19.0	194	1.5	192	1.4	109	0.8
19.0-20.0	158	1.2	173	1.3	94	0.7
20.0-21.0	139	1.1	108	0.8	75	0.5
>21.0	450	3.5	314	2.3	122	0.9

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 71.0 74.2 76.4

SITE ID: MT
 SITE LOCATION: LIVINGSTON, MT.
 DATA : SEPTEMBER 1980 THROUGH SEPTEMBER 1982

 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	0	0.00	5	0.04	2	0.01
1.0	159	1.23	62	0.46	159	1.14
1.5	516	3.98	495	3.65	877	6.29
2.0	1028	7.92	1263	9.32	1837	13.17
2.5	1568	12.09	2021	14.92	2707	19.41
3.0	2122	16.36	2773	20.46	3497	25.07
3.5	2627	20.25	3409	25.16	4193	30.06
4.0	3081	23.75	3999	29.51	4785	34.31
4.5	3539	27.28	4522	33.37	5381	38.58
5.0	3962	30.54	5017	37.03	5944	42.62
5.5	4400	33.92	5487	40.49	6513	46.69
6.0	4843	37.33	5952	43.93	7058	50.60
6.5	5304	40.89	6438	47.51	7606	54.53
7.0	5860	45.17	6911	51.00	8116	58.19
7.5	6443	49.67	7401	54.62	8656	62.06
8.0	7063	54.45	7873	58.10	9135	65.49
8.5	7570	58.36	8354	61.65	9629	69.03
9.0	8048	62.04	8820	65.09	10111	72.49
9.5	8498	65.51	9240	68.19	10549	75.63
10.0	8938	68.90	9659	71.28	10950	78.51
11.0	9677	74.60	10397	76.73	11564	82.91
12.0	10317	79.53	11002	81.20	12036	86.29
13.0	10784	83.13	11421	84.29	12421	89.05
14.0	11143	85.90	11797	87.06	12709	91.12
15.0	11439	88.18	12111	89.38	12974	93.02
16.0	11685	90.08	12344	91.10	13209	94.70
17.0	11862	91.44	12563	92.72	13385	95.96
18.0	12031	92.75	12763	94.19	13548	97.13
19.0	12225	94.24	12955	95.61	13657	97.91
20.0	12383	95.46	13128	96.89	13751	98.59
21.0	12522	96.53	13236	97.68	13826	99.13
>21.0	12972	100.00	13550	100.00	13948	100.00

SITE ID: MT
 SITE LOCATION: LIVINGSTON, MT.
 DATA : SEPTEMBER 1980 THROUGH SEPTEMBER 1982

 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	338	576	586	575	575	504	236	65
2	100	120	97	90	108	218	120	20
3	45	23	20	24	29	137	61	8
4	41	9	3	7	16	77	38	7
5	28	2	1	1	5	56	39	5
6	17	1	0	0	1	47	23	4
7	19	0	0	0	0	33	19	3
8	13	0	0	0	2	23	11	1
9	3	0	0	0	0	18	7	2
10	6	0	0	0	0	13	6	1
11	3	0	0	0	0	12	3	2
12	3	0	0	0	0	8	3	2
13	0	0	0	0	1	7	2	1
14	0	0	0	0	0	1	1	0
15	0	0	0	0	0	1	1	0
16	0	0	0	0	0	2	1	1
17	0	0	0	0	0	3	1	0
18	1	0	0	0	0	0	0	0
19	0	0	0	0	0	0	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	0	0
23	0	0	0	0	0	0	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: MT
 SITE LOCATION: LIVINGSTON, MT.
 DATA : SEPTEMBER 1980 THROUGH SEPTEMBER 1982

 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	0.32	0.07	0.14	0.12	2.11	2.08	1.91
NNE	0.28	0.12	0.16	0.15	1.52	1.67	1.74
NE	0.44	0.03	0.13	0.11	1.54	2.17	2.16
ENE	-0.29	-0.01	-0.09	-0.07	2.75	4.54	4.62
E	0.09	0.12	0.11	0.11	6.91	8.39	8.25
ESE	0.38	0.17	0.23	0.21	7.65	5.62	5.89
SE	0.61	0.18	0.30	0.27	4.42	3.28	3.79
SSE	-0.71	0.50	0.18	0.25	1.71	1.73	2.60
S	-0.87	0.80	0.36	0.46	1.65	2.51	2.34
SSW	0.12	0.12	0.12	0.12	10.80	12.16	13.16
SW	0.43	0.05	0.15	0.13	16.60	14.80	16.96
WSW	0.16	0.08	0.10	0.10	16.33	16.09	16.02
W	0.21	0.06	0.10	0.09	13.10	12.07	11.07
WNW	0.14	0.06	0.08	0.08	5.84	5.47	4.85
NW	0.25	0.03	0.08	0.07	3.11	2.93	2.57
NNW	0.42	0.05	0.15	0.13	2.27	2.10	2.02

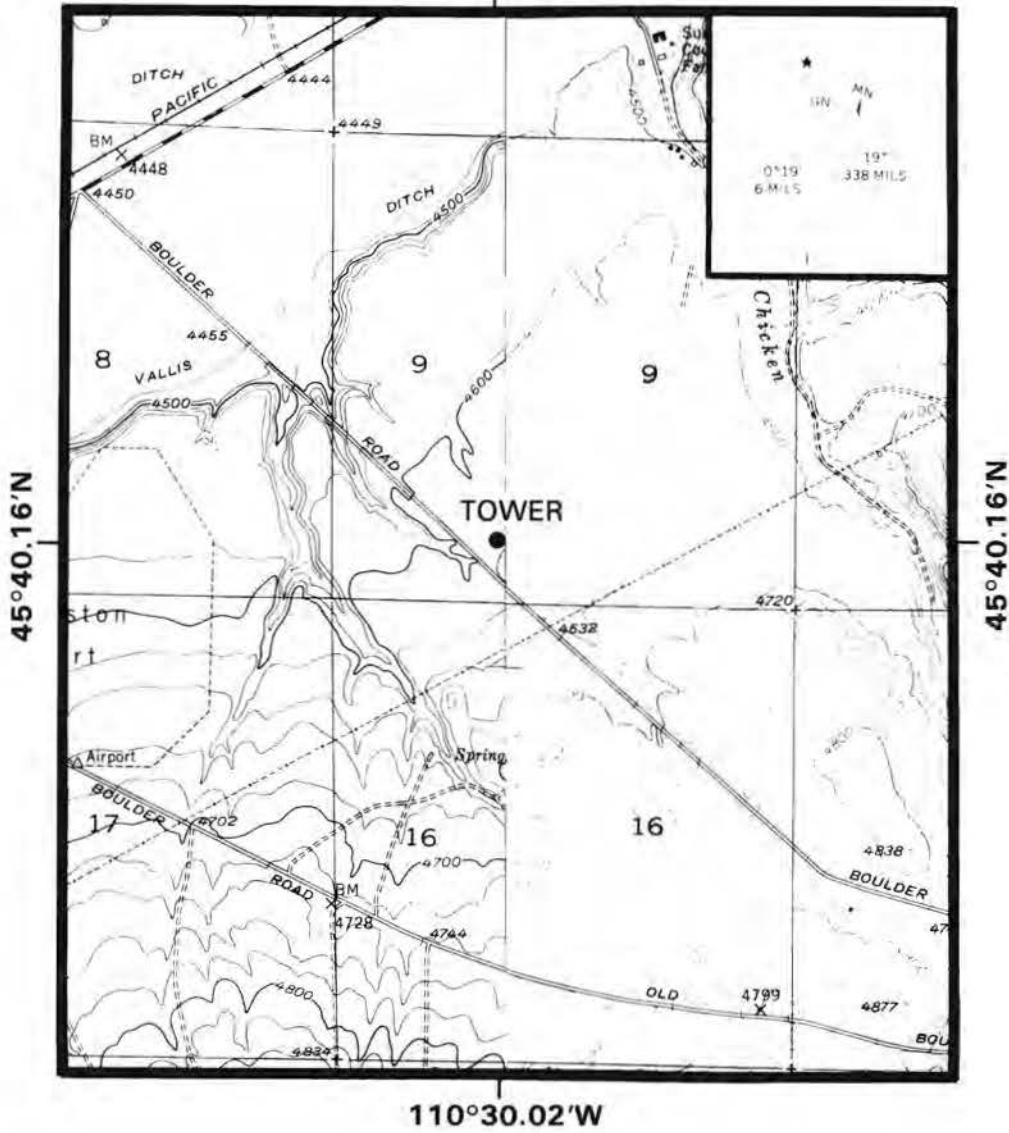
 NOTES:

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

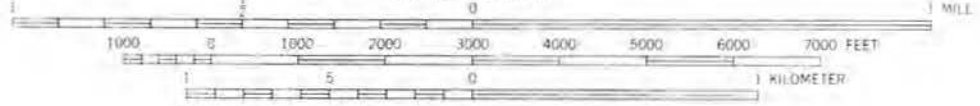
$$2. ALPHA = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))} \quad \text{WHERE; } Z = \text{ELEVATION} \\ \text{WS} = \text{WIND SPEED}$$

LIVINGSTON, MT

110°30.02'W



SCALE 1:24000



CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929



MEADE, KANSAS



SITE ID: MK
 SITE LOCATION: MEADE, KANSAS
 DATA : JULY 1980 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 19728

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	69.4
WD(A)	100.0	78.8
WS(B)	100.0	64.0
WD(B)	100.0	67.3
WS(C)	100.0	76.7
WD(C)	100.0	80.0

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	8.3	148.3	484.74
(B)	30.0	7.1	121.2	363.18
(C)	9.1	5.7	148.2	214.60

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	24.6	279.3	05/26/82	15:00	(B)-999.9 (C) 16.0
(B) 30.0	24.2	-999.9	11/15/81	12:00	(A)-999.9 (C) 12.9
(C) 9.1	19.8	356.4	03/21/81	16:00	(A) 23.2 (B) 22.0

 NOTES:

1. SITE ELEVATION: 756 METERS ABOVE SEA LEVEL.

SITE ID: MK
 SITE LOCATION: MEADE, KANSAS
 DATA : JULY 1980 THROUGH SEPTEMBER 1982

 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	8.2	147.6	6.5	131.4	5.1	147.3
01:00	8.0	148.4	6.3	132.9	4.9	153.9
02:00	7.9	157.0	6.4	142.8	4.9	157.9
03:00	7.8	163.4	6.4	142.6	4.9	162.2
04:00	7.8	165.3	6.3	111.1	4.8	156.3
05:00	7.7	166.2	6.2	92.9	4.7	176.3
06:00	7.7	166.0	6.3	74.1	4.8	186.1
07:00	7.6	171.3	6.3	20.3	5.1	201.7
08:00	7.8	178.0	6.7	15.5	5.7	212.1
09:00	8.1	187.1	7.2	359.6	6.2	214.9
10:00	8.4	183.8	7.6	19.2	6.6	211.4
11:00	8.5	174.4	7.9	97.3	6.7	196.4
12:00	8.5	172.3	8.1	132.0	6.8	190.5
13:00	8.6	167.2	8.1	139.1	6.8	183.9
14:00	8.8	167.9	8.0	152.3	6.9	185.3
15:00	8.9	156.5	8.0	144.7	6.9	166.6
16:00	8.9	149.9	7.9	132.9	6.8	151.9
17:00	8.8	141.8	7.7	124.6	6.5	135.4
18:00	8.7	128.3	7.4	114.2	6.0	118.2
19:00	8.7	124.0	7.1	110.4	5.6	114.2
20:00	8.7	122.7	7.0	111.2	5.4	113.7
21:00	8.7	123.2	7.0	114.0	5.3	117.7
22:00	8.6	129.4	7.0	122.3	5.3	127.7
23:00	8.5	137.7	6.7	128.1	5.2	137.8

SITE ID: MK
 SITE LOCATION: MEADE, KANSAS
 DATA : JULY 1980 THROUGH SEPTEMBER 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL C %
0.0- 0.5	0	0.0	2	0.0
0.5- 1.0	7	0.1	108	0.9
1.0- 1.5	66	0.5	141	1.1
1.5- 2.0	98	0.7	235	1.9
2.0- 2.5	110	0.8	352	2.8
2.5- 3.0	175	1.3	468	3.7
3.0- 3.5	235	1.7	540	4.3
3.5- 4.0	336	2.5	648	5.1
4.0- 4.5	450	3.3	678	5.4
4.5- 5.0	504	3.7	707	5.6
5.0- 5.5	572	4.2	727	5.8
5.5- 6.0	676	4.9	726	5.8
6.0- 6.5	770	5.6	728	5.8
6.5- 7.0	792	5.8	690	5.5
7.0- 7.5	927	6.8	757	6.0
7.5- 8.0	1022	7.5	656	5.2
8.0- 8.5	1027	7.5	588	4.7
8.5- 9.0	899	6.6	512	4.1
9.0- 9.5	772	5.6	547	4.3
9.5-10.0	673	4.9	512	4.1
10.0-11.0	1061	7.7	719	5.7
11.0-12.0	668	4.9	476	3.8
12.0-13.0	570	4.2	364	2.9
13.0-14.0	516	3.8	240	1.9
14.0-15.0	372	2.7	190	1.5
15.0-16.0	169	1.2	119	0.9
16.0-17.0	95	0.7	60	0.5
17.0-18.0	55	0.4	43	0.3
18.0-19.0	34	0.2	32	0.3
19.0-20.0	20	0.1	18	0.1
20.0-21.0	9	0.1	26	0.2
>21.0	20	0.1	16	0.1

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 69.4 64.0 76.7

SITE ID: MK
 SITE LOCATION: MEADE, KANSAS
 DATA : JULY 1980 THROUGH SEPTEMBER 1982

 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	0	0.00	2	0.02	0	0.00
1.0	7	0.05	110	0.87	127	0.84
1.5	73	0.53	251	1.99	582	3.84
2.0	171	1.25	486	3.85	1215	8.03
2.5	281	2.05	838	6.64	2054	13.57
3.0	456	3.33	1306	10.34	3014	19.91
3.5	691	5.04	1846	14.62	4003	26.44
4.0	1027	7.50	2494	19.75	5014	33.12
4.5	1477	10.78	3172	25.12	6048	39.95
5.0	1981	14.46	3879	30.72	7123	47.05
5.5	2553	18.64	4606	36.48	8131	53.71
6.0	3229	23.57	5332	42.23	9091	60.05
6.5	3999	29.19	6060	48.00	9925	65.55
7.0	4791	34.97	6750	53.47	10670	70.48
7.5	5718	41.74	7507	59.46	11305	74.67
8.0	6740	49.20	8163	64.66	11854	78.30
8.5	7767	56.69	8751	69.31	12415	82.00
9.0	8666	63.26	9263	73.37	12848	84.86
9.5	9438	68.89	9810	77.70	13228	87.37
10.0	10111	73.80	10322	81.76	13567	89.61
11.0	11172	81.55	11041	87.45	14109	93.19
12.0	11840	86.42	11517	91.22	14524	95.93
13.0	12410	90.58	11881	94.11	14791	97.69
14.0	12926	94.35	12121	96.01	14938	98.67
15.0	13298	97.07	12311	97.51	15026	99.25
16.0	13467	98.30	12430	98.46	15075	99.57
17.0	13562	98.99	12490	98.93	15099	99.73
18.0	13617	99.39	12533	99.27	15125	99.90
19.0	13651	99.64	12565	99.52	15136	99.97
20.0	13671	99.79	12583	99.67	15140	100.00
21.0	13680	99.85	12609	99.87	15140	100.00
>21.0	13700	100.00	12625	100.00	15140	100.00

SITE ID: MK
 SITE LOCATION: MEADE, KANSAS
 DATA : JULY 1980 THROUGH SEPTEMBER 1982

 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	94	276	415	555	679	543	193	9
2	34	71	113	169	190	173	60	4
3	11	23	36	48	60	102	30	1
4	14	12	17	17	25	80	23	2
5	4	1	8	8	11	43	28	0
6	3	2	3	4	9	51	10	0
7	4	0	0	2	4	43	11	0
8	1	0	0	0	1	30	14	0
9	0	0	0	0	0	29	7	0
10	0	0	0	1	0	18	2	0
11	0	0	0	0	0	12	2	0
12	0	0	1	0	0	11	4	0
13	0	0	0	0	0	14	3	0
14	0	0	0	0	0	4	2	0
15	0	0	0	0	0	4	1	0
16	0	0	0	0	0	1	0	0
17	0	0	0	0	0	6	0	0
18	0	0	0	0	0	2	0	0
19	0	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: MK
 SITE LOCATION: MEADE, KANSAS
 DATA : JULY 1980 THROUGH SEPTEMBER 1982

 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	0.22	0.17	0.18	0.18	8.84	8.74	9.48
NNE	0.33	0.19	0.23	0.22	7.07	5.77	6.43
NE	0.41	0.20	0.25	0.24	3.81	3.27	2.75
ENE	0.50	0.27	0.33	0.32	3.01	2.40	3.20
E	0.80	0.21	0.37	0.33	3.31	2.48	3.77
ESE	1.10	0.06	0.33	0.27	6.91	4.21	6.45
SE	0.46	0.14	0.22	0.20	9.09	7.78	10.13
SSE	0.29	0.16	0.19	0.18	10.68	10.24	11.53
S	0.23	0.24	0.23	0.23	10.78	8.51	9.76
SSW	0.24	0.25	0.25	0.25	9.34	8.57	8.41
SW	0.35	0.30	0.32	0.31	4.19	4.09	3.33
WSW	0.80	0.18	0.34	0.31	2.24	2.11	2.05
W	0.81	0.08	0.27	0.23	1.79	1.62	2.25
WNW	0.64	0.19	0.31	0.28	2.53	2.53	3.20
NW	0.32	0.11	0.16	0.15	3.81	3.12	4.58
NNW	0.14	0.20	0.18	0.19	6.07	6.11	8.26

 NOTES:

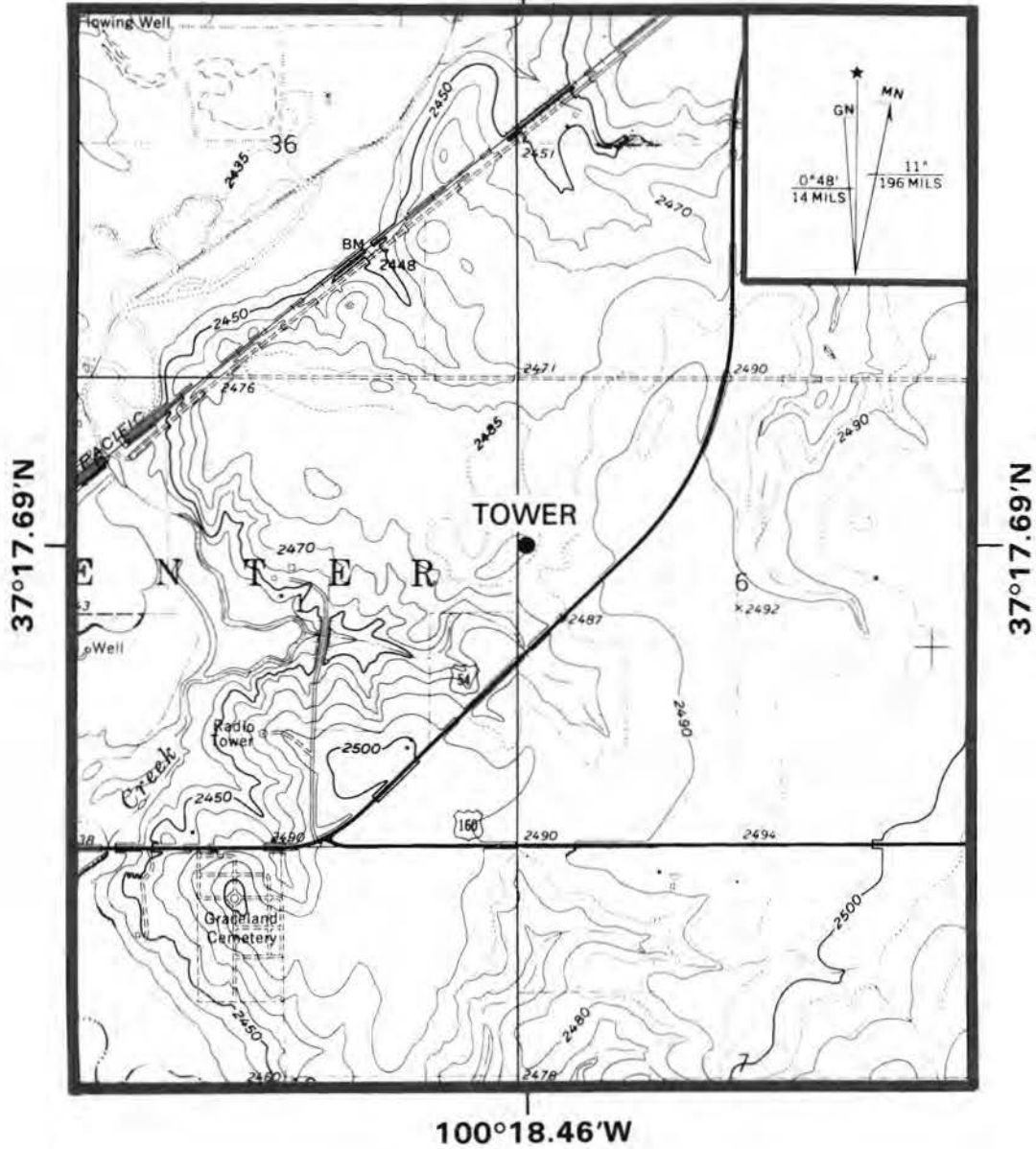
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)^{ALPHA}}{Z(LO)^{ALPHA}}$$

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

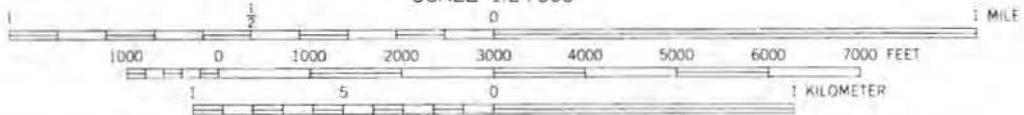
MEADE, KS

100°18.46'W



100°18.46'W

SCALE 1:24000



CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL



MINOT, NORTH DAKOTA



SITE ID: MR
 SITE LOCATION: MINOT, ND.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 17520

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	84.8
WD(A)	100.0	92.2
WS(B)	100.0	85.3
WD(B)	100.0	90.4
WS(C)	100.0	82.8
WD(C)	100.0	92.7

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	8.4	272.7	533.58
(B)	30.0	7.8	269.8	439.69
(C)	9.1	6.5	285.8	271.89

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	23.4	291.2	03/12/82	21:00	(B) 23.2 (C) 19.8
(B) 30.0	23.2	299.2	03/12/82	21:00	(A) 23.4 (C) 19.8
(C) 9.1	20.4	295.9	03/12/82	18:00	(A) 23.1 (B) 22.8

 NOTES:

1. SITE ELEVATION: 675 METERS ABOVE SEA LEVEL.

SITE ID: MR
 SITE LOCATION: MINOT, ND.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 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	8.8	257.8	8.0	250.8	6.3	258.9
01:00	8.8	252.9	8.0	245.8	6.3	260.0
02:00	8.8	254.7	8.0	249.9	6.3	264.4
03:00	8.8	252.1	7.9	249.2	6.2	262.7
04:00	8.8	253.3	7.9	252.1	6.3	264.4
05:00	8.7	259.9	7.9	257.9	6.2	270.2
06:00	8.6	260.9	7.8	259.7	6.2	272.9
07:00	8.4	264.5	7.6	263.5	6.2	277.6
08:00	8.1	268.3	7.5	267.1	6.4	280.1
09:00	7.9	271.3	7.4	270.1	6.6	285.4
10:00	7.9	277.1	7.5	277.0	6.8	293.7
11:00	7.9	280.2	7.6	281.2	6.8	298.2
12:00	8.0	280.6	7.7	282.3	7.0	299.8
13:00	8.1	275.2	7.8	277.8	7.1	294.2
14:00	8.2	277.0	7.9	281.0	7.1	296.7
15:00	8.2	279.0	7.9	280.0	7.0	295.1
16:00	8.2	280.6	7.9	280.4	6.9	298.6
17:00	8.2	286.9	7.8	286.9	6.8	305.0
18:00	8.3	292.9	7.8	291.8	6.7	311.6
19:00	8.2	298.5	7.6	295.1	6.4	316.1
20:00	8.2	299.3	7.6	287.6	6.1	318.1
21:00	8.4	298.2	7.7	283.3	6.1	308.8
22:00	8.6	275.8	7.9	261.6	6.2	268.2
23:00	8.8	265.0	8.0	252.5	6.3	264.6

SITE ID: MR
 SITE LOCATION: MINOT, ND.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 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	0	0.0	0	0.0	0	0.0
0.5- 1.0	21	0.1	43	0.3	71	0.5
1.0- 1.5	66	0.4	74	0.5	146	1.0
1.5- 2.0	154	1.0	122	0.8	291	2.0
2.0- 2.5	191	1.3	326	2.2	426	2.9
2.5- 3.0	258	1.7	322	2.2	593	4.1
3.0- 3.5	410	2.8	481	3.2	737	5.1
3.5- 4.0	526	3.5	557	3.7	909	6.3
4.0- 4.5	580	3.9	726	4.9	871	6.0
4.5- 5.0	620	4.2	735	4.9	936	6.4
5.0- 5.5	648	4.4	806	5.4	979	6.7
5.5- 6.0	677	4.6	788	5.3	1032	7.1
6.0- 6.5	774	5.2	852	5.7	977	6.7
6.5- 7.0	784	5.3	846	5.7	929	6.4
7.0- 7.5	778	5.2	857	5.7	809	5.6
7.5- 8.0	756	5.1	797	5.3	750	5.2
8.0- 8.5	818	5.5	820	5.5	671	4.6
8.5- 9.0	786	5.3	783	5.2	552	3.8
9.0- 9.5	727	4.9	761	5.1	528	3.6
9.5-10.0	727	4.9	696	4.7	460	3.2
10.0-11.0	1217	8.2	1110	7.4	634	4.4
11.0-12.0	1014	6.8	766	5.1	441	3.0
12.0-13.0	751	5.1	547	3.7	294	2.0
13.0-14.0	541	3.6	381	2.5	202	1.4
14.0-15.0	352	2.4	268	1.8	120	0.8
15.0-16.0	261	1.8	166	1.1	77	0.5
16.0-17.0	130	0.9	137	0.9	40	0.3
17.0-18.0	128	0.9	90	0.6	12	0.1
18.0-19.0	80	0.5	43	0.3	15	0.1
19.0-20.0	34	0.2	15	0.1	7	0.0
20.0-21.0	22	0.1	16	0.1	3	0.0
>21.0	21	0.1	15	0.1	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 84.8 85.3 82.8

SITE ID: MR
 SITE LOCATION: MINOT, ND.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 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	0	0.00	0	0.00	0	0.00
1.0	21	0.14	43	0.29	71	0.49
1.5	87	0.59	117	0.78	217	1.50
2.0	241	1.62	239	1.60	508	3.50
2.5	432	2.91	565	3.78	934	6.44
3.0	690	4.65	887	5.93	1527	10.52
3.5	1100	7.41	1368	9.15	2264	15.60
4.0	1626	10.95	1925	12.88	3173	21.86
4.5	2206	14.85	2651	17.74	4044	27.87
5.0	2826	19.03	3386	22.65	4980	34.32
5.5	3474	23.39	4192	28.05	5959	41.06
6.0	4151	27.95	4980	33.32	6991	48.17
6.5	4925	33.16	5832	39.02	7968	54.91
7.0	5709	38.44	6678	44.68	8897	61.31
7.5	6487	43.68	7535	50.41	9706	66.88
8.0	7243	48.77	8332	55.75	10456	72.05
8.5	8061	54.28	9152	61.23	11127	76.67
9.0	8847	59.57	9935	66.47	11679	80.48
9.5	9574	64.46	10696	71.56	12207	84.12
10.0	10301	69.36	11392	76.22	12667	87.29
11.0	11518	77.55	12502	83.65	13301	91.66
12.0	12532	84.38	13268	88.77	13742	94.69
13.0	13283	89.44	13815	92.43	14036	96.72
14.0	13824	93.08	14196	94.98	14238	98.11
15.0	14176	95.45	14464	96.78	14358	98.94
16.0	14437	97.21	14630	97.89	14435	99.47
17.0	14567	98.08	14767	98.80	14475	99.75
18.0	14695	98.94	14857	99.40	14487	99.83
19.0	14775	99.48	14900	99.69	14502	99.93
20.0	14809	99.71	14915	99.79	14509	99.98
21.0	14831	99.86	14931	99.90	14512	100.00
>21.0	14852	100.00	14946	100.00	14512	100.00

SITE ID: MR
 SITE LOCATION: MINOT, ND.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 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	143	336	495	574	623	522	270	4
2	54	109	135	170	169	186	65	2
3	29	36	62	59	61	105	38	3
4	13	31	20	27	27	91	32	1
5	10	11	9	9	14	64	13	1
6	4	3	5	4	6	40	9	0
7	3	0	5	2	7	28	13	0
8	4	1	0	0	0	34	6	1
9	0	0	0	0	1	27	6	1
10	2	0	0	0	2	18	1	0
11	0	0	0	0	0	12	6	0
12	2	0	0	0	0	13	8	0
13	0	0	0	0	0	10	1	0
14	1	0	0	0	0	5	3	0
15	0	0	0	0	0	5	1	0
16	1	0	0	0	0	10	0	0
17	0	0	0	0	0	5	1	0
18	0	0	0	0	1	2	3	0
19	1	0	0	0	0	2	1	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	2	0	0
23	0	0	0	0	0	0	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: MR
 SITE LOCATION: MINOT, ND.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION

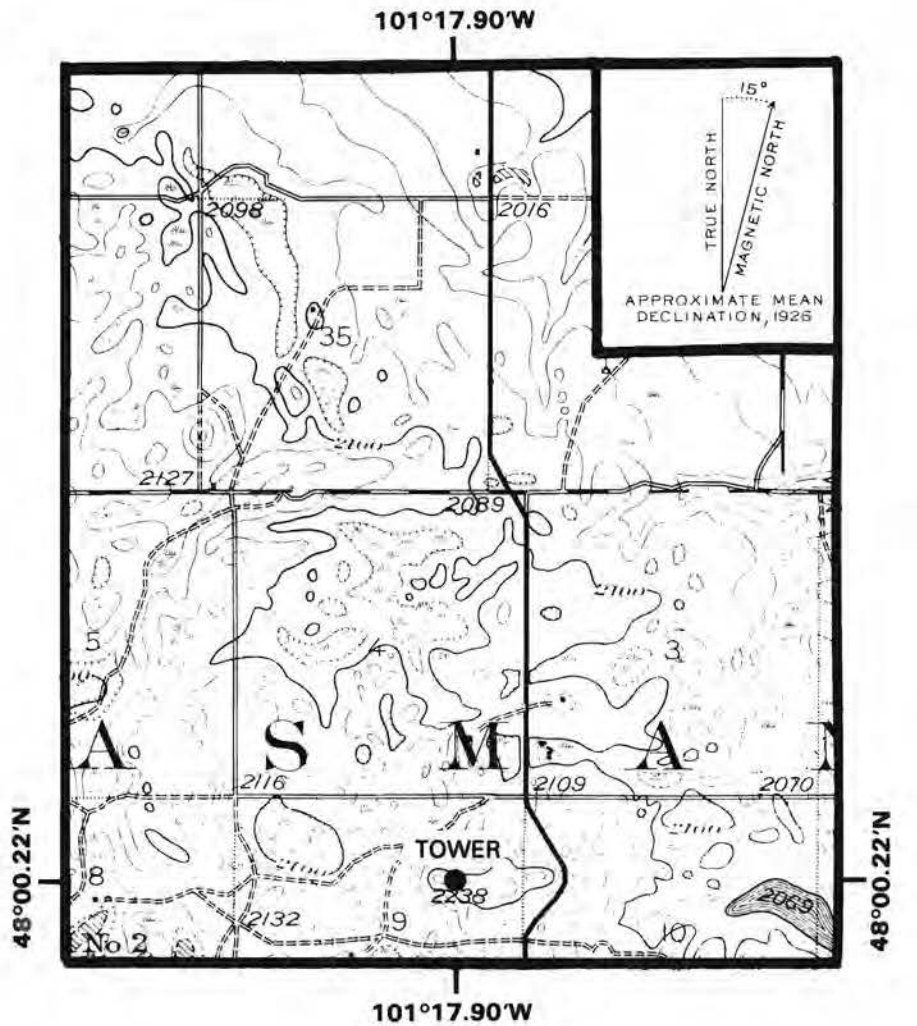
WIND DIR (ELEV A)	ALPHA (A,B)	ALPHA (B,C)	ALPHA (A,C)	ALPHA (A,B,C)	%A	%B	%C
N	-0.02	0.03	0.02	0.02	7.34	6.64	7.93
NNE	0.04	0.09	0.08	0.08	4.64	4.53	5.59
NE	0.26	0.27	0.27	0.27	3.81	4.28	4.13
ENE	0.08	0.23	0.19	0.20	3.70	3.50	3.59
E	0.12	0.21	0.18	0.19	3.73	3.99	3.96
ESE	0.13	0.13	0.13	0.13	3.65	3.75	3.62
SE	0.24	0.14	0.17	0.16	4.55	4.13	3.89
SSE	0.40	0.17	0.23	0.22	6.58	5.37	5.15
S	0.07	0.15	0.13	0.13	9.44	9.47	9.15
SSW	0.19	0.11	0.14	0.13	7.06	8.50	9.98
SW	0.18	0.14	0.15	0.15	4.54	5.10	5.94
WSW	0.29	0.21	0.23	0.22	5.83	5.31	5.13
W	0.38	0.19	0.24	0.23	7.52	7.13	6.95
WNW	0.22	0.17	0.18	0.18	8.42	8.03	7.57
NW	0.17	0.17	0.17	0.17	9.08	8.38	7.56
NNW	0.09	0.09	0.09	0.09	8.53	9.13	8.92

 NOTES:

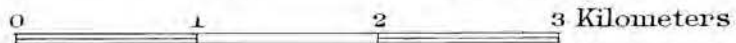
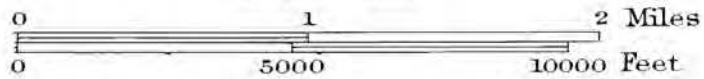
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)^{\text{ALPHA}}}{Z(LO)^{\text{ALPHA}}}$$

$$2. \text{ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{array}{l} Z=\text{ELEVATION} \\ WS=\text{WIND SPEED} \end{array}$$

MINOT, ND



Scale $\frac{1}{62500}$



Contour interval 20 feet

Datum is mean sea level



NANTUCKET ISLAND, MASSACHUSETTS



SITE ID: NI
 SITE LOCATION: NANTUCKET IS., MA.
 DATA : NOVEMBER 1980 THROUGH DECEMBER 1981

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 10224

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	71.8
WD(A)	100.0	74.3
WS(B)	100.0	32.8
WD(B)	100.0	71.8
WS(C)	100.0	61.2
WD(C)	100.0	81.2

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	9.1	269.7	698.11
(B)	30.0	8.1	251.1	631.75
(C)	9.1	6.2	278.4	359.64

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	28.1	322.9	11/30/81	10:00	(B)-999.9 (C)-999.9
(B) 30.0	26.9	128.7	02/20/81	12:00	(A) 25.5 (C)-999.9
(C) 9.1	22.1	328.3	12/30/81	21:00	(A) 25.9 (B)-999.9

 NOTES:

1. SITE ELEVATION: 12 METERS ABOVE SEA LEVEL.

SITE ID: NI
 SITE LOCATION: NANTUCKET IS., MA.
 DATA : NOVEMBER 1980 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	9.1	271.2	7.8	244.9	5.9	282.5
01:00	9.0	277.6	8.1	249.0	5.8	289.3
02:00	9.0	277.2	8.0	245.3	5.8	287.8
03:00	8.9	285.3	7.8	255.8	5.8	293.2
04:00	9.1	290.6	7.9	269.4	6.0	294.2
05:00	9.2	292.5	7.8	268.8	6.2	296.8
06:00	9.2	295.1	7.9	276.9	6.1	297.9
07:00	9.4	294.5	8.2	275.1	6.6	296.2
08:00	9.2	296.0	8.7	279.7	6.7	293.1
09:00	9.1	290.7	8.7	271.2	6.7	288.4
10:00	9.3	282.4	9.0	274.2	6.6	281.4
11:00	9.5	267.8	8.7	265.7	6.5	274.1
12:00	9.5	259.1	8.7	253.3	6.7	269.1
13:00	9.3	248.9	8.5	247.3	6.6	260.9
14:00	9.1	248.9	8.2	242.6	6.4	259.1
15:00	9.0	244.5	8.0	242.4	6.3	256.3
16:00	9.1	242.4	7.7	236.8	6.1	256.4
17:00	9.0	243.9	7.6	240.1	5.9	254.5
18:00	9.0	247.1	7.6	236.1	5.9	265.2
19:00	9.0	252.8	7.8	236.5	5.8	269.8
20:00	9.2	249.8	8.0	232.3	5.8	269.6
21:00	9.2	250.0	8.0	229.4	6.0	268.7
22:00	9.2	255.2	8.1	231.2	6.1	276.3
23:00	9.0	260.3	7.8	237.8	6.0	279.4

SITE ID: NI
 SITE LOCATION: NANTUCKET IS., MA.
 DATA : NOVEMBER 1980 THROUGH DECEMBER 1981

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C COUNT	LEVEL C %
0.0- 0.5	0	0.0	1	0.0
0.5- 1.0	0	0.0	6	0.2
1.0- 1.5	0	0.0	36	1.1
1.5- 2.0	2	0.0	52	1.6
2.0- 2.5	5	0.1	109	3.3
2.5- 3.0	31	0.4	110	3.3
3.0- 3.5	59	0.8	150	4.5
3.5- 4.0	88	1.2	118	3.5
4.0- 4.5	152	2.1	135	4.0
4.5- 5.0	222	3.0	146	4.4
5.0- 5.5	201	2.7	120	3.6
5.5- 6.0	226	3.1	183	5.5
6.0- 6.5	269	3.7	166	5.0
6.5- 7.0	464	6.3	147	4.4
7.0- 7.5	712	9.7	175	5.2
7.5- 8.0	779	10.6	171	5.1
8.0- 8.5	727	9.9	165	4.9
8.5- 9.0	498	6.8	140	4.2
9.0- 9.5	408	5.6	138	4.1
9.5-10.0	320	4.4	126	3.8
10.0-11.0	537	7.3	225	6.7
11.0-12.0	386	5.3	180	5.4
12.0-13.0	321	4.4	138	4.1
13.0-14.0	237	3.2	99	3.0
14.0-15.0	181	2.5	73	2.2
15.0-16.0	148	2.0	49	1.5
16.0-17.0	110	1.5	44	1.3
17.0-18.0	76	1.0	45	1.3
18.0-19.0	49	0.7	32	1.0
19.0-20.0	41	0.6	28	0.8
20.0-21.0	32	0.4	19	0.6
>21.0	64	0.9	24	0.7

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 71.8 32.8 61.2

SITE ID: NI
 SITE LOCATION: NANTUCKET IS., MA.
 DATA : NOVEMBER 1980 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	0	0.00	1	0.03	7	0.11
1.0	0	0.00	7	0.21	137	2.19
1.5	0	0.00	43	1.28	490	7.83
2.0	2	0.03	95	2.84	824	13.16
2.5	7	0.10	204	6.09	1120	17.89
3.0	38	0.52	314	9.37	1443	23.05
3.5	97	1.32	464	13.85	1817	29.02
4.0	185	2.52	582	17.37	2168	34.63
4.5	337	4.59	717	21.40	2532	40.44
5.0	559	7.61	863	25.76	2854	45.58
5.5	760	10.35	983	29.34	3178	50.76
6.0	986	13.42	1166	34.81	3480	55.58
6.5	1255	17.09	1332	39.76	3784	60.44
7.0	1719	23.40	1479	44.15	4069	64.99
7.5	2431	33.10	1654	49.37	4324	69.06
8.0	3210	43.70	1825	54.48	4583	73.20
8.5	3937	53.60	1990	59.40	4784	76.41
9.0	4435	60.38	2130	63.58	4982	79.57
9.5	4843	65.94	2268	67.70	5152	82.29
10.0	5163	70.29	2394	71.46	5294	84.56
11.0	5700	77.60	2619	78.18	5555	88.72
12.0	6086	82.86	2799	83.55	5739	91.66
13.0	6407	87.23	2937	87.67	5883	93.96
14.0	6644	90.46	3036	90.63	5955	95.11
15.0	6825	92.92	3109	92.81	6018	96.12
16.0	6973	94.94	3158	94.27	6084	97.17
17.0	7083	96.43	3202	95.58	6130	97.91
18.0	7159	97.47	3247	96.93	6171	98.56
19.0	7208	98.13	3279	97.88	6201	99.04
20.0	7249	98.69	3307	98.72	6230	99.50
21.0	7281	99.13	3326	99.28	6250	99.82
>21.0	7345	100.00	3350	100.00	6261	100.00

SITE ID: NI
 SITE LOCATION: NANTUCKET IS., MA.
 DATA : NOVEMBER 1980 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	18	58	126	179	275	278	155	22	
2	4	22	44	47	74	55	37	5	
3	2	4	18	28	33	47	21	6	
4	0	3	10	10	14	41	10	3	
5	0	2	4	0	6	50	9	0	
6	0	0	1	0	3	27	13	0	
7	0	1	0	2	0	12	5	2	
8	0	0	0	0	0	13	4	0	
9	0	0	0	0	1	13	2	0	
10	0	0	1	0	0	7	3	0	
11	0	0	0	0	0	8	3	0	
12	0	0	0	0	0	7	1	0	
13	0	0	0	0	0	2	3	0	
14	0	0	0	0	0	2	1	0	
15	0	0	0	0	0	3	0	0	
16	0	0	0	0	0	2	1	0	
17	0	0	0	0	0	2	0	0	
18	0	0	0	0	0	0	0	0	
19	0	0	0	0	0	2	0	0	
20	0	0	0	0	0	0	1	0	
21	0	0	0	0	0	1	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: NI
 SITE LOCATION: NANTUCKET IS., MA.
 DATA : NOVEMBER 1980 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	0.37	0.26	0.29	0.28	4.98	5.46	5.29
NNE	0.19	0.23	0.22	0.22	7.31	8.36	7.55
NE	0.50	0.02	0.14	0.12	4.78	3.43	6.45
ENE	0.27	0.18	0.20	0.20	3.53	3.52	4.01
E	0.20	0.44	0.37	0.39	3.65	3.55	2.64
ESE	0.08	0.61	0.47	0.51	3.20	3.91	2.91
SE	-0.01	0.50	0.37	0.40	3.42	2.99	2.87
SSE	0.30	0.35	0.34	0.34	4.10	3.28	3.91
S	0.23	0.38	0.34	0.35	5.62	4.12	4.65
SSW	0.46	0.27	0.32	0.31	7.91	5.73	7.55
SW	0.36	0.24	0.27	0.26	8.67	6.87	9.25
WSW	0.27	0.30	0.29	0.29	9.43	10.84	10.94
W	0.24	0.26	0.26	0.26	6.49	10.84	7.65
WNW	0.45	0.18	0.25	0.23	6.88	11.40	9.62
NW	0.63	-0.06	0.12	0.08	5.43	8.03	7.83
NNW	0.30	0.11	0.16	0.15	4.74	5.40	6.40

 NOTES:

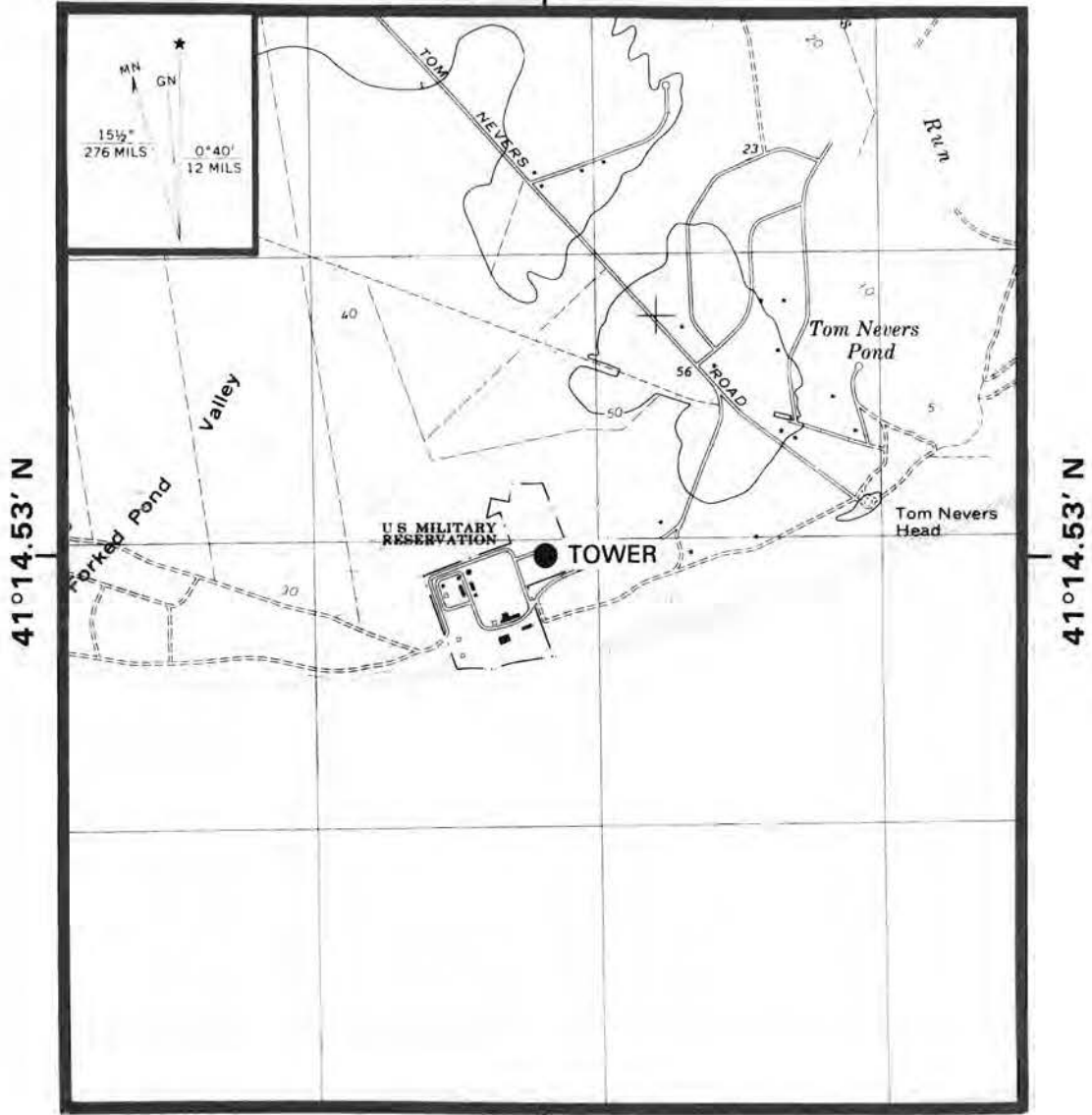
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)^{\text{ALPHA}}}{Z(LO)^{\text{ALPHA}}}$$

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

NANTUCKET, MASSACHUSETTS

70°00.27' W

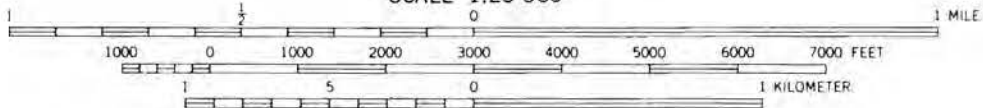


41°14.53' N

41°14.53' N

70°00.27' W

SCALE 1:25 000



CONTOUR INTERVAL 10 FEET

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10/10/10

10/10/10

PROVINCETOWN, MASSACHUSETTS



SITE ID: PT
 SITE LOCATION: PROVINCETOWN, MA.
 DATA : JANUARY 1981 THROUGH AUGUST 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 14592

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	43.5
WD(A)	100.0	44.3
WS(B)	100.0	49.6
WD(B)	100.0	36.9
WS(C)	100.0	29.4
WD(C)	100.0	35.4

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 42.7	9.8	268.5	769.18
	(B) 30.0	7.5	262.3	441.70
	(C) 9.1	4.5	271.9	109.77

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 42.7	26.3	-999.9	04/03/82	21:00	(B) 18.6 (C) 17.2
(B) 30.0	22.6	-999.9	12/02/81	07:00	(A) 17.0 (C) -999.9
(C) 9.1	20.6	-999.9	04/07/82	17:00	(A) -999.9 (B) 19.0

 NOTES:

1. SITE ELEVATION: 10 METERS ABOVE SEA LEVEL.

SITE ID: PT
 SITE LOCATION: PROVINCETOWN, MA.
 DATA : JANUARY 1981 THROUGH AUGUST 1982

 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	9.8	275.5	7.4	259.0	4.3	269.2
01:00	9.8	278.9	7.3	267.2	4.2	270.4
02:00	9.7	282.9	7.4	274.1	4.3	274.6
03:00	9.6	281.7	7.3	272.4	4.1	276.4
04:00	9.6	281.9	7.3	273.3	4.1	277.2
05:00	9.7	282.6	7.3	272.9	4.1	282.8
06:00	9.8	279.6	7.5	271.8	4.3	283.5
07:00	9.7	274.9	7.7	270.3	4.5	282.0
08:00	9.9	270.7	8.1	269.5	4.8	279.8
09:00	10.0	281.1	8.1	276.3	5.0	286.3
10:00	9.9	277.8	8.0	273.0	5.0	282.5
11:00	9.9	270.4	7.9	266.1	4.8	278.6
12:00	9.7	262.9	7.7	267.1	4.7	273.1
13:00	9.7	260.3	7.6	263.7	4.8	270.2
14:00	9.7	263.7	7.6	260.4	4.7	272.7
15:00	9.7	260.1	7.4	262.7	4.6	275.1
16:00	9.7	256.7	7.2	267.1	4.6	272.6
17:00	9.7	254.2	7.1	262.1	4.5	266.8
18:00	9.7	254.3	7.2	249.3	4.4	259.3
19:00	9.7	254.2	7.0	244.1	4.4	259.6
20:00	9.8	257.5	7.2	242.3	4.5	260.8
21:00	9.8	258.1	7.3	242.2	4.4	258.4
22:00	9.8	257.2	7.4	238.6	4.3	258.9
23:00	9.7	259.3	7.3	247.8	4.2	264.1

SITE ID: PT
 SITE LOCATION: PROVINCETOWN, MA.
 DATA : JANUARY 1981 THROUGH AUGUST 1982

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	0	0.0	0	0.0	2	0.0
0.5- 1.0	14	0.2	17	0.2	49	1.1
1.0- 1.5	4	0.1	25	0.3	180	4.2
1.5- 2.0	10	0.2	53	0.7	262	6.1
2.0- 2.5	16	0.3	120	1.7	345	8.0
2.5- 3.0	33	0.5	196	2.7	376	8.8
3.0- 3.5	54	0.9	311	4.3	435	10.1
3.5- 4.0	64	1.0	454	6.3	390	9.1
4.0- 4.5	79	1.2	437	6.0	390	9.1
4.5- 5.0	97	1.5	431	6.0	378	8.8
5.0- 5.5	141	2.2	403	5.6	312	7.3
5.5- 6.0	195	3.1	428	5.9	275	6.4
6.0- 6.5	192	3.0	418	5.8	192	4.5
6.5- 7.0	296	4.7	400	5.5	190	4.4
7.0- 7.5	345	5.4	379	5.2	116	2.7
7.5- 8.0	383	6.0	369	5.1	87	2.0
8.0- 8.5	440	6.9	356	4.9	60	1.4
8.5- 9.0	425	6.7	329	4.5	44	1.0
9.0- 9.5	432	6.8	252	3.5	46	1.1
9.5-10.0	427	6.7	293	4.1	40	0.9
10.0-11.0	698	11.0	440	6.1	44	1.0
11.0-12.0	533	8.4	322	4.5	38	0.9
12.0-13.0	436	6.9	241	3.3	13	0.3
13.0-14.0	329	5.2	188	2.6	8	0.2
14.0-15.0	251	4.0	119	1.6	6	0.1
15.0-16.0	190	3.0	89	1.2	3	0.1
16.0-17.0	102	1.6	64	0.9	3	0.1
17.0-18.0	64	1.0	54	0.7	3	0.1
18.0-19.0	53	0.8	21	0.3	1	0.0
19.0-20.0	19	0.3	9	0.1	0	0.0
20.0-21.0	10	0.2	9	0.1	1	0.0
>21.0	9	0.1	7	0.1	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 43.5 49.6 29.4

SITE ID: PT
 SITE LOCATION: PROVINCETOWN, MA.
 DATA : JANUARY 1981 THROUGH AUGUST 1982

 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	0	0.00	0	0.00	2	0.05
1.0	14	0.22	17	0.24	51	1.19
1.5	18	0.28	42	0.58	231	5.39
2.0	28	0.44	95	1.31	493	11.49
2.5	44	0.69	215	2.97	838	19.54
3.0	77	1.21	411	5.68	1214	28.30
3.5	131	2.07	722	9.98	1649	38.45
4.0	195	3.08	1176	16.26	2039	47.54
4.5	274	4.32	1613	22.30	2429	56.63
5.0	371	5.85	2044	28.26	2807	65.45
5.5	512	8.07	2447	33.83	3119	72.72
6.0	707	11.15	2875	39.74	3394	79.13
6.5	899	14.18	3293	45.52	3586	83.61
7.0	1195	18.85	3693	51.05	3776	88.04
7.5	1540	24.29	4072	56.29	3892	90.74
8.0	1923	30.33	4441	61.39	3979	92.77
8.5	2363	37.27	4797	66.31	4039	94.17
9.0	2788	43.97	5126	70.86	4083	95.20
9.5	3220	50.78	5378	74.34	4129	96.27
10.0	3647	57.51	5671	78.39	4169	97.20
11.0	4345	68.52	6111	84.48	4213	98.23
12.0	4878	76.93	6433	88.93	4251	99.11
13.0	5314	83.80	6674	92.26	4264	99.42
14.0	5643	88.99	6862	94.86	4272	99.60
15.0	5894	92.95	6981	96.50	4278	99.74
16.0	6084	95.95	7070	97.73	4281	99.81
17.0	6186	97.56	7134	98.62	4284	99.88
18.0	6250	98.56	7188	99.36	4287	99.95
19.0	6303	99.40	7209	99.65	4288	99.98
20.0	6322	99.70	7218	99.78	4288	99.98
21.0	6332	99.86	7227	99.90	4289	100.00
>21.0	6341	100.00	7234	100.00	4289	100.00

SITE ID: PT
 SITE LOCATION: PROVINCETOWN, MA.
 DATA : JANUARY 1981 THROUGH AUGUST 1982

 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	19	49	90	139	190	253	128	7
2	9	20	19	35	58	59	35	1
3	5	4	9	14	19	39	21	1
4	3	2	1	9	7	31	16	1
5	2	0	2	2	7	27	13	0
6	0	0	0	2	2	23	13	0
7	0	0	0	2	1	16	10	0
8	0	0	0	0	0	19	2	0
9	0	0	0	0	0	7	3	0
10	0	0	0	0	0	7	2	0
11	0	0	0	0	0	5	3	0
12	0	0	0	0	0	4	1	0
13	0	0	0	0	0	1	1	0
14	0	0	0	0	0	4	2	0
15	0	0	0	0	0	2	2	0
16	0	0	0	0	0	1	3	0
17	0	0	0	0	0	4	0	0
18	0	0	0	0	0	1	0	0
19	0	0	0	0	0	1	1	0
20	0	0	0	0	0	0	1	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: PT
 SITE LOCATION: PROVINCETOWN, MA.
 DATA : JANUARY 1981 THROUGH AUGUST 1982

 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	0.64	0.39	0.44	0.43	4.29	4.22	5.04
NNE	0.73	0.38	0.46	0.44	6.84	5.53	6.64
NE	0.98	0.35	0.49	0.46	4.70	3.57	4.99
ENE	0.90	0.51	0.60	0.58	2.82	2.27	3.12
E	1.18	0.39	0.57	0.53	2.05	1.85	2.03
ESE	1.68	0.28	0.60	0.52	2.59	1.87	2.35
SE	1.50	0.30	0.57	0.50	4.01	2.70	3.12
SSE	1.22	0.41	0.60	0.55	4.62	4.53	3.03
S	0.92	0.47	0.57	0.55	6.18	6.03	5.43
SSW	0.96	0.45	0.57	0.54	7.60	7.64	7.18
SW	1.22	0.28	0.49	0.44	7.30	4.96	8.86
WSW	1.00	0.45	0.57	0.54	6.91	4.70	5.55
W	0.60	0.52	0.54	0.53	11.59	6.39	5.85
WNW	0.17	0.53	0.45	0.47	8.94	6.97	8.00
NW	0.81	0.48	0.55	0.53	7.84	4.38	6.92
NNW	0.87	0.41	0.51	0.49	5.79	4.62	5.97

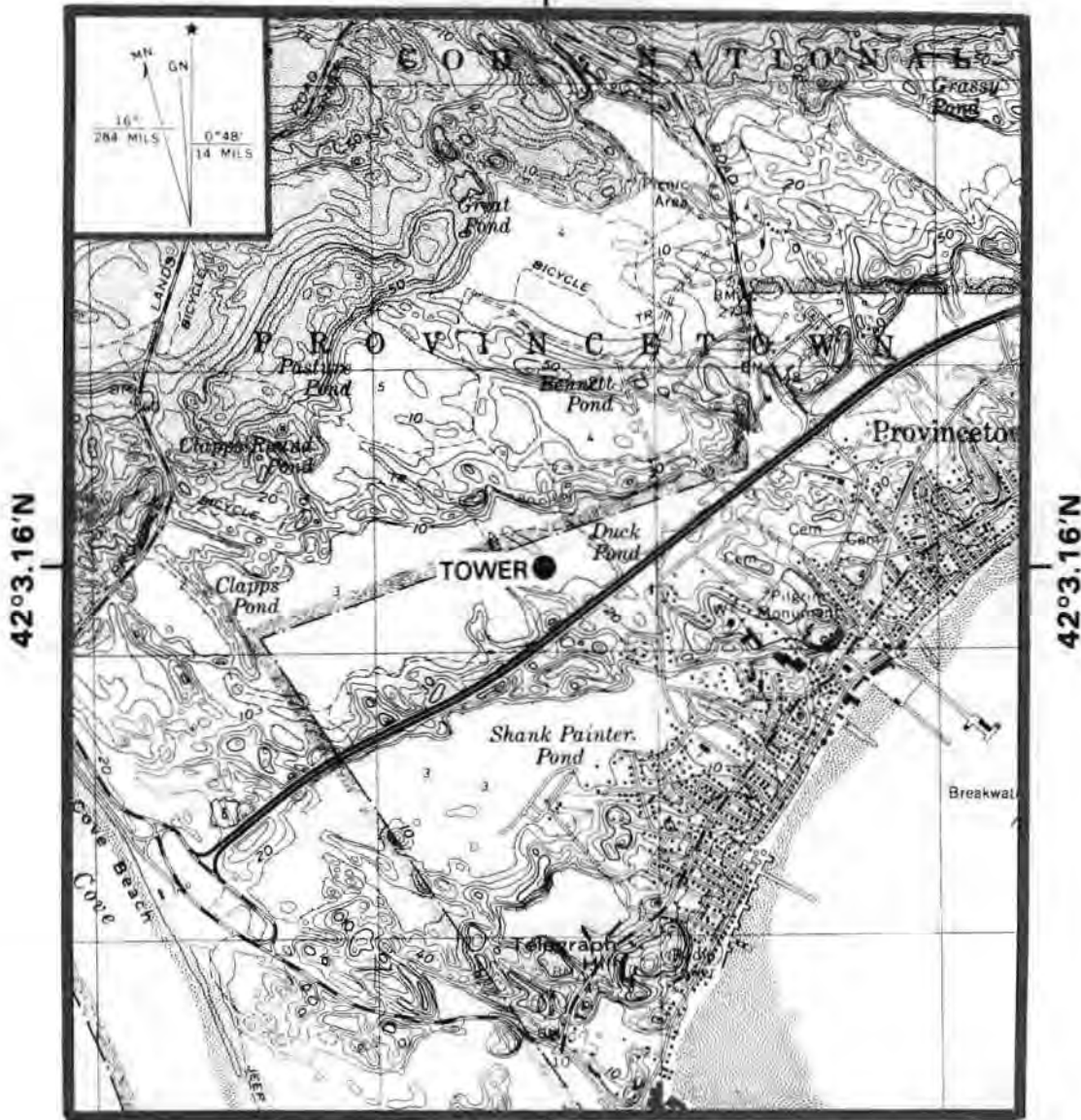
 NOTES:

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

$$2. ALPHA = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{matrix} Z = \text{ELEVATION} \\ WS = \text{WIND SPEED} \end{matrix}$$

PROVINCETOWN, MASS.

70°11.98'W

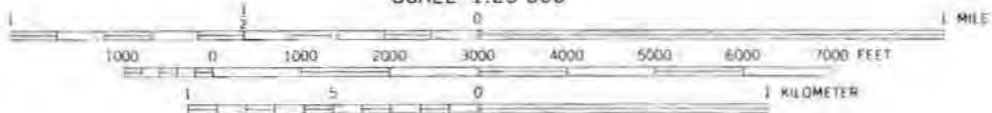


42°3.16'N

42°3.16'N

70°11.98'W

SCALE 1:25 000



CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS APPROXIMATELY 9 FEET



1

ROMERO OVERLOOK, CALIFORNIA



SITE ID: RO
 SITE LOCATION: ROMERO OVERLOOK, CA.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 17520

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	88.9
WD(A)	100.0	72.7
WS(B)	100.0	88.9
WD(B)	100.0	80.7
WS(C)	100.0	86.3
WD(C)	100.0	71.5

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	6.4	220.6	266.99
(B)	30.0	5.3	230.8	165.60
(C)	9.1	4.8	253.3	126.86

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	22.2	-999.9	05/26/82	22:00	(B) 16.3 (C) 15.4
(B) 30.0	16.4	244.0	04/11/82	15:00	(A) 20.9 (C) 14.4
(C) 9.1	15.6	240.4	05/26/82	21:00	(A) 22.0 (B) 16.3

 NOTES:

1. SITE ELEVATION: 458 METERS ABOVE SEA LEVEL.

SITE ID: RO
 SITE LOCATION: ROMERO OVERLOOK, CA.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 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	238.8	5.7	244.3	4.9	263.3
01:00	6.8	242.3	5.6	245.6	4.9	264.2
02:00	6.7	242.1	5.5	247.2	4.8	265.0
03:00	6.7	239.6	5.5	245.1	4.7	265.9
04:00	6.4	240.6	5.3	247.1	4.6	266.4
05:00	6.3	242.7	5.2	248.7	4.5	267.9
06:00	6.0	245.9	5.0	247.9	4.4	266.7
07:00	5.8	244.6	4.8	243.5	4.4	259.3
08:00	5.7	230.4	4.7	231.7	4.4	250.0
09:00	5.7	208.1	4.7	215.7	4.5	236.3
10:00	5.8	184.1	4.8	195.2	4.6	217.2
11:00	6.0	173.2	5.0	181.7	4.8	203.5
12:00	6.2	174.5	5.2	180.6	5.0	199.7
13:00	6.3	169.1	5.4	175.5	5.1	192.8
14:00	6.5	166.4	5.6	175.4	5.3	189.5
15:00	6.4	172.6	5.6	180.0	5.2	193.8
16:00	6.4	179.0	5.5	189.6	5.1	205.8
17:00	6.4	190.8	5.5	205.9	5.0	230.1
18:00	6.4	206.3	5.4	219.6	4.8	245.1
19:00	6.5	214.8	5.5	223.6	4.8	251.4
20:00	6.5	223.7	5.5	233.2	4.8	256.8
21:00	6.6	231.2	5.6	239.3	4.8	260.8
22:00	6.7	235.8	5.6	241.9	4.8	261.4
23:00	6.8	235.1	5.7	241.6	4.9	259.8

SITE ID: RO
 SITE LOCATION: ROMERO OVERLOOK, CA.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL C %
0.0- 0.5	1	0.0	0	0.0
0.5- 1.0	24	0.2	40	0.3
1.0- 1.5	94	0.6	369	2.4
1.5- 2.0	253	1.6	984	6.3
2.0- 2.5	523	3.4	1192	7.6
2.5- 3.0	689	4.4	1276	8.2
3.0- 3.5	743	4.8	1183	7.6
3.5- 4.0	918	5.9	1105	7.1
4.0- 4.5	1135	7.3	870	5.6
4.5- 5.0	1630	10.5	893	5.7
5.0- 5.5	1290	8.3	854	5.5
5.5- 6.0	1070	6.9	928	6.0
6.0- 6.5	906	5.8	824	5.3
6.5- 7.0	822	5.3	793	5.1
7.0- 7.5	783	5.0	779	5.0
7.5- 8.0	811	5.2	609	3.9
8.0- 8.5	654	4.2	601	3.9
8.5- 9.0	542	3.5	541	3.5
9.0- 9.5	519	3.3	446	2.9
9.5-10.0	430	2.8	357	2.3
10.0-11.0	646	4.1	474	3.0
11.0-12.0	263	1.7	255	1.6
12.0-13.0	179	1.1	121	0.8
13.0-14.0	261	1.7	57	0.4
14.0-15.0	174	1.1	25	0.2
15.0-16.0	85	0.5	5	0.0
16.0-17.0	44	0.3	3	0.0
17.0-18.0	30	0.2	0	0.0
18.0-19.0	19	0.1	0	0.0
19.0-20.0	14	0.1	0	0.0
20.0-21.0	12	0.1	0	0.0
>21.0	4	0.0	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 88.9 88.9 86.3

SITE ID: RO
 SITE LOCATION: ROMERO OVERLOOK, CA.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 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	1	0.01	0	0.00	0	0.00
1.0	25	0.16	40	0.26	189	1.25
1.5	119	0.76	409	2.62	1026	6.79
2.0	372	2.39	1393	8.94	2072	13.70
2.5	895	5.75	2585	16.59	3303	21.85
3.0	1584	10.17	3861	24.78	4614	30.52
3.5	2327	14.95	5044	32.37	5828	38.54
4.0	3245	20.84	6149	39.46	6948	45.95
4.5	4380	28.13	7019	45.04	7904	52.28
5.0	6010	38.60	7912	50.77	8832	58.41
5.5	7300	46.89	8766	56.25	9640	63.76
6.0	8370	53.76	9694	62.20	10385	68.68
6.5	9276	59.58	10518	67.49	11205	74.11
7.0	10098	64.86	11311	72.58	11922	78.85
7.5	10881	69.89	12090	77.58	12599	83.33
8.0	11692	75.10	12699	81.49	13129	86.83
8.5	12346	79.30	13300	85.34	13631	90.15
9.0	12888	82.79	13841	88.82	14023	92.74
9.5	13407	86.12	14287	91.68	14359	94.97
10.0	13837	88.88	14644	93.97	14609	96.62
11.0	14483	93.03	15118	97.01	14883	98.43
12.0	14746	94.72	15373	98.65	15036	99.44
13.0	14925	95.87	15494	99.42	15081	99.74
14.0	15186	97.55	15551	99.79	15113	99.95
15.0	15360	98.66	15576	99.95	15118	99.99
16.0	15445	99.21	15581	99.98	15120	100.00
17.0	15489	99.49	15584	100.00	15120	100.00
18.0	15519	99.69	15584	100.00	15120	100.00
19.0	15538	99.81	15584	100.00	15120	100.00
20.0	15552	99.90	15584	100.00	15120	100.00
21.0	15564	99.97	15584	100.00	15120	100.00
>21.0	15568	100.00	15584	100.00	15120	100.00

SITE ID: RO
 SITE LOCATION: ROMERO OVERLOOK, CA.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 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	329	694	728	705	619	400	121	7
2	154	230	263	273	225	106	24	0
3	69	78	129	97	71	88	18	0
4	50	31	62	65	38	58	7	0
5	24	10	36	28	11	43	4	0
6	7	7	26	12	11	26	3	0
7	11	1	7	6	2	18	5	0
8	2	0	5	2	0	15	2	0
9	2	0	4	5	0	11	1	0
10	0	0	2	2	0	15	0	0
11	0	0	0	0	0	5	2	0
12	0	0	2	0	0	5	1	0
13	0	0	1	0	1	8	0	0
14	0	1	0	0	0	1	0	0
15	0	0	1	0	0	0	1	0
16	0	0	0	0	0	1	0	0
17	0	0	0	0	0	0	1	0
18	0	0	0	0	0	1	0	0
19	0	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: RO
 SITE LOCATION: ROMERO OVERLOOK, CA.
 DATA : OCTOBER 1980 THROUGH SEPTEMBER 1982

 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	0.25	0.27	0.27	0.27	0.99	0.94	4.92
NNE	0.84	0.33	0.46	0.43	0.59	0.85	1.26
NE	0.76	0.33	0.44	0.42	1.48	4.17	3.64
ENE	0.84	0.11	0.30	0.26	11.23	14.11	10.75
E	0.80	0.06	0.25	0.21	10.36	6.00	5.57
ESE	0.59	0.02	0.17	0.13	2.63	1.65	1.25
SE	0.71	0.09	0.25	0.21	1.02	0.85	0.61
SSE	0.59	0.04	0.18	0.15	0.87	0.85	0.53
S	0.93	0.06	0.28	0.23	1.22	1.10	0.63
SSW	0.88	0.12	0.32	0.27	2.61	2.62	1.01
SW	0.34	0.11	0.17	0.16	17.68	19.78	7.47
WSW	0.06	0.01	0.02	0.02	23.24	31.38	34.96
W	0.39	0.10	0.18	0.16	4.16	3.64	7.61
WNW	0.91	0.13	0.33	0.29	1.43	1.02	1.05
NW	0.98	0.17	0.38	0.34	0.76	0.59	0.52
NNW	0.62	0.30	0.38	0.37	1.07	0.85	0.73

 NOTES:

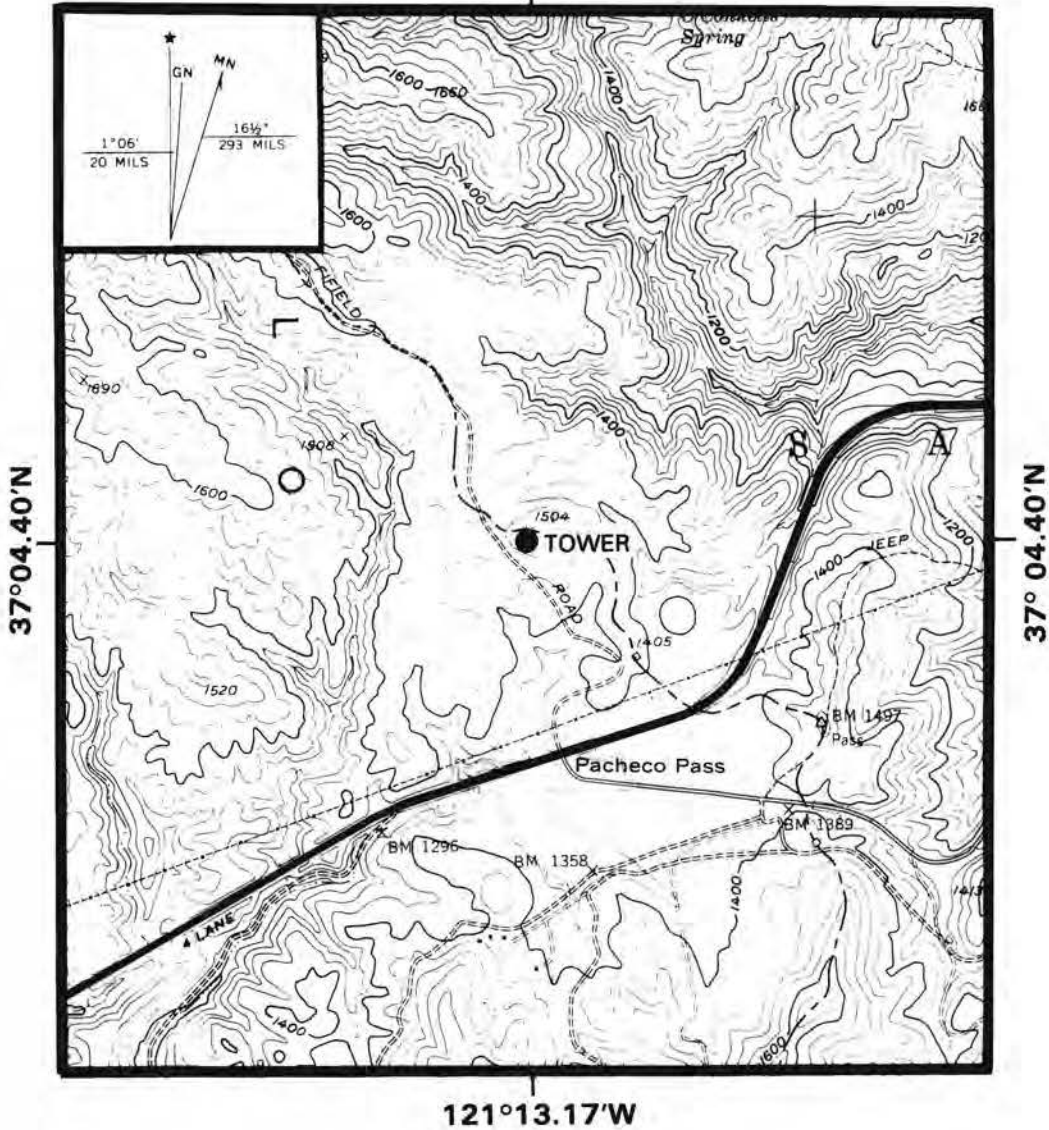
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)^{ALPHA}}{Z(LO)^{ALPHA}}$$

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

WS = WIND SPEED

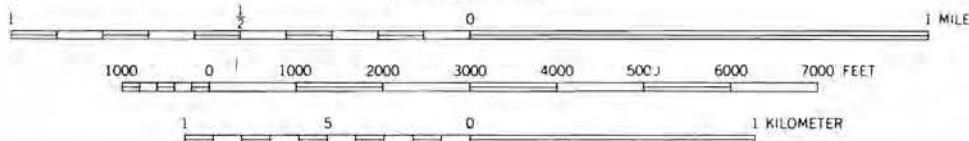
ROMERO OVERLOOK/ PACHECO PASS AREA, CA.

121°13.17'W



121°13.17'W

SCALE 1:24000



CONTOUR INTERVAL 40 FEET
 DOTTED LINES REPRESENT 10-FOOT CONTOURS
 DATUM IS MEAN SEA LEVEL

108



SAN AUGUSTIN PASS, NEW MEXICO



SITE ID: EP
 SITE LOCATION: SAN AUGUSTIN PASS, NM
 DATA : NOVEMBER 1980 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 16776

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	64.1
WD(A)	100.0	72.6
WS(B)	100.0	60.6
WD(B)	100.0	75.6
WS(C)	100.0	64.2
WD(C)	100.0	74.0

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	9.3	243.6	759.02
(B)	30.0	8.1	195.7	569.73
(C)	9.1	7.6	324.9	508.47

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	33.1	280.3	03/30/82	13:00	(B) 33.3 (C)-999.9
(B) 30.0	33.3	292.5	03/30/82	13:00	(A) 33.1 (C)-999.9
(C) 9.1	30.1	313.1	03/17/81	14:00	(A)-999.9 (B)-999.9

 NOTES:

1. SITE ELEVATION: 1859 METERS ABOVE SEA LEVEL.

SITE ID: EP
 SITE LOCATION: SAN AUGUSTIN PASS, NM
 DATA : NOVEMBER 1980 THROUGH SEPTEMBER 1982

 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	9.4	252.1	8.3	178.8	7.8	34.7
01:00	9.2	266.8	8.1	188.3	7.5	31.3
02:00	9.1	271.1	8.0	220.7	7.6	13.7
03:00	8.9	286.7	7.8	298.2	7.3	10.7
04:00	8.7	287.5	7.5	324.2	7.2	16.8
05:00	8.4	279.4	7.2	136.4	6.8	21.8
06:00	8.3	285.6	7.1	114.3	6.7	42.2
07:00	8.4	254.4	7.1	123.4	6.7	66.6
08:00	8.4	241.6	7.2	134.2	6.8	92.0
09:00	8.5	203.2	7.4	158.9	7.0	154.7
10:00	8.8	203.3	7.7	171.8	7.3	171.2
11:00	9.0	219.0	7.9	189.3	7.4	198.9
12:00	9.4	236.1	8.2	210.1	7.7	221.8
13:00	9.9	243.5	8.5	221.4	8.0	231.6
14:00	10.1	243.7	8.8	224.0	8.3	240.6
15:00	10.3	239.2	8.9	220.6	8.5	234.1
16:00	10.4	237.9	9.1	214.3	8.6	229.3
17:00	10.3	233.2	9.1	206.7	8.6	220.6
18:00	10.0	235.9	8.9	202.6	8.4	234.0
19:00	9.7	238.2	8.7	205.0	8.2	311.9
20:00	9.4	231.4	8.3	194.5	7.8	38.4
21:00	9.3	233.3	8.2	185.1	7.8	62.7
22:00	9.2	245.6	8.1	190.0	7.7	39.8
23:00	9.4	247.9	8.3	178.4	7.9	42.1

SITE ID: EP
 SITE LOCATION: SAN AUGUSTIN PASS, NM
 DATA : NOVEMBER 1980 THROUGH SEPTEMBER 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL C COUNT	%
0.0- 0.5	0	0.0	0	0.0	1 0.0
0.5- 1.0	0	0.0	0	0.0	14 0.1
1.0- 1.5	4	0.0	16	0.2	82 0.8
1.5- 2.0	13	0.1	71	0.7	215 2.0
2.0- 2.5	46	0.4	145	1.4	356 3.3
2.5- 3.0	98	0.9	276	2.7	517 4.8
3.0- 3.5	157	1.5	441	4.3	551 5.1
3.5- 4.0	287	2.7	517	5.1	629 5.8
4.0- 4.5	357	3.3	684	6.7	550 5.1
4.5- 5.0	530	4.9	687	6.8	566 5.3
5.0- 5.5	567	5.3	634	6.2	577 5.4
5.5- 6.0	579	5.4	561	5.5	583 5.4
6.0- 6.5	653	6.1	570	5.6	589 5.5
6.5- 7.0	656	6.1	507	5.0	473 4.4
7.0- 7.5	632	5.9	457	4.5	468 4.3
7.5- 8.0	538	5.0	409	4.0	449 4.2
8.0- 8.5	553	5.1	396	3.9	416 3.9
8.5- 9.0	499	4.6	366	3.6	391 3.6
9.0- 9.5	498	4.6	373	3.7	342 3.2
9.5-10.0	392	3.6	314	3.1	340 3.2
10.0-11.0	758	7.0	580	5.7	605 5.6
11.0-12.0	584	5.4	448	4.4	430 4.0
12.0-13.0	530	4.9	342	3.4	366 3.4
13.0-14.0	415	3.9	294	2.9	272 2.5
14.0-15.0	285	2.6	246	2.4	223 2.1
15.0-16.0	221	2.1	174	1.7	176 1.6
16.0-17.0	169	1.6	136	1.3	130 1.2
17.0-18.0	150	1.4	120	1.2	103 1.0
18.0-19.0	119	1.1	90	0.9	84 0.8
19.0-20.0	82	0.8	77	0.8	68 0.6
20.0-21.0	89	0.8	56	0.6	42 0.4
>21.0	296	2.8	175	1.7	160 1.5

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 64.1 60.6 64.2

SITE ID: EP
 SITE LOCATION: SAN AUGUSTIN PASS, NM
 DATA : NOVEMBER 1980 THROUGH SEPTEMBER 1982

 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	0	0.00	0	0.00	1	0.01
1.0	0	0.00	0	0.00	15	0.14
1.5	4	0.04	16	0.16	97	0.90
2.0	17	0.16	87	0.86	312	2.90
2.5	63	0.59	232	2.28	668	6.20
3.0	161	1.50	508	5.00	1185	11.00
3.5	318	2.96	949	9.34	1736	16.12
4.0	605	5.62	1466	14.43	2365	21.96
4.5	962	8.94	2150	21.16	2915	27.07
5.0	1492	13.87	2837	27.92	3481	32.33
5.5	2059	19.14	3471	34.16	4058	37.69
6.0	2638	24.52	4032	39.68	4641	43.10
6.5	3291	30.59	4602	45.29	5230	48.57
7.0	3947	36.69	5109	50.28	5703	52.96
7.5	4579	42.57	5566	54.77	6171	57.31
8.0	5117	47.57	5975	58.80	6620	61.48
8.5	5670	52.71	6371	62.69	7036	65.34
9.0	6169	57.35	6737	66.30	7427	68.97
9.5	6667	61.98	7110	69.97	7769	72.15
10.0	7059	65.62	7424	73.06	8109	75.31
11.0	7817	72.67	8004	78.76	8714	80.92
12.0	8401	78.10	8452	83.17	9144	84.92
13.0	8931	83.03	8794	86.54	9510	88.32
14.0	9346	86.88	9088	89.43	9782	90.84
15.0	9631	89.53	9334	91.85	10005	92.91
16.0	9852	91.59	9508	93.56	10181	94.55
17.0	10021	93.16	9644	94.90	10311	95.76
18.0	10171	94.55	9764	96.08	10414	96.71
19.0	10290	95.66	9854	96.97	10498	97.49
20.0	10372	96.42	9931	97.73	10566	98.12
21.0	10461	97.25	9987	98.28	10608	98.51
>21.0	10757	100.00	10162	100.00	10768	100.00

SITE ID: EP
 SITE LOCATION: SAN AUGUSTIN PASS, NM
 DATA : NOVEMBER 1980 THROUGH SEPTEMBER 1982

 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	73	220	388	503	589	505	226	29
2	23	51	131	146	136	160	66	15
3	4	24	31	53	59	102	45	10
4	2	6	12	16	23	71	30	9
5	0	1	4	9	11	49	13	9
6	0	2	1	4	2	38	14	2
7	0	0	2	4	4	33	16	1
8	0	0	2	0	1	22	5	1
9	0	0	1	0	0	12	7	2
10	0	0	0	0	1	11	7	5
11	0	0	0	0	0	12	6	1
12	0	0	0	0	0	6	2	0
13	0	0	0	0	1	1	1	0
14	0	0	0	0	0	3	1	1
15	0	0	0	0	0	3	0	0
16	0	0	0	0	0	1	0	0
17	0	0	0	0	0	1	1	0
18	0	0	0	0	0	2	0	0
19	0	0	0	0	0	0	1	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: EP
 SITE LOCATION: SAN AUGUSTIN PASS, NM
 DATA : NOVEMBER 1980 THROUGH SEPTEMBER 1982

 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	0.52	0.40	0.43	0.43	0.98	0.93	0.79
NNE	0.60	0.10	0.23	0.20	0.50	0.54	0.80
NE	0.66	0.14	0.27	0.24	0.47	0.42	0.66
ENE	1.04	-0.03	0.25	0.19	1.31	0.79	1.33
E	0.62	0.06	0.20	0.17	4.60	3.68	5.74
ESE	0.37	-0.01	0.09	0.07	13.98	14.56	16.84
SE	0.10	0.12	0.12	0.12	15.44	17.56	15.62
SSE	0.46	0.24	0.30	0.29	3.88	4.02	2.10
S	0.82	0.15	0.32	0.28	1.08	0.95	0.67
SSW	0.74	0.27	0.39	0.36	1.05	0.85	0.62
SW	1.04	0.14	0.38	0.33	1.26	0.92	0.66
WSW	0.97	0.21	0.41	0.37	4.09	2.13	1.36
W	0.72	0.13	0.28	0.25	15.10	7.68	5.15
WNW	0.02	0.01	0.02	0.02	20.15	23.36	18.06
NW	0.36	-0.05	0.05	0.03	10.93	15.23	21.78
NNW	0.46	0.09	0.18	0.16	3.95	5.00	5.00

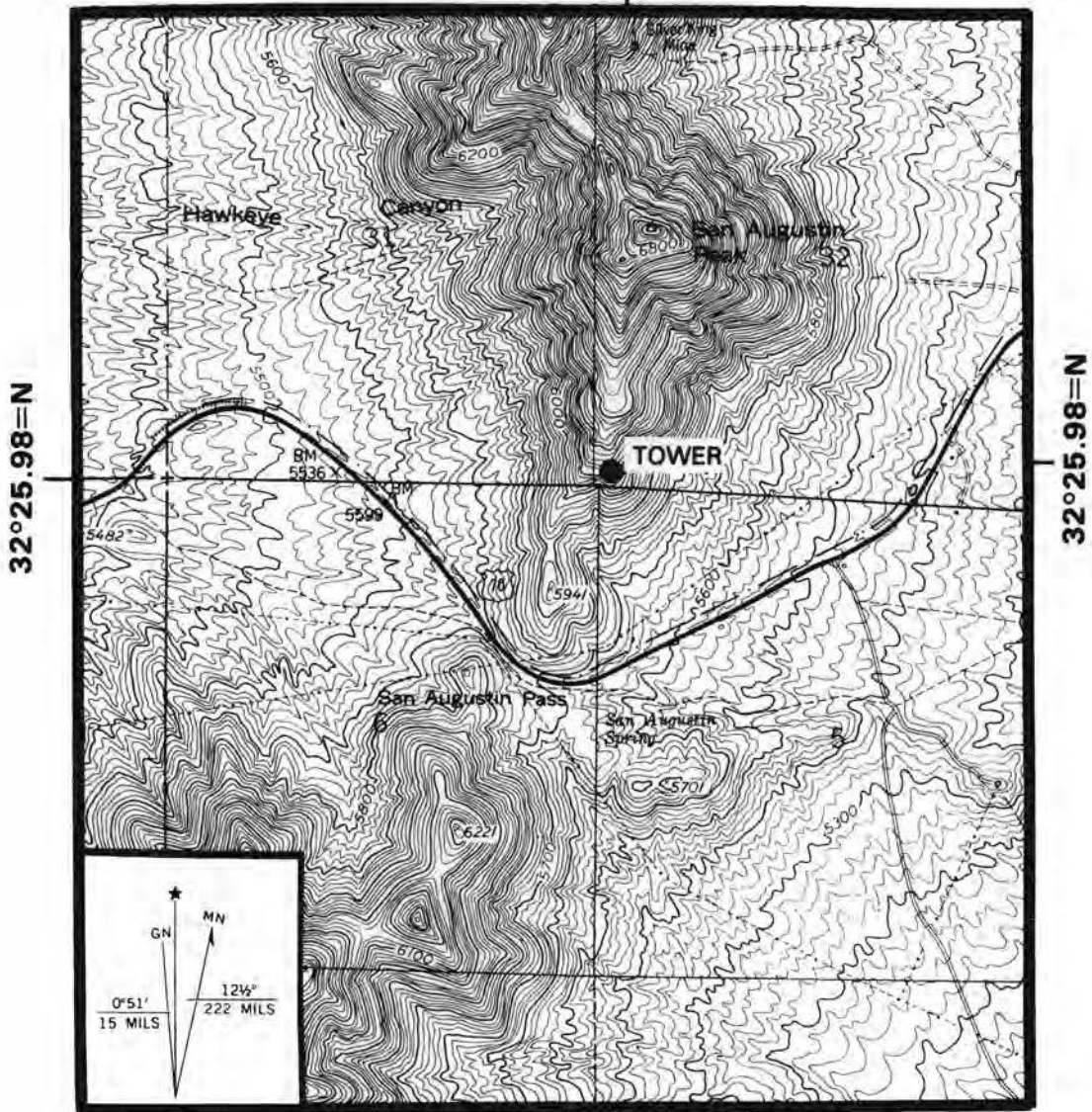
 NOTES:

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

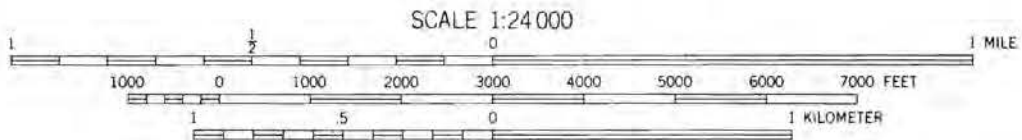
$$2. \text{ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{matrix} Z=\text{ELEVATION} \\ WS=\text{WIND SPEED} \end{matrix}$$

SAN AUGUSTIN PASS, N. MEX.

106°32.68=W



106°32.68=W



CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929



STRATTON MOUNTAIN, VERMONT



SITE ID: VT
 SITE LOCATION: STRATTON MT. VT.
 DATA : JANUARY 1981 THROUGH DECEMBER 1981

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 8760

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	20.1
WD(A)	100.0	35.6
WS(B)	100.0	9.5
WD(B)	100.0	19.2
WS(C)	100.0	29.5
WD(C)	100.0	39.4

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 45.7	11.4	254.8	1306.27
	(B) 30.0	9.4	306.8	856.08
	(C) 9.1	6.2	278.9	215.86

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	30.4	265.7	06/22/81	21:00	(B) -999.9 (C) 15.3
(B) 30.0	29.9	279.0	01/26/81	23:00	(A) 29.2 (C) 19.3
(C) 9.1	19.4	298.6	01/18/81	20:00	(A) 25.7 (B) 25.3

 NOTES:

1. SITE ELEVATION: 1183 METERS ABOVE SEA LEVEL.

SITE ID: VT
 SITE LOCATION: STRATTON MT. VT.
 DATA : JANUARY 1981 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	12.1	257.0	9.9	309.5	6.7	280.6
01:00	12.1	256.1	10.1	308.6	6.7	279.8
02:00	12.2	255.2	10.2	308.6	6.8	281.5
03:00	12.1	256.7	10.1	308.3	6.9	281.2
04:00	12.0	257.5	9.7	308.0	6.7	281.8
05:00	11.8	257.7	9.7	308.4	6.6	282.3
06:00	11.7	257.3	9.5	308.7	6.3	280.8
07:00	11.5	256.5	9.5	307.5	6.3	279.3
08:00	11.1	254.9	9.1	305.7	6.1	278.7
09:00	10.8	254.5	8.9	306.1	5.9	280.0
10:00	11.0	254.8	9.1	306.3	5.7	278.2
11:00	10.8	254.2	9.0	305.1	5.6	278.6
12:00	10.8	252.4	9.0	305.8	5.5	277.3
13:00	10.8	252.5	9.5	306.7	5.6	278.1
14:00	10.9	253.1	9.4	306.3	5.7	276.3
15:00	11.1	255.1	9.3	306.4	5.9	277.8
16:00	11.2	255.9	9.3	306.1	5.9	279.0
17:00	11.1	255.2	9.3	306.5	5.9	278.6
18:00	11.4	253.5	9.1	304.8	5.9	275.9
19:00	11.0	252.7	8.9	305.0	6.2	277.0
20:00	11.3	251.4	9.4	305.4	6.5	275.9
21:00	11.4	253.0	9.2	306.1	6.4	276.2
22:00	11.4	253.5	9.0	305.8	6.4	277.6
23:00	11.8	254.6	9.4	307.3	6.7	280.0

SITE ID: VT
 SITE LOCATION: STRATTON MT. VT.
 DATA : JANUARY 1981 THROUGH DECEMBER 1981

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	COUNT	%	COUNT	%	COUNT	%
0.0- 0.5	0	0.0	0	0.0	0	0.0
0.5- 1.0	0	0.0	0	0.0	0	0.0
1.0- 1.5	0	0.0	1	0.1	12	0.5
1.5- 2.0	2	0.1	6	0.7	49	1.9
2.0- 2.5	10	0.6	14	1.7	97	3.8
2.5- 3.0	25	1.4	18	2.2	121	4.7
3.0- 3.5	28	1.6	12	1.4	149	5.8
3.5- 4.0	30	1.7	25	3.0	139	5.4
4.0- 4.5	40	2.3	34	4.1	170	6.6
4.5- 5.0	54	3.1	32	3.9	181	7.0
5.0- 5.5	56	3.2	32	3.9	220	8.5
5.5- 6.0	71	4.0	37	4.5	209	8.1
6.0- 6.5	65	3.7	57	6.9	193	7.5
6.5- 7.0	57	3.2	57	6.9	160	6.2
7.0- 7.5	55	3.1	53	6.4	135	5.2
7.5- 8.0	44	2.5	31	3.7	152	5.9
8.0- 8.5	41	2.3	36	4.3	133	5.2
8.5- 9.0	53	3.0	31	3.7	102	4.0
9.0- 9.5	59	3.4	21	2.5	72	2.8
9.5-10.0	49	2.8	18	2.2	55	2.1
10.0-11.0	103	5.9	38	4.6	89	3.4
11.0-12.0	134	7.6	37	4.5	61	2.4
12.0-13.0	119	6.8	48	5.8	27	1.0
13.0-14.0	109	6.2	51	6.1	15	0.6
14.0-15.0	118	6.7	22	2.6	15	0.6
15.0-16.0	104	5.9	33	4.0	13	0.5
16.0-17.0	76	4.3	20	2.4	2	0.1
17.0-18.0	65	3.7	21	2.5	7	0.3
18.0-19.0	54	3.1	20	2.4	0	0.0
19.0-20.0	52	3.0	4	0.5	2	0.1
20.0-21.0	21	1.2	3	0.4	0	0.0
>21.0	66	3.8	19	2.3	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 20.1 9.5 29.5

SITE ID: VT
 SITE LOCATION: STRATTON MT. VT.
 DATA : JANUARY 1981 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	0	0.00	0	0.00	0	0.00
1.0	0	0.00	0	0.00	0	0.00
1.5	0	0.00	1	0.12	12	0.47
2.0	2	0.11	7	0.84	61	2.36
2.5	12	0.68	21	2.53	158	6.12
3.0	37	2.10	39	4.69	279	10.81
3.5	65	3.69	51	6.14	428	16.59
4.0	95	5.40	76	9.15	567	21.98
4.5	135	7.67	110	13.24	737	28.57
5.0	189	10.74	142	17.09	918	35.58
5.5	245	13.92	174	20.94	1138	44.11
6.0	316	17.95	211	25.39	1347	52.21
6.5	381	21.65	268	32.25	1540	59.69
7.0	438	24.89	325	39.11	1700	65.89
7.5	493	28.01	378	45.49	1835	71.12
8.0	537	30.51	409	49.22	1987	77.02
8.5	578	32.84	445	53.55	2120	82.17
9.0	631	35.85	476	57.28	2222	86.12
9.5	690	39.20	497	59.81	2294	88.91
10.0	739	41.99	515	61.97	2349	91.05
11.0	842	47.84	553	66.55	2438	94.50
12.0	976	55.45	590	71.00	2499	96.86
13.0	1095	62.22	638	76.77	2526	97.91
14.0	1204	68.41	689	82.91	2541	98.49
15.0	1322	75.11	711	85.56	2556	99.07
16.0	1426	81.02	744	89.53	2569	99.57
17.0	1502	85.34	764	91.94	2571	99.65
18.0	1567	89.03	785	94.46	2578	99.92
19.0	1621	92.10	805	96.87	2578	99.92
20.0	1673	95.06	809	97.35	2580	100.00
21.0	1694	96.25	812	97.71	2580	100.00
>21.0	1760	100.00	831	100.00	2580	100.00

SITE ID: VT
 SITE LOCATION: STRATTON MT. VT.
 DATA : JANUARY 1981 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	10	17	42	48	44	51	48	14
2	2	6	11	17	15	17	10	5
3	0	7	4	4	2	11	7	1
4	2	0	2	3	3	13	7	0
5	3	0	1	2	0	7	4	1
6	0	0	0	0	1	5	5	0
7	0	1	0	0	0	3	5	1
8	0	0	0	0	0	3	2	1
9	0	0	0	0	0	6	1	1
10	0	0	0	0	0	2	1	0
11	0	0	0	0	1	1	0	0
12	0	0	0	0	0	1	0	0
13	0	0	0	0	0	2	0	0
14	0	0	0	0	0	1	2	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	1	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	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: VT
 SITE LOCATION: STRATTON MT. VT.
 DATA : JANUARY 1981 THROUGH DECEMBER 1981

 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION

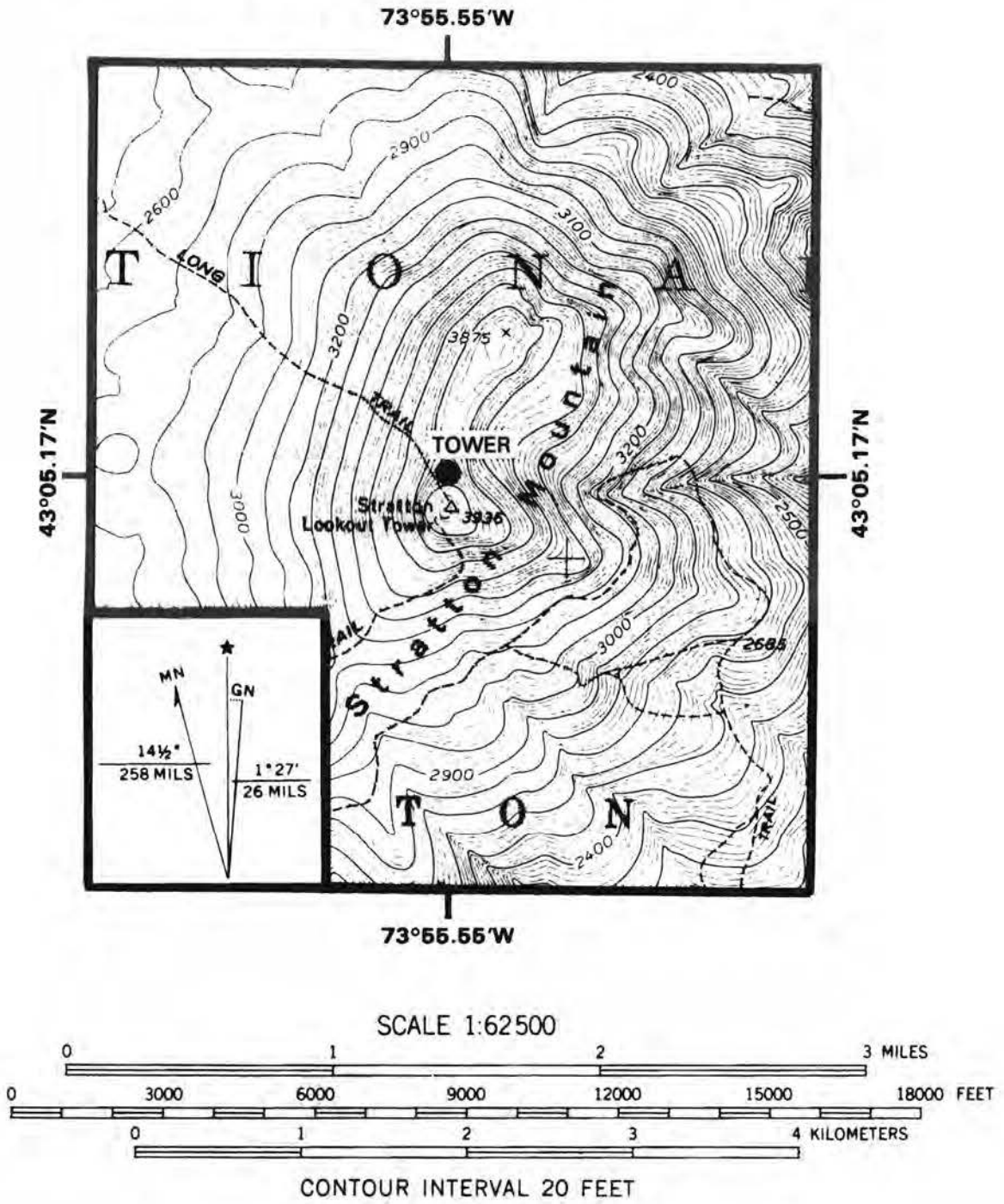
WIND DIR (ELEV A)	ALPHA (A,B)	ALPHA (B,C)	ALPHA (A,C)	ALPHA (A,B,C)	%A	%B	%C
N	0.75	0.51	0.57	0.56	3.24	0.72	2.44
NNE	1.57	0.18	0.55	0.47	0.63	0.24	0.58
NE	2.27	0.01	0.60	0.47	0.85	0.24	0.78
ENE	1.10	0.17	0.41	0.36	2.16	0.12	1.32
E	0.18	0.52	0.42	0.36	1.25	0.00	0.85
ESE	0.18	0.52	0.55	0.36	1.76	0.00	3.29
SE	0.27	0.40	0.36	0.37	3.52	2.17	5.70
SSE	-0.01	0.60	0.44	0.48	5.74	4.21	5.27
S	0.24	0.52	0.44	0.46	5.91	4.69	5.70
SSW	0.72	0.40	0.48	0.47	4.60	2.53	5.19
SW	1.43	0.18	0.51	0.43	6.99	1.93	6.74
WSW	0.06	0.66	0.50	0.54	9.55	4.57	7.91
W	0.09	0.51	0.40	0.42	11.59	12.88	11.86
WNW	0.14	0.44	0.36	0.38	11.59	17.45	20.43
NW	0.14	0.34	0.29	0.30	9.77	11.67	13.02
NNW	0.27	0.22	0.23	0.23	8.69	4.09	8.88

 NOTES:

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

$$2. \alpha = \frac{\log(WS(UP)/WS(LO))}{\log(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{matrix} Z = \text{ELEVATION} \\ WS = \text{WIND SPEED} \end{matrix}$$

STRATTON MOUNTAIN, VT





TUCUMCARI, NEW MEXICO



SITE ID: TU
 SITE LOCATION: TUCUMCARI NM.
 DATA : NOVEMBER 1980 THROUGH AUGUST 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 16056

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	57.2
WD(A)	100.0	68.0
WS(B)	100.0	57.7
WD(B)	100.0	66.1
WS(C)	100.0	68.9
WD(C)	100.0	69.6

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 45.7	8.6	248.3	518.59
	(B) 30.0	7.6	229.5	403.98
	(C) 9.1	6.4	223.6	254.92

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	25.6	224.8	03/29/82	13:00	(B) 24.8 (C) 21.8
(B) 30.0	24.8	228.8	03/29/82	13:00	(A) 25.6 (C) 21.8
(C) 9.1	22.5	182.8	07/07/81	15:00	(A)-999.9 (B)-999.9

 NOTES:

1. SITE ELEVATION: 1354 METERS ABOVE SEA LEVEL.

SITE ID: TU
 SITE LOCATION: TUCUMCARI NM.
 DATA : NOVEMBER 1980 THROUGH AUGUST 1982

 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	253.9	7.9	233.0	6.1	228.0
01:00	8.9	263.1	7.7	243.1	6.0	237.8
02:00	8.7	269.2	7.6	251.0	5.8	242.0
03:00	8.5	277.9	7.4	259.1	5.7	247.2
04:00	8.3	285.8	7.1	266.2	5.5	251.9
05:00	8.0	291.9	6.9	268.6	5.4	255.6
06:00	8.0	296.8	6.9	269.7	5.6	253.8
07:00	7.8	289.1	6.8	264.5	5.8	251.8
08:00	7.6	294.1	6.6	269.9	6.0	259.0
09:00	7.6	292.8	6.8	266.7	6.3	261.5
10:00	7.9	295.9	7.0	254.8	6.5	252.9
11:00	8.0	278.1	7.1	229.3	6.7	235.0
12:00	8.2	243.0	7.4	216.0	6.9	216.9
13:00	8.3	228.6	7.6	216.2	7.1	209.7
14:00	8.5	215.1	7.8	211.3	7.2	201.6
15:00	8.8	207.8	8.1	211.8	7.5	202.0
16:00	9.2	208.1	8.4	209.6	7.6	202.7
17:00	9.4	205.3	8.5	206.5	7.4	198.0
18:00	9.5	203.2	8.5	205.2	7.0	196.3
19:00	9.5	203.7	8.4	204.3	6.6	196.5
20:00	9.4	209.4	8.3	208.2	6.5	201.0
21:00	9.4	213.2	8.2	210.2	6.4	204.5
22:00	9.4	216.6	8.2	213.2	6.3	210.8
23:00	9.1	236.1	8.0	222.0	6.2	216.4

SITE ID: TU
 SITE LOCATION: TUCUMCARI NM.
 DATA : NOVEMBER 1980 THROUGH AUGUST 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

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

0.0- 0.5	0	0.0	0	0.0	0	0.0
0.5- 1.0	7	0.1	8	0.1	22	0.2
1.0- 1.5	24	0.3	36	0.4	89	0.8
1.5- 2.0	49	0.5	132	1.4	263	2.4
2.0- 2.5	85	0.9	178	1.9	430	3.9
2.5- 3.0	138	1.5	266	2.9	555	5.0
3.0- 3.5	191	2.1	361	3.9	668	6.0
3.5- 4.0	249	2.7	414	4.5	718	6.5
4.0- 4.5	293	3.2	507	5.5	725	6.5
4.5- 5.0	402	4.4	500	5.4	729	6.6
5.0- 5.5	371	4.0	522	5.6	728	6.6
5.5- 6.0	417	4.5	504	5.4	740	6.7
6.0- 6.5	390	4.2	522	5.6	663	6.0
6.5- 7.0	439	4.8	451	4.9	624	5.6
7.0- 7.5	478	5.2	526	5.7	602	5.4
7.5- 8.0	534	5.8	481	5.2	505	4.6
8.0- 8.5	619	6.7	450	4.9	441	4.0
8.5- 9.0	646	7.0	457	4.9	407	3.7
9.0- 9.5	546	5.9	370	4.0	358	3.2
9.5-10.0	451	4.9	347	3.7	315	2.8
10.0-11.0	778	8.5	601	6.5	469	4.2
11.0-12.0	596	6.5	469	5.1	381	3.4
12.0-13.0	474	5.2	415	4.5	232	2.1
13.0-14.0	354	3.9	279	3.0	175	1.6
14.0-15.0	239	2.6	173	1.9	97	0.9
15.0-16.0	162	1.8	128	1.4	49	0.4
16.0-17.0	100	1.1	70	0.8	38	0.3
17.0-18.0	65	0.7	34	0.4	18	0.2
18.0-19.0	35	0.4	24	0.3	18	0.2
19.0-20.0	26	0.3	16	0.2	6	0.1
20.0-21.0	11	0.1	8	0.1	2	0.0
>21.0	21	0.2	14	0.2	2	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 57.2 57.7 68.9

SITE ID: TU
 SITE LOCATION: TUCUMCARI NM.
 DATA : NOVEMBER 1980 THROUGH AUGUST 1982

 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	0	0.00	0	0.00	0	0.00
1.0	7	0.08	8	0.09	22	0.20
1.5	31	0.34	44	0.48	111	1.00
2.0	80	0.87	176	1.90	374	3.38
2.5	165	1.80	354	3.82	804	7.26
3.0	303	3.30	620	6.69	1359	12.28
3.5	494	5.38	981	10.59	2027	18.31
4.0	743	8.08	1395	15.06	2745	24.80
4.5	1036	11.27	1902	20.53	3470	31.35
5.0	1438	15.65	2402	25.93	4199	37.93
5.5	1809	19.68	2924	31.57	4927	44.51
6.0	2226	24.22	3428	37.01	5667	51.20
6.5	2616	28.47	3950	42.64	6330	57.19
7.0	3055	33.24	4401	47.51	6954	62.82
7.5	3533	38.44	4927	53.19	7556	68.26
8.0	4067	44.25	5408	58.38	8061	72.83
8.5	4686	50.99	5858	63.24	8502	76.81
9.0	5332	58.02	6315	68.17	8909	80.49
9.5	5878	63.96	6685	72.17	9267	83.72
10.0	6329	68.87	7032	75.91	9582	86.57
11.0	7107	77.33	7633	82.40	10051	90.80
12.0	7703	83.82	8102	87.47	10432	94.25
13.0	8177	88.98	8517	91.95	10664	96.34
14.0	8531	92.83	8796	94.96	10839	97.92
15.0	8770	95.43	8969	96.83	10936	98.80
16.0	8932	97.19	9097	98.21	10985	99.24
17.0	9032	98.28	9167	98.96	11023	99.58
18.0	9097	98.99	9201	99.33	11041	99.75
19.0	9132	99.37	9225	99.59	11059	99.91
20.0	9158	99.65	9241	99.76	11065	99.96
21.0	9169	99.77	9249	99.85	11067	99.98
>21.0	9190	100.00	9263	100.00	11069	100.00

SITE ID: TU
 SITE LOCATION: TUCUMCARI NM.
 DATA : NOVEMBER 1980 THROUGH AUGUST 1982

 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	76	176	310	398	423	414	202	4
2	29	61	98	108	120	144	61	4
3	12	27	27	32	29	104	36	1
4	10	7	11	7	6	91	28	2
5	4	3	4	2	3	49	21	0
6	2	2	1	0	1	42	10	0
7	0	0	1	0	0	33	10	0
8	4	0	0	1	0	14	6	0
9	1	0	1	0	0	16	6	1
10	0	0	0	0	0	8	4	0
11	0	0	0	0	0	6	5	0
12	0	0	0	0	0	11	3	0
13	0	0	0	0	0	2	0	0
14	0	0	0	0	0	2	1	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	2	0	0
17	0	0	0	0	0	2	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	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	0	0
23	0	0	0	0	0	0	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: TU
 SITE LOCATION: TUCUMCARI NM.
 DATA : NOVEMBER 1980 THROUGH AUGUST 1982

 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	0.60	0.19	0.30	0.28	2.72	2.44	2.39
NNE	0.53	0.13	0.23	0.21	4.43	4.38	4.51
NE	0.31	0.12	0.17	0.16	5.72	5.13	5.28
ENE	0.06	0.16	0.14	0.14	7.00	6.10	6.94
E	0.20	0.14	0.15	0.15	4.65	3.86	4.38
ESE	0.14	0.17	0.16	0.17	2.80	3.42	2.92
SE	0.36	0.11	0.18	0.16	2.88	4.13	3.16
SSE	0.39	0.13	0.19	0.18	3.07	3.39	3.66
S	0.24	0.13	0.16	0.15	5.87	5.17	5.60
SSW	0.26	0.13	0.17	0.16	12.67	11.40	15.13
SW	0.34	0.13	0.18	0.17	11.80	11.54	14.23
WSW	0.44	0.16	0.23	0.22	9.85	8.99	9.72
W	0.26	0.17	0.20	0.19	10.44	10.83	9.71
WNW	0.17	0.23	0.21	0.22	3.93	4.47	3.91
NW	-0.25	0.48	0.29	0.33	2.35	4.28	2.24
NNW	0.13	0.28	0.24	0.25	1.82	2.50	1.81

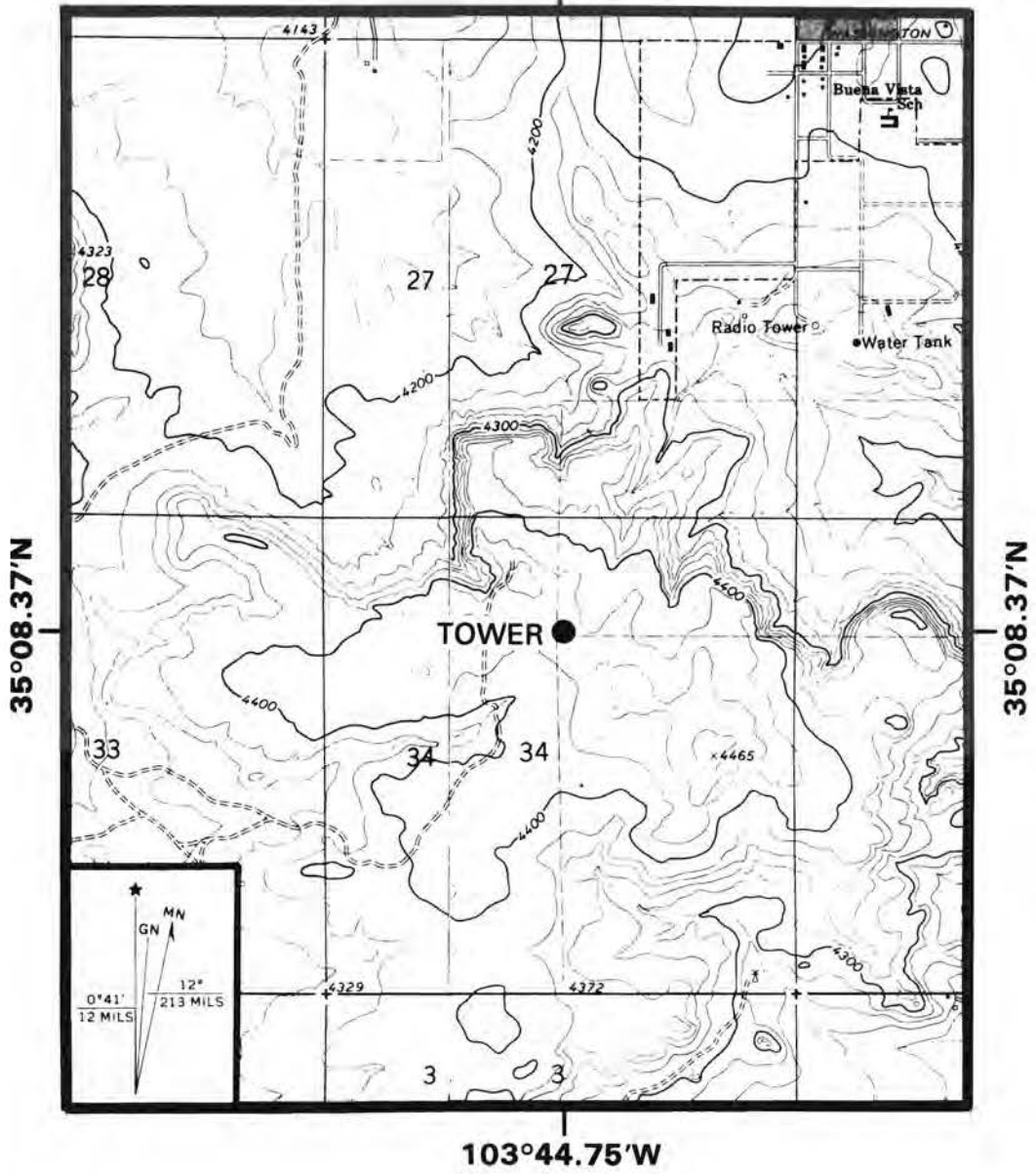
 NOTES:

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

$$2. \text{ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{array}{l} Z=\text{ELEVATION} \\ WS=\text{WIND SPEED} \end{array}$$

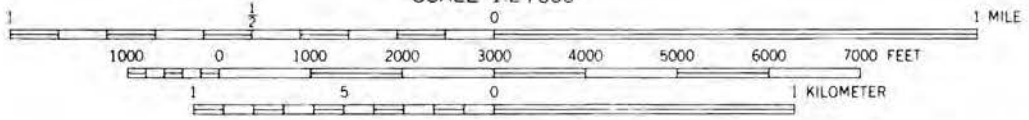
TUCUMCARI, NM

103°44.75'W



103°44.75'W

SCALE 1:24 000



CONTOUR INTERVAL 40 FEET

1

2

3

WELLS, NEVADA



SITE ID: NV
 SITE LOCATION: WELLS, NV.
 DATA : OCTOBER 1980 THROUGH JANUARY 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 11712

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	85.8
WD(A)	100.0	87.2
WS(B)	100.0	85.3
WD(B)	100.0	87.1
WS(C)	100.0	68.6
WD(C)	100.0	87.9

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 45.7	7.8	272.7	409.41
	(B) 30.0	7.2	262.0	338.10
	(C) 9.1	6.8	264.0	304.51

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	24.6	298.1	02/09/81	11:00	(B) 24.3 (C) 24.2
(B) 30.0	24.3	283.8	02/09/81	11:00	(A) 24.6 (C) 24.2
(C) 9.1	24.6	269.6	12/15/81	11:00	(A) 23.3 (B) 23.7

 NOTES:

1. SITE ELEVATION: 2268 METERS ABOVE SEA LEVEL.

SITE ID: NV
 SITE LOCATION: WELLS, NV.
 DATA : OCTOBER 1980 THROUGH JANUARY 1982

 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	271.8	6.9	259.9	6.4	263.2
01:00	7.4	271.2	6.8	260.1	6.3	262.9
02:00	7.4	270.1	6.8	259.5	6.3	264.8
03:00	7.3	270.9	6.7	261.3	6.3	266.0
04:00	7.4	272.5	6.8	262.5	6.5	267.8
05:00	7.3	272.8	6.7	262.3	6.4	266.2
06:00	7.4	269.8	6.7	261.1	6.3	265.3
07:00	7.3	266.5	6.6	256.6	6.1	261.3
08:00	7.3	262.9	6.6	252.8	6.0	256.3
09:00	7.4	258.4	6.7	249.3	6.4	250.7
10:00	7.7	256.5	7.1	246.6	6.7	248.1
11:00	8.1	259.8	7.5	249.3	7.3	250.3
12:00	8.4	265.5	7.8	254.3	7.4	256.5
13:00	8.6	268.8	8.0	257.5	7.6	257.7
14:00	8.6	274.5	8.1	262.6	7.7	262.3
15:00	8.6	276.3	8.0	264.0	7.6	263.4
16:00	8.5	283.7	7.9	273.9	7.5	272.7
17:00	8.5	289.6	8.0	279.4	7.4	281.6
18:00	8.2	291.0	7.7	281.4	7.1	283.3
19:00	8.0	289.8	7.5	279.5	6.9	279.0
20:00	7.8	292.6	7.4	280.7	6.8	282.3
21:00	7.8	283.6	7.3	271.8	6.7	272.2
22:00	7.7	279.5	7.2	267.0	6.6	268.2
23:00	7.5	275.4	7.0	262.5	6.5	265.0

SITE ID: NV
 SITE LOCATION: WELLS, NV.
 DATA : OCTOBER 1980 THROUGH JANUARY 1982

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B %	LEVEL B COUNT	LEVEL C %	LEVEL C COUNT	LEVEL C %
0.0- 0.5	0	0.0	0	0.0	0	0.0
0.5- 1.0	14	0.1	8	0.1	52	0.6
1.0- 1.5	23	0.2	49	0.5	74	0.9
1.5- 2.0	77	0.8	132	1.3	184	2.3
2.0- 2.5	148	1.5	283	2.8	272	3.4
2.5- 3.0	204	2.0	405	4.1	388	4.8
3.0- 3.5	325	3.2	474	4.7	419	5.2
3.5- 4.0	422	4.2	511	5.1	486	6.0
4.0- 4.5	540	5.4	565	5.7	523	6.5
4.5- 5.0	585	5.8	610	6.1	513	6.4
5.0- 5.5	648	6.5	631	6.3	537	6.7
5.5- 6.0	686	6.8	641	6.4	503	6.3
6.0- 6.5	655	6.5	613	6.1	470	5.8
6.5- 7.0	651	6.5	580	5.8	475	5.9
7.0- 7.5	642	6.4	521	5.2	405	5.0
7.5- 8.0	529	5.3	527	5.3	348	4.3
8.0- 8.5	464	4.6	412	4.1	325	4.0
8.5- 9.0	418	4.2	401	4.0	254	3.2
9.0- 9.5	344	3.4	325	3.3	235	2.9
9.5-10.0	334	3.3	324	3.2	227	2.8
10.0-11.0	505	5.0	472	4.7	313	3.9
11.0-12.0	430	4.3	390	3.9	246	3.1
12.0-13.0	375	3.7	313	3.1	207	2.6
13.0-14.0	270	2.7	233	2.3	167	2.1
14.0-15.0	236	2.3	178	1.8	132	1.6
15.0-16.0	158	1.6	133	1.3	93	1.2
16.0-17.0	111	1.1	91	0.9	72	0.9
17.0-18.0	76	0.8	68	0.7	47	0.6
18.0-19.0	53	0.5	35	0.4	13	0.2
19.0-20.0	36	0.4	26	0.3	21	0.3
20.0-21.0	31	0.3	18	0.2	22	0.3
>21.0	56	0.6	17	0.2	16	0.2

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 85.8 85.3 68.6

SITE ID: NV
 SITE LOCATION: WELLS, NV.
 DATA : OCTOBER 1980 THROUGH JANUARY 1982

 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	0	0.00	0	0.00	0	0.00
1.0	14	0.14	8	0.08	52	0.65
1.5	37	0.37	57	0.57	126	1.57
2.0	114	1.13	189	1.89	310	3.86
2.5	262	2.61	472	4.73	582	7.24
3.0	466	4.64	877	8.78	970	12.07
3.5	791	7.87	1351	13.53	1389	17.28
4.0	1213	12.07	1862	18.65	1875	23.32
4.5	1753	17.45	2427	24.30	2398	29.83
5.0	2338	23.27	3037	30.41	2911	36.21
5.5	2986	29.72	3668	36.73	3448	42.89
6.0	3672	36.55	4309	43.15	3951	49.15
6.5	4327	43.07	4922	49.29	4421	54.99
7.0	4978	49.55	5502	55.10	4896	60.90
7.5	5620	55.94	6023	60.31	5301	65.94
8.0	6149	61.21	6550	65.59	5649	70.27
8.5	6613	65.83	6962	69.72	5974	74.31
9.0	7031	69.99	7363	73.73	6228	77.47
9.5	7375	73.41	7688	76.99	6463	80.40
10.0	7709	76.74	8012	80.23	6690	83.22
11.0	8214	81.76	8484	84.96	7003	87.11
12.0	8644	86.04	8874	88.86	7249	90.17
13.0	9019	89.78	9187	92.00	7456	92.75
14.0	9289	92.46	9420	94.33	7623	94.83
15.0	9525	94.81	9598	96.11	7755	96.47
16.0	9683	96.39	9731	97.45	7848	97.62
17.0	9794	97.49	9822	98.36	7920	98.52
18.0	9870	98.25	9890	99.04	7967	99.10
19.0	9923	98.78	9925	99.39	7980	99.27
20.0	9959	99.13	9951	99.65	8001	99.53
21.0	9990	99.44	9969	99.83	8023	99.80
>21.0	10046	100.00	9986	100.00	8039	100.00

SITE ID: NV
 SITE LOCATION: WELLS, NV.
 DATA : OCTOBER 1980 THROUGH JANUARY 1982

 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	103	305	418	579	555	409	157	16
2	56	78	137	160	151	154	59	14
3	16	35	51	50	59	111	37	7
4	14	14	23	24	21	65	28	1
5	4	5	11	11	9	52	25	2
6	6	2	5	2	4	24	12	0
7	4	4	3	2	2	23	11	0
8	1	0	0	1	2	21	7	1
9	1	0	1	1	0	14	4	0
10	0	0	0	0	0	9	4	0
11	0	0	0	0	0	9	0	0
12	0	0	0	0	0	6	3	0
13	0	1	0	0	0	4	4	0
14	1	0	0	0	0	0	0	0
15	0	0	0	0	0	2	0	0
16	0	0	0	0	0	1	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	1	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
21	0	0	0	0	0	2	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: NV
 SITE LOCATION: WELLS, NV.
 DATA : OCTOBER 1980 THROUGH JANUARY 1982

 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	0.48	-0.06	0.08	0.05	3.21	2.49	2.62
NNE	-0.28	0.04	-0.05	-0.03	5.00	3.80	3.52
NE	0.68	-0.04	0.15	0.11	3.49	2.89	3.45
ENE	0.49	-0.02	0.12	0.09	1.86	1.96	2.64
E	0.63	0.00	0.16	0.13	1.79	1.58	1.88
ESE	0.57	0.03	0.17	0.14	1.48	1.69	1.75
SE	0.05	0.09	0.08	0.08	1.68	2.39	2.91
SSE	0.02	0.03	0.03	0.03	5.26	9.08	9.06
S	0.32	0.08	0.14	0.13	8.61	6.79	7.77
SSW	0.45	0.06	0.16	0.14	5.76	5.07	5.08
SW	-0.05	0.07	0.04	0.05	8.73	9.82	7.15
WSW	0.20	-0.01	0.05	0.03	10.50	10.72	11.20
W	0.12	0.12	0.12	0.12	7.67	7.58	8.31
WNW	0.02	0.08	0.06	0.06	12.62	18.90	16.30
NW	0.41	-0.02	0.09	0.07	16.12	10.56	12.55
NNW	0.38	0.02	0.12	0.10	5.35	3.62	3.79

 NOTES:

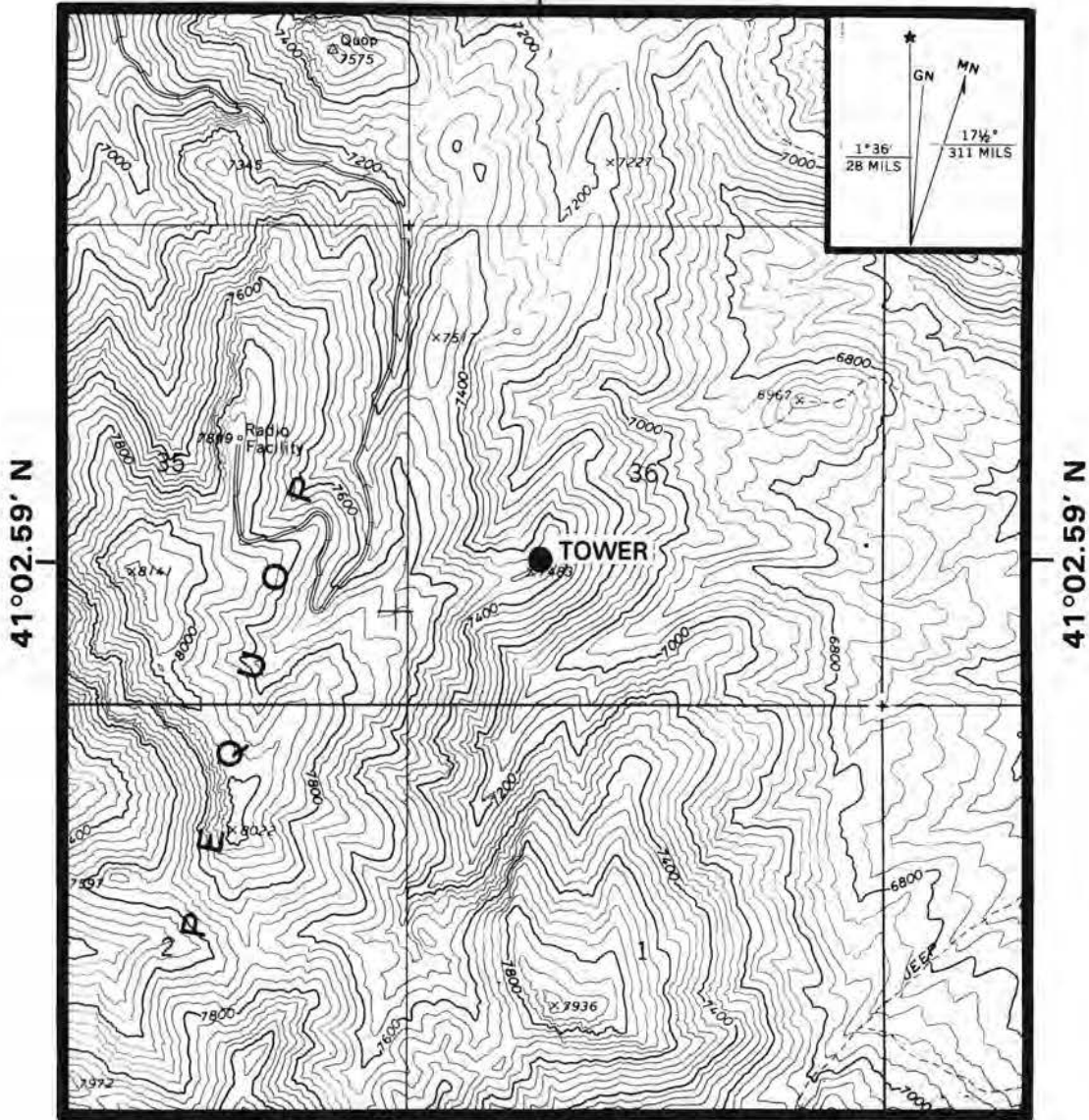
$$1. \frac{WS(UP)}{WS(LO)} = \frac{Z(UP)^{ALPHA}}{Z(LO)^{ALPHA}}$$

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

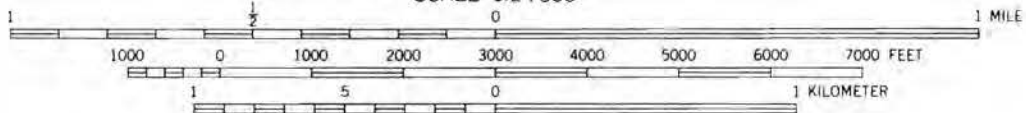
WELLS, NEVADA

114°34.65' W



114°34.65' W

SCALE 1:24 000



CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

1000

APPENDIX A

APPENDIX A

Summarized meteorological data are provided for the period January 1982 through September 1982 for those "new" and "original" sites that were operational. During this period 15 "new" sites and 6 "original" sites were operational. The format of the data is the same as that presented in earlier sections.

Tables A.1, A.2 and A.3 provide an all-site summary of data recovery rates and wind speed characteristics for each sensor level for the period of record. Data under the column "Maximum" represent maximum hourly average values during the reporting period. Data under the column "Power" represent the available power for the reporting period.

The data in this appendix complete a series of annual data reports (Sandusky and Renne 1981a, 1981b; and Sandusky et al. 1982a) for both the "original" and "new" sites.

TABLE A.1. Summary of Hourly Data for the Period January 1982 Through September 1982 for the Lower Level

<u>Site Code</u>	<u>Sensor Level</u>	<u>% Sample Recovery</u>	<u>Wind Speed (m/s)</u>		<u>Power Watts/M²</u>
			<u>Mean</u>	<u>Max.</u>	
SP	9.1	27.7	5.1	18.5	142.53
RI (0)	9.1	40.3	4.6	12.7	115.14
WY	9.1	78.5	6.7	22.5	306.68
NM (0)	9.1	42.8	5.6	20.6	188.42
PR (0)	9.1	16.0	3.2	6.1	26.35
DD ^(a)	9.1	55.2	1.9	5.9	8.40
ND	9.1	66.2	6.1	21.6	235.69
WA (1)	15.2	87.5	5.6	23.6	194.05
SD	9.1	80.1	4.6	22.1	127.73
IP	9.1	15.9	8.4	14.0	464.66
KR	9.1	34.9	5.3	16.4	237.09
KU (0)	9.1	22.2	7.4	23.7	466.40
MT	9.1	42.3	6.7	26.5	505.13
MK	9.1	66.3	6.1	19.5	236.98
MR	9.1	93.4	7.1	20.4	322.93
NY	18.2	57.1	6.5	19.9	339.17
PT	9.1	11.6	5.6	20.6	239.59
RO	9.1	82.8	5.4	15.6	165.13
EP	9.1	65.9	8.7	28.9	700.66
SG	9.1	53.9	6.8	19.7	422.80
TU	9.1	77.1	6.5	21.8	255.57

(0) MOD-0A Turbine Site

(1) MOD-2 Turbine Site

(a) Sensor is at the top of a dense forest canopy and is not representative of open terrain conditions.

TABLE A.2. Summary of Hourly Data for the Period January 1982 Through September 1982 for the Middle Level

<u>Site Code</u>	<u>Sensor Level</u>	<u>% Sample Recovery</u>	<u>Wind Speed (m/s)</u>		<u>Power Watts/M²</u>
			<u>Mean</u>	<u>Max.</u>	
SP	30.0	36.1	7.1	23.2	395.66
RI (0)	30.0	27.9	6.4	15.4	248.82
WY	30.0	78.4	7.6	24.1	420.70
NM (0)	30.0	17.2	6.8	22.2	329.49
DD ^(a)	30.0	30.4	3.5	12.4	61.49
ND	30.0	63.0	7.1	23.8	344.90
WA (1)	60.9	80.2	7.5	29.5	434.59
IP	30.0	14.7	10.6	16.0	814.40
KR	30.0	12.9	6.8	18.7	354.36
KU (0)	30.0	22.2	7.8	22.7	501.77
MT	30.0	51.3	7.7	29.4	754.51
MK	30.0	25.6	7.5	18.2	341.89
MR	30.0	95.4	7.9	23.2	455.47
PT	30.0	36.4	8.3	21.5	582.30
RO	30.0	82.7	5.9	16.4	213.84
EP	30.0	64.1	9.3	33.3	815.25
SG	30.0	58.5	7.2	23.8	523.81
TU	30.0	64.2	8.2	24.8	472.79

(0) MOD-0A Turbine Site

(1) MOD-2 Turbine Site

(a) Sensor is at the top of a dense forest canopy and is not representative of open terrain conditions.

TABLE A.3. Summary of Hourly Data for the Period January 1982 Through September 1982 for the Upper Level

<u>Site Code</u>	<u>Sensor Level</u>	<u>% Sample Recovery</u>	<u>Wind Speed (m/s)</u>		<u>Power Watts/M²</u>
			<u>Mean</u>	<u>Max.</u>	
SP	45.7	24.4	7.5	25.5	504.83
RI (0)	45.7	34.7	7.1	17.4	348.06
WY	45.7	78.6	7.7	24.6	460.99
NM (0)	45.7	26.7	7.2	23.1	361.67
PR (0)	45.7	12.3	7.8	13.2	344.14
DD	45.7	66.9	3.9	14.2	81.66
ND	45.7	65.7	8.6	24.5	573.03
WA (1)	105.1	87.0	7.6	30.7	477.03
SD	45.7	80.4	6.7	29.9	322.96
IP	45.7	0.0	-99.9	-999.9	0.00
KR	45.7	0.0	-99.9	-999.9	0.00
KU (0)	45.7	22.2	8.1	23.5	568.55
MT	45.7	51.8	8.3	33.1	991.89
MK	45.7	69.8	8.8	24.6	560.79
MR	45.7	96.6	8.4	23.4	547.63
NY	45.7	57.3	6.9	22.5	445.30
PT	42.7	23.6	10.0	26.3	831.64
RO	45.7	82.5	7.3	22.2	419.51
EP	45.7	64.1	10.4	33.1	895.52
SG	45.7	31.2	7.5	24.9	551.18
TU	45.7	61.6	8.7	25.6	568.72

(0) MOD-0A Turbine Site
 (1) MOD-2 Turbine Site

BIG SABLE POINT, MICHIGAN



SITE ID: SP
 SITE LOCATION: BIG SABLE PT., MI.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 6552

SENSOR	% ON-LINE	% RECOVERED
WS(A)	71.2	24.4
WD(A)	71.2	27.1
WS(B)	71.2	36.1
WD(B)	71.2	37.1
WS(C)	71.2	27.7
WD(C)	71.2	35.2

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	7.5	201.9	504.83
(B)	30.0	7.1	183.7	395.66
(C)	9.1	5.1	135.9	142.53

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	25.5	329.1	01/04/82	16:00	(B) 23.2 (C) -999.9
(B) 30.0	24.3	152.1	05/20/82	11:00	(A) -999.9 (C) 18.5
(C) 9.1	18.5	145.8	05/20/82	10:00	(A) -999.9 (B) 23.9

 NOTES:

1. SITE ELEVATION: 179 METERS ABOVE SEA LEVEL.

SITE ID: SP
 SITE LOCATION: BIG SABLE PT., MI.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	160.7	6.7	158.3	4.8	123.2
01:00	7.3	189.7	6.6	165.2	4.7	127.3
02:00	7.3	180.6	6.7	170.8	4.8	131.0
03:00	7.5	154.4	6.9	163.5	5.1	125.5
04:00	7.7	148.9	7.0	155.2	5.1	124.2
05:00	7.5	137.9	6.9	149.9	5.0	121.1
06:00	7.4	144.1	7.1	150.5	5.2	121.6
07:00	7.3	170.7	7.0	162.1	5.2	133.0
08:00	7.2	153.5	6.8	159.3	5.2	129.2
09:00	7.3	190.7	7.0	193.5	5.3	158.4
10:00	7.6	226.3	7.3	203.4	5.6	176.1
11:00	7.8	257.1	7.5	216.0	5.7	196.9
12:00	8.1	238.6	7.7	219.5	5.8	189.1
13:00	8.3	246.6	7.8	229.9	5.8	184.1
14:00	8.3	254.8	7.9	230.5	5.8	190.5
15:00	8.1	258.5	7.7	229.7	5.7	185.1
16:00	7.8	240.8	7.5	224.7	5.6	178.9
17:00	7.7	250.6	7.3	224.9	5.3	135.1
18:00	7.4	232.8	6.9	197.1	5.0	114.8
19:00	7.2	256.1	6.7	183.2	4.7	104.2
20:00	7.0	193.5	6.7	173.8	4.4	111.2
21:00	7.2	168.5	6.6	158.4	4.3	117.8
22:00	7.1	166.7	6.7	161.2	4.6	119.2
23:00	7.3	158.3	6.7	167.9	4.5	124.0

SITE ID: SP
 SITE LOCATION: BIG SABLE PT., MI.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL C %
0.0- 0.5	0	0.0	0	0.0
0.5- 1.0	24	1.5	15	0.6
1.0- 1.5	55	3.4	27	1.1
1.5- 2.0	29	1.8	37	1.6
2.0- 2.5	39	2.4	75	3.2
2.5- 3.0	46	2.9	84	3.6
3.0- 3.5	60	3.8	113	4.8
3.5- 4.0	58	3.6	107	4.5
4.0- 4.5	55	3.4	128	5.4
4.5- 5.0	67	4.2	136	5.8
5.0- 5.5	87	5.4	156	6.6
5.5- 6.0	93	5.8	153	6.5
6.0- 6.5	84	5.3	147	6.2
6.5- 7.0	109	6.8	147	6.2
7.0- 7.5	75	4.7	118	5.0
7.5- 8.0	72	4.5	120	5.1
8.0- 8.5	72	4.5	92	3.9
8.5- 9.0	53	3.3	80	3.4
9.0- 9.5	59	3.7	85	3.6
9.5-10.0	55	3.4	74	3.1
10.0-11.0	121	7.6	165	7.0
11.0-12.0	89	5.6	110	4.7
12.0-13.0	71	4.4	77	3.3
13.0-14.0	41	2.6	41	1.7
14.0-15.0	22	1.4	15	0.6
15.0-16.0	12	0.8	9	0.4
16.0-17.0	12	0.8	14	0.6
17.0-18.0	8	0.5	10	0.4
18.0-19.0	9	0.6	6	0.3
19.0-20.0	2	0.1	6	0.3
20.0-21.0	6	0.4	7	0.3
>21.0	14	0.9	9	0.4

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 24.4 36.1 27.7

SITE ID: SP
 SITE LOCATION: BIG SABLE PT., MI.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0	0.00	0	0.00	0	0.00
1.0	24	1.50	15	0.63	17	0.94
1.5	79	4.94	42	1.78	77	4.25
2.0	108	6.75	79	3.34	181	9.98
2.5	147	9.19	154	6.52	316	17.43
3.0	193	12.07	238	10.07	414	22.84
3.5	253	15.82	351	14.85	534	29.45
4.0	311	19.45	458	19.38	657	36.24
4.5	366	22.89	586	24.80	795	43.85
5.0	433	27.08	722	30.55	905	49.92
5.5	520	32.52	878	37.16	1044	57.58
6.0	613	38.34	1031	43.63	1178	64.98
6.5	697	43.59	1178	49.85	1310	72.26
7.0	806	50.41	1325	56.07	1413	77.94
7.5	881	55.10	1443	61.07	1496	82.52
8.0	953	59.60	1563	66.14	1580	87.15
8.5	1025	64.10	1655	70.04	1646	90.79
9.0	1078	67.42	1735	73.42	1689	93.16
9.5	1137	71.11	1820	77.02	1732	95.53
10.0	1192	74.55	1894	80.15	1757	96.91
11.0	1313	82.11	2059	87.14	1789	98.68
12.0	1402	87.68	2169	91.79	1805	99.56
13.0	1473	92.12	2246	95.05	1810	99.83
14.0	1514	94.68	2287	96.78	1810	99.83
15.0	1536	96.06	2302	97.42	1810	99.83
16.0	1548	96.81	2311	97.80	1810	99.83
17.0	1560	97.56	2325	98.39	1811	99.89
18.0	1568	98.06	2335	98.82	1811	99.89
19.0	1577	98.62	2341	99.07	1813	100.00
20.0	1579	98.75	2347	99.32	1813	100.00
21.0	1585	99.12	2354	99.62	1813	100.00
>21.0	1599	100.00	2363	100.00	1813	100.00

SITE ID: SP
 SITE LOCATION: BIG SABLE PT., MI.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	19	41	61	71	77	51	18	1
2	10	15	16	21	22	23	6	0
3	5	6	6	5	11	11	5	0
4	2	3	0	6	4	11	3	1
5	2	3	1	1	1	6	0	0
6	2	0	0	0	0	5	4	0
7	1	0	0	0	1	2	0	0
8	1	0	0	1	0	2	2	0
9	1	0	0	1	0	2	2	0
10	1	0	0	0	0	2	1	0
11	0	0	0	0	0	1	1	1
12	1	0	0	0	0	0	0	0
13	0	0	0	0	0	1	0	0
14	0	0	0	0	0	1	0	0
15	0	0	0	0	0	0	0	0
16	1	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	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: SP
 SITE LOCATION: BIG SABLE PT., MI.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0.20	0.21	0.20	0.21	4.38	2.37	3.86
NNE	0.09	0.30	0.24	0.25	9.13	8.59	8.83
NE	0.06	0.36	0.28	0.30	5.44	5.50	5.79
ENE	-0.28	0.05	-0.04	-0.02	3.69	3.72	4.58
E	0.06	-0.07	-0.03	-0.04	2.63	3.30	5.30
ESE	0.40	0.29	0.32	0.31	4.63	3.98	9.32
SE	-0.41	0.41	0.20	0.24	4.69	8.42	7.06
SSE	0.36	0.21	0.25	0.24	7.63	5.88	8.44
S	0.03	0.22	0.17	0.18	14.95	16.72	19.31
SSW	-0.02	0.36	0.26	0.28	8.07	11.89	5.07
SW	0.36	0.12	0.18	0.17	4.88	5.84	3.42
WSW	0.11	0.29	0.24	0.25	3.13	3.68	2.10
W	0.31	0.35	0.34	0.34	4.88	3.60	2.48
WNW	0.36	0.20	0.24	0.23	8.44	4.32	3.20
NW	0.10	0.42	0.33	0.35	8.38	7.19	2.43
NNW	0.46	0.73	0.66	0.68	5.07	4.99	2.04

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

BLOCK ISLAND, RHODE ISLAND



SITE ID: RI
 SITE LOCATION: BLOCK ISLAND, RI.
 DATA : JANUARY 1982 THROUGH JUNE 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 4344

SENSOR	% ON-LINE	% RECOVERED
WS(A)	87.4	34.7
WD(A)	87.4	41.6
WS(B)	87.4	27.9
WD(B)	87.4	41.6
WS(C)	87.4	40.3
WD(C)	87.4	0.0

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	7.1	281.2	348.06
(B)	30.0	6.4	273.5	248.82
(C)	9.1	4.6	273.5	115.14

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	17.4	206.1	01/04/82	20:00	(B) 14.9 (C) 10.5
(B) 30.0	15.4	269.5	01/05/82	09:00	(A) 17.0 (C) 10.4
(C) 9.1	12.7	-999.9	04/06/82	12:00	(A)-999.9 (B)-999.9

 NOTES:

1. SITE ELEVATION: 14 METERS ABOVE SEA LEVEL.

SITE ID: RI
 SITE LOCATION: BLOCK ISLAND, RI.
 DATA : JANUARY 1982 THROUGH JUNE 1982

 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	287.4	6.4	276.4	4.0	0.0
01:00	7.0	288.3	6.5	278.2	4.4	0.0
02:00	6.9	288.1	6.1	281.9	4.2	0.0
03:00	6.8	293.2	6.1	279.6	4.2	0.0
04:00	6.6	292.9	6.0	281.0	4.3	0.0
05:00	6.6	290.5	6.2	282.1	4.2	0.0
06:00	6.6	290.1	6.2	279.3	4.2	0.0
07:00	6.7	288.0	6.2	283.3	4.3	0.0
08:00	6.8	293.6	6.2	281.1	4.6	0.0
09:00	7.0	295.2	6.3	278.5	4.8	0.0
10:00	7.2	294.8	6.5	275.2	5.0	0.0
11:00	7.5	285.2	6.7	271.8	5.4	0.0
12:00	7.6	269.4	6.7	269.8	5.5	0.0
13:00	7.7	264.1	6.6	268.7	5.4	0.0
14:00	7.7	260.9	6.6	265.9	5.1	0.0
15:00	7.7	259.2	6.6	261.7	5.2	0.0
16:00	7.5	261.6	6.5	262.9	5.1	0.0
17:00	7.5	264.3	6.6	272.0	4.9	0.0
18:00	7.5	266.4	6.5	268.1	4.7	0.0
19:00	7.3	266.2	6.6	266.2	4.5	0.0
20:00	7.2	275.9	6.6	264.3	4.5	0.0
21:00	7.0	283.3	6.7	269.1	4.3	0.0
22:00	6.9	286.6	6.7	264.0	4.1	0.0
23:00	6.7	286.7	6.3	273.1	4.0	0.0

SITE ID: RI
 SITE LOCATION: BLOCK ISLAND, RI.
 DATA : JANUARY 1982 THROUGH JUNE 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	COUNT	%	COUNT	%	COUNT	%
0.0- 0.5	0	0.0	0	0.0	46	2.6
0.5- 1.0	1	0.1	0	0.0	62	3.5
1.0- 1.5	6	0.4	7	0.6	75	4.3
1.5- 2.0	23	1.5	15	1.2	92	5.3
2.0- 2.5	24	1.6	31	2.6	98	5.6
2.5- 3.0	55	3.6	39	3.2	101	5.8
3.0- 3.5	51	3.4	53	4.4	141	8.1
3.5- 4.0	89	5.9	69	5.7	127	7.3
4.0- 4.5	70	4.6	78	6.4	142	8.1
4.5- 5.0	90	6.0	95	7.9	137	7.8
5.0- 5.5	84	5.6	96	7.9	133	7.6
5.5- 6.0	81	5.4	107	8.8	139	7.9
6.0- 6.5	101	6.7	96	7.9	94	5.4
6.5- 7.0	96	6.4	91	7.5	61	3.5
7.0- 7.5	99	6.6	69	5.7	47	2.7
7.5- 8.0	95	6.3	56	4.6	60	3.4
8.0- 8.5	88	5.8	60	5.0	50	2.9
8.5- 9.0	68	4.5	51	4.2	56	3.2
9.0- 9.5	70	4.6	33	2.7	31	1.8
9.5-10.0	55	3.6	31	2.6	18	1.0
10.0-11.0	90	6.0	56	4.6	33	1.9
11.0-12.0	61	4.0	35	2.9	6	0.3
12.0-13.0	53	3.5	27	2.2	1	0.1
13.0-14.0	27	1.8	8	0.7	0	0.0
14.0-15.0	17	1.1	6	0.5	0	0.0
15.0-16.0	4	0.3	1	0.1	0	0.0
16.0-17.0	8	0.5	0	0.0	0	0.0
17.0-18.0	1	0.1	0	0.0	0	0.0
18.0-19.0	0	0.0	0	0.0	0	0.0
19.0-20.0	0	0.0	0	0.0	0	0.0
20.0-21.0	0	0.0	0	0.0	0	0.0
>21.0	0	0.0	0	0.0	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 34.7 27.9 40.3

SITE ID: RI
 SITE LOCATION: BLOCK ISLAND, RI.
 DATA : JANUARY 1982 THROUGH JUNE 1982

 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	0	0.00	0	0.00	46	2.63
1.0	1	0.07	0	0.00	108	6.17
1.5	7	0.46	7	0.58	183	10.46
2.0	30	1.99	22	1.82	275	15.71
2.5	54	3.58	53	4.38	373	21.31
3.0	109	7.23	92	7.60	474	27.09
3.5	160	10.62	145	11.98	615	35.14
4.0	249	16.52	214	17.69	742	42.40
4.5	319	21.17	292	24.13	884	50.51
5.0	409	27.14	387	31.98	1021	58.34
5.5	493	32.71	483	39.92	1154	65.94
6.0	574	38.09	590	48.76	1293	73.89
6.5	675	44.79	686	56.69	1387	79.26
7.0	771	51.16	777	64.21	1448	82.74
7.5	870	57.73	846	69.92	1495	85.43
8.0	965	64.03	902	74.55	1555	88.86
8.5	1053	69.87	962	79.50	1605	91.71
9.0	1121	74.39	1013	83.72	1661	94.91
9.5	1191	79.03	1046	86.45	1692	96.69
10.0	1246	82.68	1077	89.01	1710	97.71
11.0	1336	88.65	1133	93.64	1743	99.60
12.0	1397	92.70	1168	96.53	1749	99.94
13.0	1450	96.22	1195	98.76	1750	100.00
14.0	1477	98.01	1203	99.42	1750	100.00
15.0	1494	99.14	1209	99.92	1750	100.00
16.0	1498	99.40	1210	100.00	1750	100.00
17.0	1506	99.93	1210	100.00	1750	100.00
18.0	1507	100.00	1210	100.00	1750	100.00
19.0	1507	100.00	1210	100.00	1750	100.00
20.0	1507	100.00	1210	100.00	1750	100.00
21.0	1507	100.00	1210	100.00	1750	100.00
>21.0	1507	100.00	1210	100.00	1750	100.00

SITE ID: RI
 SITE LOCATION: BLOCK ISLAND, RI.
 DATA : JANUARY 1982 THROUGH JUNE 1982

 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	22	53	68	64	85	37	11	0
2	6	11	22	30	20	13	6	0
3	9	13	4	7	4	10	3	0
4	1	2	4	1	5	7	1	0
5	1	1	2	3	3	6	2	0
6	1	0	0	0	1	4	0	0
7	1	1	0	0	0	4	0	0
8	1	0	0	0	1	6	0	0
9	0	0	0	0	0	1	0	0
10	0	0	0	0	0	1	0	0
11	0	0	0	0	0	6	0	0
12	0	0	0	0	0	1	0	0
13	0	0	0	0	0	2	0	0
14	0	0	0	0	0	0	1	0
15	0	0	0	0	0	0	1	0
16	0	0	0	0	0	2	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	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	1	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 : JANUARY 1982 THROUGH JUNE 1982

 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	0.34	0.52	0.70	0.00	3.32	3.64	0.00
NNE	0.17	0.52	0.70	0.00	5.04	4.38	0.00
NE	0.01	0.52	0.70	0.00	4.18	3.80	0.00
ENE	0.08	0.52	0.70	0.00	5.84	5.70	0.00
E	0.21	0.52	0.70	0.00	3.65	3.88	0.00
ESE	-0.01	0.52	0.70	0.00	3.72	2.81	0.00
SE	0.78	0.52	0.70	0.00	3.12	2.31	0.00
SSE	0.05	0.52	0.70	0.00	4.38	2.73	0.00
S	0.37	0.52	0.70	0.00	4.31	3.14	0.00
SSW	0.66	0.52	0.70	0.00	7.83	5.95	0.00
SW	0.38	0.52	0.70	0.00	7.10	6.45	0.00
WSW	0.48	0.52	0.70	0.00	12.14	11.40	0.00
W	0.36	0.52	0.70	0.00	10.68	13.88	0.00
WNW	0.32	0.52	0.70	0.00	12.34	15.54	0.00
NW	-0.13	0.52	0.70	0.00	8.49	10.25	0.00
NNW	-0.04	0.52	0.70	0.00	3.85	4.13	0.00

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

BRIDGER BUTTE, WYOMING



SITE ID: WY
 SITE LOCATION: BRIDGER BUTTE, WY.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 6552

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	78.6
WD(A)	100.0	92.9
WS(B)	100.0	78.4
WD(B)	100.0	92.9
WS(C)	100.0	78.5
WD(C)	100.0	92.9

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	7.7	233.6	460.99
(B)	30.0	7.6	240.6	420.70
(C)	9.1	6.7	233.4	306.68

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	24.6	252.8	03/30/82	10:00	(B) 24.1 (C) 22.0
(B) 30.0	24.1	257.1	03/30/82	10:00	(A) 24.6 (C) 22.0
(C) 9.1	22.5	245.8	03/30/82	09:00	(A) 23.5 (B) 23.3

 NOTES:

1. SITE ELEVATION: 2290 METERS ABOVE SEA LEVEL.

SITE ID: WY
 SITE LOCATION: BRIDGER BUTTE, WY.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	226.2	7.2	234.8	6.1	229.7
01:00	7.3	226.1	7.1	235.0	6.0	230.6
02:00	7.4	224.7	7.1	233.0	6.0	226.9
03:00	7.4	224.8	7.1	233.1	6.0	227.3
04:00	7.3	225.0	7.1	235.0	5.9	231.3
05:00	7.1	222.1	6.9	233.3	5.8	230.6
06:00	6.8	224.1	6.6	236.0	5.6	233.8
07:00	6.4	216.1	6.2	228.3	5.4	225.0
08:00	6.1	217.2	6.0	225.4	5.4	212.9
09:00	6.4	218.3	6.5	221.9	6.0	209.4
10:00	7.0	234.7	7.1	234.8	6.5	224.5
11:00	7.5	232.4	7.5	232.4	6.9	223.6
12:00	7.9	234.9	8.0	237.4	7.3	225.5
13:00	8.4	244.9	8.4	247.0	7.8	235.6
14:00	8.8	242.8	8.8	246.3	8.1	235.3
15:00	9.4	243.6	9.4	248.2	8.6	236.7
16:00	9.3	247.6	9.3	251.6	8.5	240.5
17:00	9.2	249.9	9.2	254.3	8.4	245.2
18:00	8.8	249.7	8.7	254.4	7.8	245.1
19:00	8.5	245.8	8.3	252.1	7.4	243.6
20:00	8.1	247.8	7.8	254.9	6.7	248.0
21:00	7.7	244.4	7.5	251.0	6.3	243.8
22:00	7.5	234.0	7.3	241.7	6.1	234.3
23:00	7.5	227.5	7.3	235.6	6.1	229.0

SITE ID: WY
 SITE LOCATION: BRIDGER BUTTE, WY.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C COUNT	%
0.0- 0.5	0	0.0	0	0.0
0.5- 1.0	6	0.1	4	0.1
1.0- 1.5	84	1.6	69	1.3
1.5- 2.0	195	3.8	181	3.5
2.0- 2.5	250	4.9	244	4.7
2.5- 3.0	238	4.6	215	4.2
3.0- 3.5	261	5.1	226	4.4
3.5- 4.0	244	4.7	213	4.1
4.0- 4.5	231	4.5	245	4.8
4.5- 5.0	254	4.9	269	5.2
5.0- 5.5	199	3.9	256	5.0
5.5- 6.0	220	4.3	262	5.1
6.0- 6.5	177	3.4	223	4.3
6.5- 7.0	214	4.2	229	4.5
7.0- 7.5	193	3.7	221	4.3
7.5- 8.0	195	3.8	167	3.3
8.0- 8.5	160	3.1	177	3.4
8.5- 9.0	163	3.2	157	3.1
9.0- 9.5	154	3.0	182	3.5
9.5-10.0	165	3.2	186	3.6
10.0-11.0	327	6.4	299	5.8
11.0-12.0	261	5.1	263	5.1
12.0-13.0	238	4.6	245	4.8
13.0-14.0	226	4.4	185	3.6
14.0-15.0	155	3.0	137	2.7
15.0-16.0	109	2.1	92	1.8
16.0-17.0	63	1.2	66	1.3
17.0-18.0	63	1.2	52	1.0
18.0-19.0	46	0.9	30	0.6
19.0-20.0	19	0.4	15	0.3
20.0-21.0	14	0.3	15	0.3
>21.0	24	0.5	13	0.3

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 78.6 78.4 78.5

SITE ID: WY
 SITE LOCATION: BRIDGER BUTTE, WY.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0	0.00	0	0.00	0	0.00
1.0	6	0.12	4	0.08	18	0.35
1.5	90	1.75	73	1.42	120	2.33
2.0	285	5.54	254	4.94	359	6.98
2.5	535	10.39	498	9.69	654	12.71
3.0	773	15.02	713	13.88	978	19.01
3.5	1034	20.09	939	18.28	1289	25.06
4.0	1278	24.83	1152	22.42	1597	31.05
4.5	1509	29.31	1397	27.19	1851	35.98
5.0	1763	34.25	1666	32.43	2110	41.02
5.5	1962	38.11	1922	37.41	2360	45.88
6.0	2182	42.39	2184	42.51	2597	50.49
6.5	2359	45.82	2407	46.85	2819	54.80
7.0	2573	49.98	2636	51.30	3013	58.57
7.5	2766	53.73	2857	55.61	3191	62.03
8.0	2961	57.52	3024	58.86	3389	65.88
8.5	3121	60.63	3201	62.30	3601	70.00
9.0	3284	63.79	3358	65.36	3799	73.85
9.5	3438	66.78	3540	68.90	3960	76.98
10.0	3603	69.99	3726	72.52	4096	79.63
11.0	3930	76.34	4025	78.34	4379	85.13
12.0	4191	81.41	4288	83.46	4592	89.27
13.0	4429	86.03	4533	88.22	4767	92.67
14.0	4655	90.42	4718	91.83	4887	95.00
15.0	4810	93.43	4855	94.49	4975	96.71
16.0	4919	95.55	4947	96.28	5046	98.09
17.0	4982	96.78	5013	97.57	5092	98.99
18.0	5045	98.00	5065	98.58	5116	99.46
19.0	5091	98.89	5095	99.16	5129	99.71
20.0	5110	99.26	5110	99.46	5133	99.79
21.0	5124	99.53	5125	99.75	5136	99.84
>21.0	5148	100.00	5138	100.00	5144	100.00

SITE ID: WY
 SITE LOCATION: BRIDGER BUTTE, WY.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	104	240	244	241	236	215	95	11	
2	48	75	62	47	44	93	35	3	
3	36	20	18	11	13	48	17	0	
4	21	10	5	4	4	31	9	0	
5	14	2	0	1	1	19	11	2	
6	7	0	0	1	0	20	13	0	
7	2	0	0	0	0	9	6	0	
8	4	0	1	0	0	12	4	0	
9	3	0	1	0	0	9	2	0	
10	1	0	0	0	0	6	5	0	
11	0	0	0	0	0	6	1	0	
12	2	0	0	0	0	1	0	0	
13	0	0	0	0	0	1	0	0	
14	0	0	0	0	0	2	0	0	
15	0	0	0	0	0	2	0	0	
16	0	0	0	0	0	0	1	0	
17	1	0	0	0	0	0	0	0	
18	0	0	0	0	0	0	1	0	
19	0	0	0	0	0	0	0	0	
20	0	0	0	0	0	0	1	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: WY
 SITE LOCATION: BRIDGER BUTTE, WY.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0.13	0.11	0.12	1.18	1.27	1.38
NNE	-0.28	0.07	-0.02	0.00	0.93	0.68	1.21
NE	0.35	-0.07	0.04	0.02	1.86	1.13	2.70
ENE	-0.10	0.15	0.09	0.10	5.59	3.31	5.68
E	-0.23	0.14	0.04	0.06	5.34	6.07	4.28
ESE	-0.05	0.12	0.08	0.09	3.50	4.20	3.64
SE	-0.11	0.04	0.00	0.01	2.95	3.68	2.53
SSE	-0.02	0.05	0.03	0.04	2.80	2.51	2.41
S	1.23	-0.25	0.13	0.05	8.57	3.35	6.16
SSW	0.58	-0.03	0.13	0.09	10.82	7.57	12.46
SW	-0.20	0.16	0.06	0.08	9.67	16.33	11.98
WSW	0.14	0.07	0.09	0.08	18.24	17.94	21.09
W	-0.02	0.18	0.13	0.14	16.20	18.33	13.78
WNW	-0.06	0.15	0.09	0.11	7.23	8.17	5.77
NW	-0.12	0.17	0.10	0.11	3.54	3.54	3.38
NNW	-0.12	0.16	0.09	0.11	1.57	1.91	1.56

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

CLAYTON, NEW MEXICO



SITE ID: NM
 SITE LOCATION: CLAYTON, NM.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 6552

SENSOR	% ON-LINE	% RECOVERED
WS(A)	81.6	26.7
WD(A)	81.6	20.5
WS(B)	81.6	17.2
WD(B)	81.6	24.8
WS(C)	81.6	42.8
WD(C)	81.6	25.1

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	7.2	245.9	361.67
(B)	30.0	6.8	230.7	329.49
(C)	9.1	5.6	246.5	188.42

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	23.1	246.1	03/29/82	15:00	(B) 21.5 (C) 20.6
(B) 30.0	22.2	296.0	04/02/82	11:00	(A)-999.9 (C) 20.1
(C) 9.1	20.6	251.3	03/29/82	15:00	(A) 23.1 (B) 21.5

 NOTES:

1. SITE ELEVATION: 1536 METERS ABOVE SEA LEVEL.

SITE ID: NM
 SITE LOCATION: CLAYTON, NM.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	246.7	6.1	229.6	4.6	245.8
01:00	6.8	255.2	6.1	236.3	4.6	259.1
02:00	6.7	254.6	6.0	241.6	4.5	265.0
03:00	6.5	256.5	5.6	244.2	4.3	269.4
04:00	6.5	262.4	5.5	250.7	4.2	277.3
05:00	6.3	259.4	5.5	251.3	4.2	277.1
06:00	6.6	265.0	6.0	256.1	4.7	281.2
07:00	6.7	267.7	6.2	255.9	5.4	288.5
08:00	7.0	268.5	6.5	252.5	6.0	283.3
09:00	7.6	263.1	7.1	242.1	6.4	273.6
10:00	7.8	256.4	7.5	234.2	6.6	252.7
11:00	7.2	256.2	7.3	226.8	6.5	235.8
12:00	7.5	243.3	7.3	220.4	6.7	223.9
13:00	8.1	237.0	7.8	214.4	7.0	212.1
14:00	8.2	226.8	8.3	214.5	7.4	211.6
15:00	8.5	222.9	8.8	212.1	7.7	206.8
16:00	8.5	219.3	8.6	209.8	7.3	203.3
17:00	7.9	220.2	7.8	212.3	6.6	204.7
18:00	7.8	223.8	7.0	216.5	6.0	210.6
19:00	7.5	225.7	6.5	212.0	5.4	205.7
20:00	7.1	230.2	6.2	220.4	5.0	223.0
21:00	7.1	233.4	6.1	224.6	4.8	240.0
22:00	6.9	236.1	6.5	226.4	4.7	240.4
23:00	6.8	238.6	6.5	227.8	4.6	245.1

SITE ID: NM
 SITE LOCATION: CLAYTON, NM.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT
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0.0- 0.5	0	0.0	6
0.5- 1.0	11	0.6	16
1.0- 1.5	11	0.6	27
1.5- 2.0	36	2.1	33
2.0- 2.5	44	2.5	51
2.5- 3.0	58	3.3	50
3.0- 3.5	64	3.7	53
3.5- 4.0	92	5.3	57
4.0- 4.5	72	4.1	63
4.5- 5.0	108	6.2	59
5.0- 5.5	126	7.2	70
5.5- 6.0	119	6.8	55
6.0- 6.5	109	6.2	43
6.5- 7.0	101	5.8	62
7.0- 7.5	96	5.5	47
7.5- 8.0	92	5.3	42
8.0- 8.5	84	4.8	49
8.5- 9.0	56	3.2	41
9.0- 9.5	53	3.0	52
9.5-10.0	54	3.1	43
10.0-11.0	92	5.3	63
11.0-12.0	87	5.0	53
12.0-13.0	66	3.8	37
13.0-14.0	43	2.5	18
14.0-15.0	21	1.2	12
15.0-16.0	20	1.1	6
16.0-17.0	9	0.5	7
17.0-18.0	4	0.2	4
18.0-19.0	3	0.2	2
19.0-20.0	5	0.3	2
20.0-21.0	5	0.3	1
>21.0	6	0.3	6

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 26.7 17.2 42.8

SITE ID: NM
 SITE LOCATION: CLAYTON, NM.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0	0.00	6	0.53	0	0.00
1.0	11	0.63	22	1.95	22	0.78
1.5	22	1.26	49	4.34	122	4.35
2.0	58	3.32	82	7.26	256	9.13
2.5	102	5.84	133	11.77	432	15.40
3.0	160	9.16	183	16.19	616	21.96
3.5	224	12.82	236	20.88	793	28.27
4.0	316	18.09	293	25.93	973	34.69
4.5	388	22.21	356	31.50	1186	42.28
5.0	496	28.39	415	36.73	1400	49.91
5.5	622	35.60	485	42.92	1586	56.54
6.0	741	42.42	540	47.79	1764	62.89
6.5	850	48.65	583	51.59	1887	67.27
7.0	951	54.44	645	57.08	2012	71.73
7.5	1047	59.93	692	61.24	2117	75.47
8.0	1139	65.20	734	64.96	2230	79.50
8.5	1223	70.01	783	69.29	2335	83.24
9.0	1279	73.21	824	72.92	2425	86.45
9.5	1332	76.24	876	77.52	2496	88.98
10.0	1386	79.34	919	81.33	2553	91.02
11.0	1478	84.60	982	86.90	2655	94.65
12.0	1565	89.58	1035	91.59	2718	96.90
13.0	1631	93.36	1072	94.87	2743	97.79
14.0	1674	95.82	1090	96.46	2771	98.79
15.0	1695	97.02	1102	97.52	2780	99.11
16.0	1715	98.17	1108	98.05	2783	99.22
17.0	1724	98.68	1115	98.67	2788	99.39
18.0	1728	98.91	1119	99.03	2794	99.61
19.0	1731	99.08	1121	99.20	2799	99.79
20.0	1736	99.37	1123	99.38	2802	99.89
21.0	1741	99.66	1124	99.47	2805	100.00
>21.0	1747	100.00	1130	100.00	2805	100.00

SITE ID: NM
 SITE LOCATION: CLAYTON, NM.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	41	71	108	132	94	68	24	1
2	12	20	21	28	26	27	7	1
3	4	4	6	9	14	16	5	1
4	4	4	2	4	4	16	6	0
5	3	1	0	2	0	9	3	1
6	0	0	0	0	1	6	4	0
7	2	0	0	0	0	4	1	0
8	0	0	1	0	0	0	0	0
9	0	0	0	0	0	6	0	0
10	0	0	0	1	0	6	0	0
11	0	0	0	0	0	1	1	0
12	1	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	3	0	0
16	1	1	0	0	0	0	0	0
17	0	1	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	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: NM
 SITE LOCATION: CLAYTON, NM.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0.74	0.00	0.19	0.15	4.75	5.84	4.39
NNE	0.59	0.08	0.22	0.19	2.98	6.73	3.39
NE	0.69	-0.02	0.16	0.12	1.49	3.98	1.89
ENE	0.63	-0.17	0.04	0.00	0.52	2.21	1.00
E	0.41	-0.10	0.03	0.00	0.80	1.95	0.96
ESE	0.79	-0.02	0.19	0.15	1.09	3.19	2.03
SE	0.73	-0.07	0.14	0.10	2.52	5.22	2.25
SSE	0.78	-0.20	0.06	0.00	1.09	2.74	2.00
S	0.59	0.00	0.15	0.12	4.18	6.64	4.03
SSW	0.46	0.07	0.17	0.15	5.72	12.74	8.81
SW	0.34	0.08	0.15	0.13	5.78	10.53	7.27
WSW	0.69	0.07	0.23	0.20	5.38	8.32	4.24
W	0.50	0.11	0.22	0.19	6.07	12.39	6.35
WNW	0.41	0.25	0.29	0.28	3.55	6.73	4.10
NW	0.22	0.13	0.15	0.15	2.40	6.02	2.82
NNW	0.41	0.20	0.26	0.25	1.66	3.72	3.07

 NOTES:

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

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

WS = WIND SPEED

CULEBRA, PUERTO RICO



SITE ID: PR
 SITE LOCATION: CULEBRA, PR.
 DATA : JANUARY 1982 THROUGH MAY 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 3624

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	12.3
WD(A)	100.0	16.0
WS(C)	100.0	16.0
WD(C)	100.0	16.0

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	7.8	82.0	344.14
(C)	9.1	3.2	83.4	26.35

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	13.2	71.5	03/12/82	03:00	(B)-999.9 (C) 5.5
(C) 9.1	6.1	92.2	03/11/82	10:00	(A)-999.9 (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 : JANUARY 1982 THROUGH MAY 1982

 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	7.8	79.4	0.0	0.0	3.1	84.8
01:00	7.6	80.2	0.0	0.0	3.0	84.4
02:00	7.5	82.0	0.0	0.0	3.0	84.1
03:00	7.4	82.8	0.0	0.0	3.0	82.0
04:00	7.4	82.2	0.0	0.0	2.9	81.9
05:00	7.3	83.7	0.0	0.0	2.8	80.4
06:00	7.1	83.5	0.0	0.0	2.8	80.9
07:00	7.2	82.9	0.0	0.0	3.1	83.5
08:00	7.4	82.5	0.0	0.0	3.5	85.8
09:00	8.2	84.1	0.0	0.0	3.7	84.1
10:00	8.6	86.5	0.0	0.0	3.9	82.8
11:00	8.1	87.1	0.0	0.0	3.6	81.9
12:00	8.0	84.0	0.0	0.0	3.7	84.1
13:00	8.0	85.3	0.0	0.0	3.6	81.6
14:00	8.2	84.2	0.0	0.0	3.5	82.4
15:00	8.2	79.8	0.0	0.0	3.4	84.4
16:00	7.9	79.6	0.0	0.0	3.3	84.6
17:00	7.9	80.9	0.0	0.0	3.2	83.3
18:00	8.0	82.8	0.0	0.0	3.0	80.8
19:00	8.4	82.7	0.0	0.0	3.0	82.4
20:00	8.0	79.4	0.0	0.0	3.1	83.6
21:00	8.0	77.2	0.0	0.0	3.1	86.7
22:00	7.8	78.1	0.0	0.0	3.1	86.1
23:00	7.8	79.3	0.0	0.0	3.1	85.4

SITE ID: PR
 SITE LOCATION: CULEBRA, PR.
 DATA : JANUARY 1982 THROUGH MAY 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT
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0.0- 0.5	0	0.0	0 0.0
0.5- 1.0	0	0.0	0 0.0
1.0- 1.5	0	0.0	0 0.0
1.5- 2.0	1	0.2	0 0.0
2.0- 2.5	0	0.0	0 0.0
2.5- 3.0	0	0.0	0 0.0
3.0- 3.5	1	0.2	0 0.0
3.5- 4.0	2	0.4	0 0.0
4.0- 4.5	6	1.3	0 0.0
4.5- 5.0	6	1.3	0 0.0
5.0- 5.5	22	4.9	0 0.0
5.5- 6.0	29	6.5	0 0.0
6.0- 6.5	43	9.7	0 0.0
6.5- 7.0	48	10.8	0 0.0
7.0- 7.5	49	11.0	0 0.0
7.5- 8.0	50	11.2	0 0.0
8.0- 8.5	42	9.4	0 0.0
8.5- 9.0	39	8.8	0 0.0
9.0- 9.5	31	7.0	0 0.0
9.5-10.0	23	5.2	0 0.0
10.0-11.0	25	5.6	0 0.0
11.0-12.0	10	2.2	0 0.0
12.0-13.0	12	2.7	0 0.0
13.0-14.0	6	1.3	0 0.0
14.0-15.0	0	0.0	0 0.0
15.0-16.0	0	0.0	0 0.0
16.0-17.0	0	0.0	0 0.0
17.0-18.0	0	0.0	0 0.0
18.0-19.0	0	0.0	0 0.0
19.0-20.0	0	0.0	0 0.0
20.0-21.0	0	0.0	0 0.0
>21.0	0	0.0	0 0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 12.3 0.0 16.0

SITE ID: PR
 SITE LOCATION: CULEBRA, PR.
 DATA : JANUARY 1982 THROUGH MAY 1982

 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	0	0.00	0	0.00	0	0.00
1.0	0	0.00	0	0.00	0	0.00
1.5	0	0.00	0	0.00	19	3.28
2.0	1	0.22	0	0.00	50	8.64
2.5	1	0.22	0	0.00	128	22.11
3.0	1	0.22	0	0.00	256	44.21
3.5	2	0.45	0	0.00	380	65.63
4.0	4	0.90	0	0.00	474	81.87
4.5	10	2.25	0	0.00	525	90.67
5.0	16	3.60	0	0.00	537	92.75
5.5	38	8.54	0	0.00	556	96.03
6.0	67	15.06	0	0.00	577	99.65
6.5	110	24.72	0	0.00	579	100.00
7.0	158	35.51	0	0.00	579	100.00
7.5	207	46.52	0	0.00	579	100.00
8.0	257	57.75	0	0.00	579	100.00
8.5	299	67.19	0	0.00	579	100.00
9.0	338	75.96	0	0.00	579	100.00
9.5	369	82.92	0	0.00	579	100.00
10.0	392	88.09	0	0.00	579	100.00
11.0	417	93.71	0	0.00	579	100.00
12.0	427	95.96	0	0.00	579	100.00
13.0	439	98.65	0	0.00	579	100.00
14.0	445	100.00	0	0.00	579	100.00
15.0	445	100.00	0	0.00	579	100.00
16.0	445	100.00	0	0.00	579	100.00
17.0	445	100.00	0	0.00	579	100.00
18.0	445	100.00	0	0.00	579	100.00
19.0	445	100.00	0	0.00	579	100.00
20.0	445	100.00	0	0.00	579	100.00
21.0	445	100.00	0	0.00	579	100.00
>21.0	445	100.00	0	0.00	579	100.00

SITE ID: PR
 SITE LOCATION: CULEBRA, PR.
 DATA : JANUARY 1982 THROUGH MAY 1982

 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	1	3	6	9	28	20	3	0
2	0	0	1	5	7	4	2	0
3	0	0	0	5	5	3	0	0
4	0	0	1	0	2	3	0	0
5	0	0	0	0	1	4	1	0
6	0	0	0	0	1	2	1	0
7	0	0	0	0	0	0	0	0
8	0	0	0	1	0	1	0	0
9	0	0	0	1	0	2	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	1	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	2	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	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: PR
 SITE LOCATION: CULEBRA, PR.
 DATA : JANUARY 1982 THROUGH MAY 1982

 1.8 POWER LAW EXPONENT AND W/D DISTRIBUTION

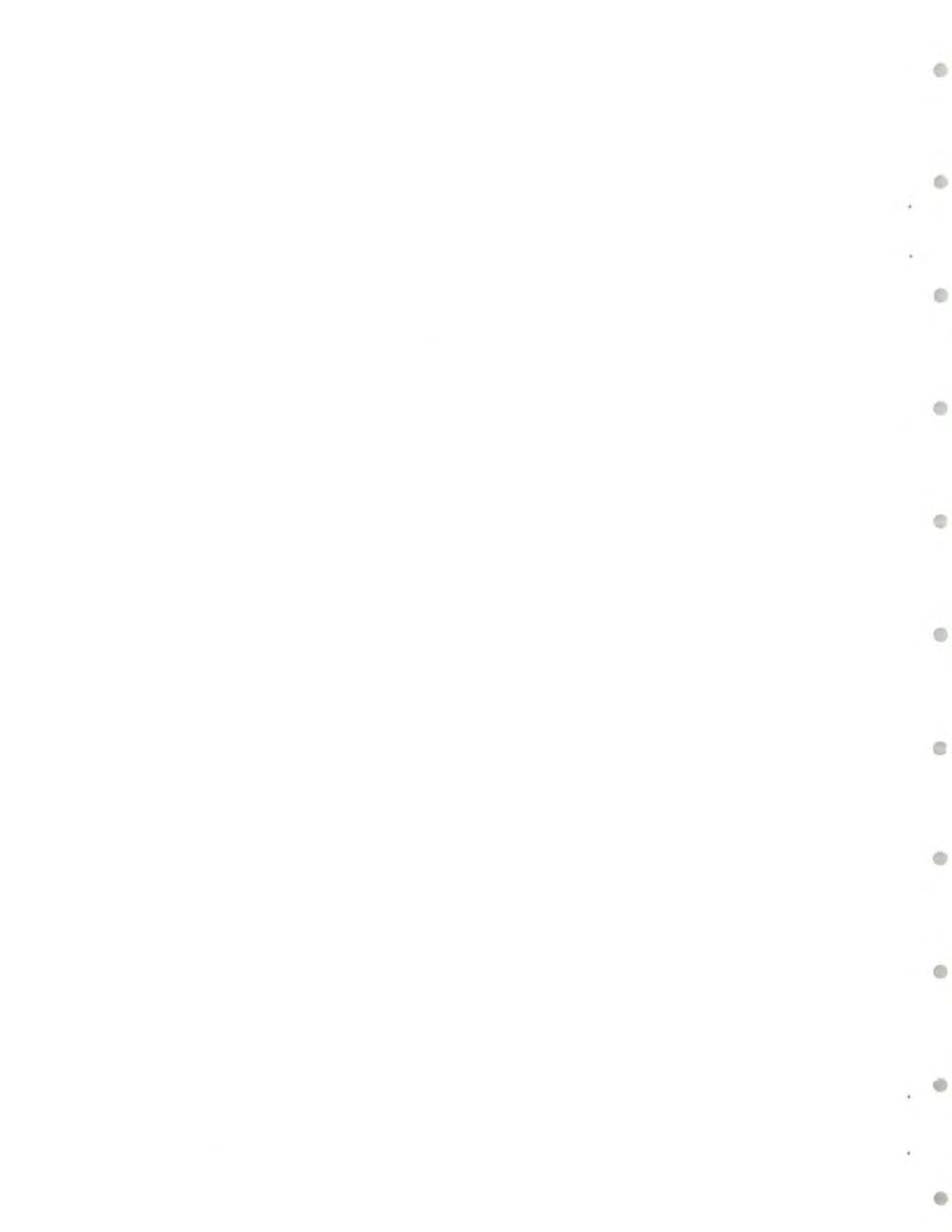
WIND DIR (ELEV A)	ALPHA (A,B)	ALPHA (B,C)	ALPHA (A,C)	ALPHA (A,B,C)	%A	%B	%C
N	0.00	0.00	0.70	0.00	0.00	0.00	0.69
NNE	0.00	0.00	0.95	0.00	1.57	0.00	2.42
NE	0.00	0.00	0.85	0.00	10.34	0.00	3.11
ENE	0.00	0.00	0.67	0.00	46.29	0.00	28.84
E	0.00	0.00	0.42	0.00	31.24	0.00	55.09
ESE	0.00	0.00	0.68	0.00	9.89	0.00	8.98
SE	0.00	0.00	0.47	0.00	0.67	0.00	0.52
SSE	0.00	0.00	0.70	0.00	0.00	0.00	0.00
S	0.00	0.00	0.70	0.00	0.00	0.00	0.00
SSW	0.00	0.00	0.70	0.00	0.00	0.00	0.00
SW	0.00	0.00	0.70	0.00	0.00	0.00	0.00
WSW	0.00	0.00	0.70	0.00	0.00	0.00	0.00
W	0.00	0.00	0.70	0.00	0.00	0.00	0.35
WNW	0.00	0.00	0.70	0.00	0.00	0.00	0.00
NW	0.00	0.00	0.70	0.00	0.00	0.00	0.00
NNW	0.00	0.00	0.70	0.00	0.00	0.00	0.00

 NOTES:

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

$$2. \text{ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{array}{l} Z = \text{ELEVATION} \\ WS = \text{WIND SPEED} \end{array}$$

DIABLO DAM, WASHINGTON



SITE ID: DD
 SITE LOCATION: DIABLO DAM, WA.
 DATA : JANUARY 1982 THROUGH JUNE 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 4344

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	66.9
WD(A)	100.0	75.6
WS(B)	100.0	30.4
WD(B)	100.0	75.8
WS(C)	100.0	55.2
WD(C)	100.0	41.8

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	3.9	218.5	81.66
(B)	30.0	3.5	234.9	61.49
(C)	9.1	1.9	80.2	8.40

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	14.2	267.2	03/31/82	14:00	(B) 12.4 (C) 4.1
(B) 30.0	12.4	264.5	03/31/82	14:00	(A) 14.2 (C) 4.1
(C) 9.1	5.9	266.9	01/26/82	14:00	(A) 6.5 (B)-999.9

 NOTES:

1. SITE ELEVATION: 500 METERS ABOVE SEA LEVEL.

SITE ID: DD
 SITE LOCATION: DIABLO DAM, WA.
 DATA : JANUARY 1982 THROUGH JUNE 1982

 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	3.7	162.5	2.3	179.2	1.8	71.1
01:00	3.6	167.4	2.5	206.6	1.8	65.0
02:00	3.7	158.9	2.8	218.4	1.8	67.6
03:00	3.7	155.9	2.7	169.2	1.9	66.2
04:00	3.8	153.6	2.8	186.8	1.8	67.9
05:00	3.7	148.3	2.6	174.5	1.8	67.1
06:00	3.7	138.8	2.5	164.9	1.8	76.2
07:00	3.5	147.4	2.4	195.8	1.9	89.1
08:00	3.4	159.1	3.0	215.5	2.0	93.3
09:00	3.5	183.4	3.3	209.9	2.0	107.2
10:00	3.9	203.8	3.5	214.4	2.0	118.6
11:00	4.1	224.8	4.3	228.0	2.1	156.1
12:00	4.3	242.5	4.9	239.6	2.1	205.0
13:00	4.3	246.4	5.0	242.7	2.1	200.0
14:00	4.6	245.4	5.5	245.2	2.2	220.3
15:00	4.7	250.9	5.3	248.1	2.1	236.8
16:00	4.4	252.3	4.8	249.2	2.1	203.0
17:00	4.0	257.9	4.2	253.2	1.9	56.5
18:00	4.0	254.9	3.4	259.4	2.0	72.7
19:00	3.6	242.7	2.8	250.3	1.8	78.5
20:00	3.8	236.3	2.8	240.7	1.8	68.8
21:00	3.8	219.3	2.7	236.3	1.8	70.9
22:00	3.7	190.9	2.6	220.1	1.9	70.6
23:00	3.6	164.3	2.5	206.0	1.8	72.3

SITE ID: DD
 SITE LOCATION: DIABLO DAM, WA.
 DATA : JANUARY 1982 THROUGH JUNE 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT
0.0- 0.5	0	0.0	0	0.0	0	0.0
0.5- 1.0	176	6.1	73	5.5	661	27.6
1.0- 1.5	274	9.4	326	24.7	345	14.4
1.5- 2.0	164	5.6	128	9.7	341	14.2
2.0- 2.5	199	6.8	93	7.1	323	13.5
2.5- 3.0	324	11.1	75	5.7	237	9.9
3.0- 3.5	427	14.7	57	4.3	308	12.8
3.5- 4.0	314	10.8	65	4.9	105	4.4
4.0- 4.5	133	4.6	61	4.6	48	2.0
4.5- 5.0	134	4.6	63	4.8	21	0.9
5.0- 5.5	128	4.4	76	5.8	7	0.3
5.5- 6.0	137	4.7	83	6.3	2	0.1
6.0- 6.5	92	3.2	63	4.8	0	0.0
6.5- 7.0	91	3.1	45	3.4	0	0.0
7.0- 7.5	58	2.0	36	2.7	0	0.0
7.5- 8.0	47	1.6	30	2.3	0	0.0
8.0- 8.5	44	1.5	15	1.1	0	0.0
8.5- 9.0	40	1.4	14	1.1	0	0.0
9.0- 9.5	28	1.0	5	0.4	0	0.0
9.5-10.0	24	0.8	3	0.2	0	0.0
10.0-11.0	38	1.3	5	0.4	0	0.0
11.0-12.0	18	0.6	2	0.2	0	0.0
12.0-13.0	15	0.5	1	0.1	0	0.0
13.0-14.0	2	0.1	0	0.0	0	0.0
14.0-15.0	1	0.0	0	0.0	0	0.0
15.0-16.0	0	0.0	0	0.0	0	0.0
16.0-17.0	0	0.0	0	0.0	0	0.0
17.0-18.0	0	0.0	0	0.0	0	0.0
18.0-19.0	0	0.0	0	0.0	0	0.0
19.0-20.0	0	0.0	0	0.0	0	0.0
20.0-21.0	0	0.0	0	0.0	0	0.0
>21.0	0	0.0	0	0.0	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 66.9 30.4 55.2

SITE ID: DD
 SITE LOCATION: DIABLO DAM, WA.
 DATA : JANUARY 1982 THROUGH JUNE 1982

 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	0	0.00	0	0.00	0	0.00
1.0	176	6.05	73	5.53	661	27.56
1.5	450	15.47	399	30.25	1006	41.95
2.0	614	21.11	527	39.95	1347	56.17
2.5	813	27.96	620	47.01	1670	69.64
3.0	1137	39.10	695	52.69	1907	79.52
3.5	1564	53.78	752	57.01	2215	92.37
4.0	1878	64.58	817	61.94	2320	96.75
4.5	2011	69.15	878	66.57	2368	98.75
5.0	2145	73.76	941	71.34	2389	99.62
5.5	2273	78.16	1017	77.10	2396	99.92
6.0	2410	82.87	1100	83.40	2398	100.00
6.5	2502	86.04	1163	88.17	2398	100.00
7.0	2593	89.17	1208	91.58	2398	100.00
7.5	2651	91.16	1244	94.31	2398	100.00
8.0	2698	92.78	1274	96.59	2398	100.00
8.5	2742	94.29	1289	97.73	2398	100.00
9.0	2782	95.67	1303	98.79	2398	100.00
9.5	2810	96.63	1308	99.17	2398	100.00
10.0	2834	97.46	1311	99.39	2398	100.00
11.0	2872	98.76	1316	99.77	2398	100.00
12.0	2890	99.38	1318	99.92	2398	100.00
13.0	2905	99.90	1319	100.00	2398	100.00
14.0	2907	99.97	1319	100.00	2398	100.00
15.0	2908	100.00	1319	100.00	2398	100.00
16.0	2908	100.00	1319	100.00	2398	100.00
17.0	2908	100.00	1319	100.00	2398	100.00
18.0	2908	100.00	1319	100.00	2398	100.00
19.0	2908	100.00	1319	100.00	2398	100.00
20.0	2908	100.00	1319	100.00	2398	100.00
21.0	2908	100.00	1319	100.00	2398	100.00
>21.0	2908	100.00	1319	100.00	2398	100.00

SITE ID: DD
 SITE LOCATION: DIABLO DAM, WA.
 DATA : JANUARY 1982 THROUGH JUNE 1982

 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	116	120	111	99	81	40	7	0
2	51	25	33	20	30	21	2	0
3	18	3	8	11	8	9	0	0
4	11	6	4	1	1	5	1	0
5	11	3	2	2	1	6	0	0
6	7	2	1	1	0	4	0	0
7	8	0	1	1	0	3	0	0
8	7	0	1	0	0	1	0	0
9	4	1	0	0	0	2	0	0
10	3	0	0	0	0	0	0	0
11	5	0	0	0	0	0	0	0
12	0	1	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	1	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	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: DD
 SITE LOCATION: DIABLO DAM, WA.
 DATA : JANUARY 1982 THROUGH JUNE 1982

 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	1.04	0.33	0.52	0.47	0.38	0.23	0.17
NNE	2.17	-0.53	0.17	0.02	0.58	0.23	0.50
NE	1.23	-0.01	0.31	0.24	1.51	1.21	2.29
ENE	2.03	-0.09	0.46	0.34	4.09	5.46	6.92
E	1.77	-0.09	0.39	0.29	12.69	11.52	9.22
ESE	1.65	-0.16	0.31	0.21	15.41	8.72	4.50
SE	1.31	-0.10	0.27	0.19	5.36	3.56	1.04
SSE	1.15	-0.13	0.20	0.13	2.34	2.27	0.83
S	1.28	-0.11	0.26	0.18	2.27	1.67	0.46
SSW	2.03	-0.07	0.48	0.36	1.79	1.21	0.88
SW	1.25	0.09	0.40	0.33	3.51	2.81	1.54
WSW	0.54	0.41	0.45	0.44	16.37	14.33	4.55
W	0.04	0.62	0.47	0.50	29.47	39.50	5.88
WNW	-0.02	0.46	0.33	0.36	2.99	5.00	4.21
NW	1.55	-0.20	0.26	0.16	0.89	1.67	3.42
NNW	1.65	-0.31	0.20	0.09	0.31	0.61	0.83

 NOTES:

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

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

WS = WIND SPEED

FINLEY, NORTH DAKOTA



SITE ID: ND
 SITE LOCATION: FINLEY, ND.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 6552

SENSOR	% ON-LINE	% RECOVERED
WS(A)	96.2	65.7
WD(A)	96.2	66.3
WS(B)	96.2	51.6
WD(B)	96.2	56.7
WS(C)	96.2	66.1
WD(C)	96.2	66.3

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	8.6	306.7	573.03
(B)	30.0	7.3	348.0	344.90
(C)	9.1	6.1	311.1	235.69

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	24.5	280.1	03/12/82	22:00	(B) 23.3 (C) 20.5
(B) 30.0	23.8	280.5	03/12/82	21:00	(A) 24.1 (C) 21.6
(C) 9.1	21.6	283.1	03/12/82	21:00	(A) 24.1 (B) 23.8

NOTES:

1. SITE ELEVATION: 472 METERS ABOVE SEA LEVEL.

SITE ID: ND
 SITE LOCATION: FINLEY, ND.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	8.9	295.3	7.2	323.0	5.7	295.5
01:00	8.9	296.1	7.2	321.8	5.6	290.4
02:00	8.9	294.7	7.1	321.4	5.6	298.4
03:00	8.7	294.8	7.0	319.3	5.6	293.0
04:00	8.7	299.8	7.0	318.4	5.5	293.0
05:00	8.7	297.9	7.0	319.1	5.6	294.3
06:00	8.5	305.4	7.0	321.4	5.5	297.1
07:00	8.3	304.4	6.9	324.6	5.7	300.3
08:00	8.1	305.9	6.8	328.6	5.9	311.8
09:00	8.2	301.9	7.0	335.1	6.2	315.1
10:00	8.3	309.2	7.1	335.0	6.4	319.1
11:00	8.4	315.0	7.2	339.5	6.6	335.3
12:00	8.5	330.3	7.2	342.9	6.8	344.0
13:00	8.8	323.5	7.4	339.5	7.0	340.3
14:00	8.8	310.2	7.5	332.3	7.0	326.4
15:00	8.8	309.3	7.5	331.0	6.9	323.3
16:00	8.7	301.7	7.4	329.2	6.7	315.3
17:00	8.7	304.1	7.3	328.4	6.5	317.9
18:00	8.6	303.0	7.3	327.5	6.2	312.5
19:00	8.5	310.9	7.0	331.1	6.0	321.2
20:00	8.5	320.8	7.0	339.5	5.7	321.1
21:00	8.5	323.0	7.0	338.4	5.7	317.4
22:00	8.6	305.5	7.2	331.8	5.7	297.2
23:00	8.8	307.7	7.3	327.8	5.8	299.5

SITE ID: ND
 SITE LOCATION: FINLEY, ND.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL C %
0.0- 0.5	0	0.0	1	0.1
0.5- 1.0	1	0.0	104	0.0
1.0- 1.5	5	0.1	259	0.4
1.5- 2.0	20	0.5	37	1.4
2.0- 2.5	41	1.0	30	3.1
2.5- 3.0	59	1.4	34	6.5
3.0- 3.5	80	1.9	57	8.5
3.5- 4.0	73	1.7	101	8.4
4.0- 4.5	89	2.1	109	8.3
4.5- 5.0	146	3.4	160	6.4
5.0- 5.5	240	5.6	201	6.3
5.5- 6.0	298	6.9	337	6.1
6.0- 6.5	263	6.1	468	6.1
6.5- 7.0	290	6.7	308	5.5
7.0- 7.5	292	6.8	266	5.1
7.5- 8.0	256	5.9	212	4.5
8.0- 8.5	234	5.4	232	4.4
8.5- 9.0	239	5.6	187	3.7
9.0- 9.5	213	4.9	180	3.1
9.5-10.0	182	4.2	139	2.4
10.0-11.0	311	7.2	247	3.7
11.0-12.0	234	5.4	158	2.0
12.0-13.0	189	4.4	81	1.5
13.0-14.0	158	3.7	49	1.0
14.0-15.0	133	3.1	44	0.5
15.0-16.0	112	2.6	49	0.4
16.0-17.0	80	1.9	16	0.2
17.0-18.0	37	0.9	19	0.1
18.0-19.0	12	0.3	12	0.1
19.0-20.0	1	0.0	16	0.1
20.0-21.0	5	0.1	4	0.1
>21.0	11	0.3	9	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 65.7 63.0 66.2

SITE ID: ND
 SITE LOCATION: FINLEY, ND.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0	0.00	1	0.02	4	0.09
1.0	1	0.02	105	2.54	6	0.14
1.5	6	0.14	364	8.82	23	0.53
2.0	26	0.60	401	9.72	84	1.94
2.5	67	1.56	431	10.45	219	5.05
3.0	126	2.93	465	11.27	501	11.55
3.5	206	4.79	522	12.65	869	20.04
4.0	279	6.48	623	15.10	1232	28.41
4.5	368	8.55	732	17.74	1591	36.69
5.0	514	11.94	892	21.62	1867	43.06
5.5	754	17.52	1093	26.49	2142	49.40
6.0	1052	24.44	1430	34.66	2408	55.54
6.5	1315	30.55	1898	46.00	2672	61.62
7.0	1605	37.29	2206	53.47	2911	67.14
7.5	1897	44.08	2472	59.91	3134	72.28
8.0	2153	50.02	2684	65.05	3327	76.73
8.5	2387	55.46	2916	70.67	3516	81.09
9.0	2626	61.01	3103	75.21	3678	84.82
9.5	2839	65.96	3283	79.57	3813	87.94
10.0	3021	70.19	3422	82.94	3919	90.38
11.0	3332	77.42	3669	88.92	4078	94.05
12.0	3566	82.85	3827	92.75	4163	96.01
13.0	3755	87.24	3908	94.72	4228	97.51
14.0	3913	90.92	3957	95.90	4271	98.50
15.0	4046	94.01	4001	96.97	4294	99.03
16.0	4158	96.61	4050	98.16	4310	99.40
17.0	4238	98.47	4066	98.55	4320	99.63
18.0	4275	99.33	4085	99.01	4325	99.75
19.0	4287	99.61	4097	99.30	4328	99.82
20.0	4288	99.63	4113	99.68	4331	99.88
21.0	4293	99.74	4117	99.78	4334	99.95
>21.0	4304	100.00	4126	100.00	4336	100.00

SITE ID: ND
 SITE LOCATION: FINLEY, ND.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	31	70	99	155	200	188	71	3
2	10	16	24	37	57	63	25	0
3	9	9	10	21	23	36	13	0
4	2	1	6	11	10	15	14	0
5	1	2	2	8	5	10	6	0
6	1	1	1	4	6	10	4	0
7	1	0	0	3	1	9	5	0
8	0	0	0	1	1	10	4	0
9	0	0	0	1	0	10	3	0
10	0	0	0	0	0	5	1	0
11	0	0	0	1	0	3	3	0
12	0	0	0	1	1	1	2	0
13	0	0	1	0	1	0	0	0
14	0	0	0	0	0	2	1	0
15	0	0	0	0	0	1	0	0
16	0	0	0	0	0	2	1	0
17	0	0	0	2	0	0	0	0
18	0	0	0	0	0	1	0	0
19	0	0	0	0	0	0	0	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	0	0
23	0	0	0	0	0	0	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: ND
 SITE LOCATION: FINLEY, ND.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0.33	0.19	0.23	0.22	4.37	5.11	5.47
NNE	0.37	0.08	0.15	0.14	8.78	7.32	8.35
NE	0.55	0.01	0.15	0.12	6.81	6.45	7.50
ENE	0.67	0.02	0.19	0.15	4.09	3.17	4.57
E	0.05	0.23	0.19	0.20	4.18	2.98	4.13
ESE	0.39	0.27	0.30	0.29	4.44	3.39	4.08
SE	0.87	0.21	0.38	0.35	5.67	4.73	4.64
SSE	0.75	0.04	0.23	0.19	7.57	7.13	7.61
S	0.64	0.16	0.29	0.26	4.83	3.13	5.37
SSW	0.76	0.12	0.28	0.25	4.34	2.57	4.15
SW	0.52	0.20	0.28	0.26	4.55	3.22	4.50
WSW	0.30	0.29	0.29	0.29	5.62	4.41	6.39
W	0.30	0.24	0.26	0.25	9.80	8.31	8.72
WNW	0.32	0.06	0.13	0.11	11.43	10.74	11.23
NW	0.51	0.09	0.20	0.18	7.34	6.74	7.03
NNW	0.19	0.09	0.12	0.11	6.16	5.31	6.27

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

GOODNOE HILLS, WASHINGTON



SITE ID: WA
 SITE LOCATION: GOODNOE HILLS WA.
 DATA : JANUARY 1982 THROUGH APRIL 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 2880

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	87.0
WD(A)	100.0	87.6
WS(B)	100.0	80.2
WD(B)	100.0	84.7
WS(C)	100.0	87.5
WD(C)	100.0	87.0

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 105.1	7.6	258.6	477.03
	(B) 60.9	7.5	257.3	434.59
	(C) 15.2	5.6	222.3	194.05

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 105.1	30.7	259.1	01/23/82	21:00	(B) 29.5 (C) 23.1
(B) 60.9	29.5	258.9	01/23/82	21:00	(A) 30.7 (C) 23.1
(C) 15.2	23.6	289.4	01/23/82	20:00	(A) 28.7 (B) 29.0

 NOTES:

1. SITE ELEVATION: 805 METERS ABOVE SEA LEVEL.

SITE ID: WA
 SITE LOCATION: GOODNOE HILLS WA.
 DATA : JANUARY 1982 THROUGH APRIL 1982

 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	7.8	269.8	7.7	274.0	5.5	225.1
01:00	7.7	263.6	7.6	266.2	5.4	224.5
02:00	7.9	263.2	7.6	269.5	5.4	228.5
03:00	7.7	264.6	7.6	266.6	5.4	230.2
04:00	7.6	270.7	7.3	270.5	5.3	234.3
05:00	7.4	261.9	7.2	260.5	5.1	219.5
06:00	7.3	253.6	7.0	249.5	5.1	207.8
07:00	7.2	248.7	7.1	249.0	5.2	207.3
08:00	7.0	250.7	6.8	247.4	5.2	212.8
09:00	6.8	243.7	6.6	239.5	5.1	208.7
10:00	6.8	238.0	6.7	231.6	5.4	205.2
11:00	7.2	238.2	7.1	232.2	5.8	201.7
12:00	7.3	241.2	7.3	236.6	6.0	202.8
13:00	7.5	245.2	7.3	237.7	6.1	203.3
14:00	7.4	249.7	7.3	243.3	6.0	212.6
15:00	7.6	254.5	7.5	249.7	6.1	221.5
16:00	7.8	260.2	7.6	257.4	6.1	229.1
17:00	8.0	267.0	7.8	265.6	6.0	237.6
18:00	8.2	272.1	8.0	268.6	6.0	242.3
19:00	8.3	273.0	8.1	270.8	6.0	246.5
20:00	8.2	271.5	7.8	270.9	5.8	235.8
21:00	8.0	271.9	7.7	277.8	5.6	234.1
22:00	8.1	272.9	8.1	281.5	5.7	241.4
23:00	8.0	271.0	7.8	275.6	5.6	232.5

SITE ID: WA
 SITE LOCATION: GOODNOE HILLS WA.
 DATA : JANUARY 1982 THROUGH APRIL 1982

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	0	0.0	0	0.0	2	0.1
0.5- 1.0	0	0.0	0	0.0	20	0.8
1.0- 1.5	38	1.5	36	1.6	64	2.5
1.5- 2.0	60	2.4	53	2.3	129	5.1
2.0- 2.5	87	3.5	83	3.6	165	6.5
2.5- 3.0	117	4.7	119	5.2	169	6.7
3.0- 3.5	115	4.6	99	4.3	172	6.8
3.5- 4.0	123	4.9	120	5.2	172	6.8
4.0- 4.5	133	5.3	117	5.1	156	6.2
4.5- 5.0	135	5.4	108	4.7	141	5.6
5.0- 5.5	114	4.5	107	4.6	132	5.2
5.5- 6.0	94	3.7	106	4.6	124	4.9
6.0- 6.5	108	4.3	103	4.5	112	4.4
6.5- 7.0	92	3.7	87	3.8	111	4.4
7.0- 7.5	92	3.7	87	3.8	264	10.5
7.5- 8.0	92	3.7	77	3.3	87	3.5
8.0- 8.5	72	2.9	84	3.6	75	3.0
8.5- 9.0	71	2.8	73	3.2	95	3.8
9.0- 9.5	74	3.0	92	4.0	68	2.7
9.5-10.0	243	9.7	226	9.8	63	2.5
10.0-11.0	167	6.7	140	6.1	99	3.9
11.0-12.0	118	4.7	116	5.0	46	1.8
12.0-13.0	107	4.3	96	4.2	21	0.8
13.0-14.0	87	3.5	77	3.3	14	0.6
14.0-15.0	78	3.1	48	2.1	8	0.3
15.0-16.0	33	1.3	18	0.8	5	0.2
16.0-17.0	21	0.8	14	0.6	1	0.0
17.0-18.0	10	0.4	5	0.2	0	0.0
18.0-19.0	8	0.3	6	0.3	2	0.1
19.0-20.0	6	0.2	5	0.2	0	0.0
20.0-21.0	4	0.2	2	0.1	1	0.0
>21.0	8	0.3	6	0.3	2	0.1

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 87.0 80.2 87.5

SITE ID: WA
 SITE LOCATION: GOODNOE HILLS WA.
 DATA : JANUARY 1982 THROUGH APRIL 1982

 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	0	0.00	0	0.00	2	0.08
1.0	0	0.00	0	0.00	22	0.87
1.5	38	1.52	36	1.56	86	3.41
2.0	98	3.91	89	3.85	215	8.53
2.5	185	7.38	172	7.45	380	15.08
3.0	302	12.05	291	12.60	549	21.79
3.5	417	16.63	390	16.88	721	28.61
4.0	540	21.54	510	22.08	893	35.44
4.5	673	26.84	627	27.14	1049	41.63
5.0	808	32.23	735	31.82	1190	47.22
5.5	922	36.78	842	36.45	1322	52.46
6.0	1016	40.53	948	41.04	1446	57.38
6.5	1124	44.83	1051	45.50	1558	61.83
7.0	1216	48.50	1138	49.26	1669	66.23
7.5	1308	52.17	1225	53.03	1933	76.71
8.0	1400	55.84	1302	56.36	2020	80.16
8.5	1472	58.72	1386	60.00	2095	83.13
9.0	1543	61.55	1459	63.16	2190	86.90
9.5	1617	64.50	1551	67.14	2258	89.60
10.0	1860	74.19	1777	76.93	2321	92.10
11.0	2027	80.85	1917	82.99	2420	96.03
12.0	2145	85.56	2033	88.01	2466	97.86
13.0	2252	89.83	2129	92.16	2487	98.69
14.0	2339	93.30	2206	95.50	2501	99.25
15.0	2417	96.41	2254	97.58	2509	99.56
16.0	2450	97.73	2272	98.35	2514	99.76
17.0	2471	98.56	2286	98.96	2515	99.80
18.0	2481	98.96	2291	99.18	2515	99.80
19.0	2489	99.28	2297	99.44	2517	99.88
20.0	2495	99.52	2302	99.65	2517	99.88
21.0	2499	99.68	2304	99.74	2518	99.92
>21.0	2507	100.00	2310	100.00	2520	100.00

SITE ID: WA
 SITE LOCATION: GOODNOE HILLS WA.
 DATA : JANUARY 1982 THROUGH APRIL 1982

 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	38	105	105	100	93	77	42	4
2	19	32	39	31	25	34	16	0
3	14	10	12	9	5	27	13	1
4	9	5	4	0	7	21	4	0
5	5	0	2	2	0	7	7	1
6	1	0	0	0	1	6	5	0
7	2	0	0	0	0	4	2	0
8	0	0	1	0	0	3	2	0
9	1	0	1	0	0	1	2	0
10	1	0	0	0	0	2	0	0
11	0	0	0	0	0	1	0	0
12	1	0	0	0	0	2	1	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	1	0	0	0	0	2	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	1	0	0
19	0	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: WA
 SITE LOCATION: GOODNOE HILLS WA.
 DATA : JANUARY 1982 THROUGH APRIL 1982

 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	0.29	-0.12	0.00	-0.03	0.20	0.35	0.60
NNE	-0.01	0.67	0.48	0.52	7.18	8.10	0.48
NE	0.09	0.30	0.24	0.25	2.19	2.47	1.51
ENE	-0.02	0.26	0.18	0.20	5.11	6.45	4.33
E	0.22	0.14	0.16	0.16	4.95	3.81	4.33
ESE	0.01	0.26	0.19	0.21	3.75	2.99	4.96
SE	-0.17	0.05	-0.01	0.00	3.31	3.16	5.04
SSE	-0.24	-0.11	-0.15	-0.14	2.15	2.16	5.83
S	0.16	-0.27	-0.15	-0.17	2.35	3.42	10.04
SSW	0.27	-0.16	-0.04	-0.06	3.59	3.90	10.28
SW	0.01	0.04	0.03	0.03	9.41	10.74	15.16
WSW	-0.03	0.23	0.16	0.17	16.51	14.55	9.17
W	0.06	0.44	0.33	0.35	23.45	21.39	4.13
WNW	0.05	0.13	0.11	0.11	14.44	15.50	6.71
NW	0.09	-0.45	-0.30	-0.33	1.20	0.95	8.17
NNW	0.27	-0.72	-0.44	-0.49	0.20	0.09	8.57

 NOTES:

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

$$2. \text{ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{array}{l} Z=\text{ELEVATION} \\ WS=\text{WIND SPEED} \end{array}$$

HURON, SOUTH DAKOTA



SITE ID: SD
 SITE LOCATION: HURON, SD.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 6552

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	80.4
WD(A)	100.0	80.7
WS(C)	100.0	80.1
WD(C)	100.0	80.7

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	6.7	110.8	322.96
(C)	9.1	4.6	121.1	127.73

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	29.9	204.9	03/26/82	13:00	(B)-999.9 (C)-999.9
(C) 9.1	22.1	216.0	03/26/82	14:00	(A) 24.1 (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 : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	110.5	0.0	0.0	4.1	119.9
01:00	6.7	119.9	0.0	0.0	4.1	132.9
02:00	6.5	144.0	0.0	0.0	4.0	143.1
03:00	6.5	150.9	0.0	0.0	3.9	142.1
04:00	6.6	141.1	0.0	0.0	3.9	131.7
05:00	6.5	110.9	0.0	0.0	4.0	107.1
06:00	6.4	98.2	0.0	0.0	4.0	103.1
07:00	6.2	99.7	0.0	0.0	4.1	103.1
08:00	6.3	85.9	0.0	0.0	4.6	91.9
09:00	6.5	92.0	0.0	0.0	5.0	101.1
10:00	6.7	117.7	0.0	0.0	5.3	137.5
11:00	6.8	132.9	0.0	0.0	5.4	156.8
12:00	6.9	190.1	0.0	0.0	5.5	177.1
13:00	6.9	185.6	0.0	0.0	5.5	170.7
14:00	7.1	226.2	0.0	0.0	5.7	198.3
15:00	6.9	282.6	0.0	0.0	5.5	261.5
16:00	6.9	329.2	0.0	0.0	5.3	322.7
17:00	6.8	8.8	0.0	0.0	5.1	32.8
18:00	6.5	74.8	0.0	0.0	4.7	91.9
19:00	6.5	85.6	0.0	0.0	4.4	105.2
20:00	6.5	88.8	0.0	0.0	4.1	109.7
21:00	6.8	98.2	0.0	0.0	4.2	119.1
22:00	7.0	102.3	0.0	0.0	4.2	114.5
23:00	6.9	107.9	0.0	0.0	4.1	116.9

SITE ID: SD
 SITE LOCATION: HURON, SD.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	1	0.0	0	0.0	1	0.0
0.5- 1.0	38	0.7	0	0.0	95	1.8
1.0- 1.5	110	2.1	0	0.0	304	5.8
1.5- 2.0	166	3.1	0	0.0	447	8.5
2.0- 2.5	198	3.8	0	0.0	422	8.0
2.5- 3.0	187	3.5	0	0.0	419	8.0
3.0- 3.5	242	4.6	0	0.0	456	8.7
3.5- 4.0	236	4.5	0	0.0	408	7.8
4.0- 4.5	293	5.6	0	0.0	353	6.7
4.5- 5.0	316	6.0	0	0.0	360	6.9
5.0- 5.5	334	6.3	0	0.0	294	5.6
5.5- 6.0	314	6.0	0	0.0	287	5.5
6.0- 6.5	306	5.8	0	0.0	264	5.0
6.5- 7.0	306	5.8	0	0.0	235	4.5
7.0- 7.5	282	5.4	0	0.0	178	3.4
7.5- 8.0	284	5.4	0	0.0	149	2.8
8.0- 8.5	254	4.8	0	0.0	105	2.0
8.5- 9.0	228	4.3	0	0.0	90	1.7
9.0- 9.5	217	4.1	0	0.0	73	1.4
9.5-10.0	176	3.3	0	0.0	57	1.1
10.0-11.0	264	5.0	0	0.0	115	2.2
11.0-12.0	166	3.1	0	0.0	68	1.3
12.0-13.0	125	2.4	0	0.0	29	0.6
13.0-14.0	85	1.6	0	0.0	22	0.4
14.0-15.0	46	0.9	0	0.0	11	0.2
15.0-16.0	33	0.6	0	0.0	7	0.1
16.0-17.0	24	0.5	0	0.0	1	0.0
17.0-18.0	15	0.3	0	0.0	0	0.0
18.0-19.0	16	0.3	0	0.0	0	0.0
19.0-20.0	2	0.0	0	0.0	0	0.0
20.0-21.0	4	0.1	0	0.0	0	0.0
>21.0	3	0.1	0	0.0	1	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 80.4 0.0 80.1

SITE ID: SD
 SITE LOCATION: HURON, SD.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	1	0.02	0	0.00	1	0.02
1.0	39	0.74	0	0.00	96	1.83
1.5	149	2.83	0	0.00	400	7.62
2.0	315	5.98	0	0.00	847	16.13
2.5	513	9.73	0	0.00	1269	24.17
3.0	700	13.28	0	0.00	1688	32.15
3.5	942	17.87	0	0.00	2144	40.83
4.0	1178	22.35	0	0.00	2552	48.60
4.5	1471	27.91	0	0.00	2905	55.32
5.0	1787	33.90	0	0.00	3265	62.18
5.5	2121	40.24	0	0.00	3559	67.78
6.0	2435	46.20	0	0.00	3846	73.24
6.5	2741	52.00	0	0.00	4110	78.27
7.0	3047	57.81	0	0.00	4345	82.75
7.5	3329	63.16	0	0.00	4523	86.14
8.0	3613	68.54	0	0.00	4672	88.97
8.5	3867	73.36	0	0.00	4777	90.97
9.0	4095	77.69	0	0.00	4867	92.69
9.5	4312	81.81	0	0.00	4940	94.08
10.0	4488	85.15	0	0.00	4997	95.16
11.0	4752	90.15	0	0.00	5112	97.35
12.0	4918	93.30	0	0.00	5180	98.65
13.0	5043	95.67	0	0.00	5209	99.20
14.0	5128	97.29	0	0.00	5231	99.62
15.0	5174	98.16	0	0.00	5242	99.83
16.0	5207	98.79	0	0.00	5249	99.96
17.0	5231	99.24	0	0.00	5250	99.98
18.0	5246	99.53	0	0.00	5250	99.98
19.0	5262	99.83	0	0.00	5250	99.98
20.0	5264	99.87	0	0.00	5250	99.98
21.0	5268	99.94	0	0.00	5250	99.98
>21.0	5271	100.00	0	0.00	5251	100.00

SITE ID: SD
 SITE LOCATION: HURON, SD.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	95	217	247	292	289	183	41	1
2	35	57	70	80	85	50	7	0
3	16	20	29	28	20	35	15	2
4	7	8	16	17	8	26	3	0
5	14	3	6	3	3	19	4	0
6	7	1	0	1	0	11	2	0
7	4	0	1	0	0	10	3	0
8	4	1	0	0	1	8	2	0
9	3	0	0	0	0	6	3	0
10	1	0	0	0	0	5	0	0
11	1	0	0	0	0	5	1	0
12	4	0	0	0	0	4	0	0
13	2	0	0	0	0	4	2	0
14	5	0	0	0	0	1	0	0
15	0	0	0	0	0	3	0	0
16	0	0	0	0	0	0	0	0
17	1	0	0	0	0	0	1	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	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	0	0
23	0	0	0	0	0	0	0	0
>23	0	0	0	0	0	0	0	0

SITE ID: SD
 SITE LOCATION: HURON, SD.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0.30	0.00	7.32	0.00	5.69
NNE	0.00	0.00	0.25	0.00	3.47	0.00	3.60
NE	0.00	0.00	0.24	0.00	3.02	0.00	3.07
ENE	0.00	0.00	0.22	0.00	4.89	0.00	5.05
E	0.00	0.00	0.21	0.00	4.48	0.00	4.61
ESE	0.00	0.00	0.27	0.00	6.03	0.00	7.37
SE	0.00	0.00	0.23	0.00	16.05	0.00	16.26
SSE	0.00	0.00	0.17	0.00	12.01	0.00	11.71
S	0.00	0.00	0.21	0.00	4.15	0.00	3.90
SSW	0.00	0.00	0.29	0.00	2.41	0.00	2.40
SW	0.00	0.00	0.25	0.00	2.52	0.00	2.61
WSW	0.00	0.00	0.28	0.00	2.98	0.00	3.85
W	0.00	0.00	0.25	0.00	5.22	0.00	5.58
WNW	0.00	0.00	0.19	0.00	8.50	0.00	7.05
NW	0.00	0.00	0.26	0.00	7.91	0.00	8.44
NNW	0.00	0.00	0.20	0.00	9.01	0.00	8.80

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

ILIO POINT MOLOKAI, HAWAII



SITE ID: IP
 SITE LOCATION: ILIO PT., MOLOKAI, HI
 DATA : JANUARY 1982 THROUGH MAY 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 3624

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	0.0
WD(A)	100.0	3.0
WS(B)	100.0	14.7
WD(B)	100.0	3.0
WS(C)	100.0	15.9
WD(C)	100.0	20.1

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	-99.9	-99.9	0.00
(B)	30.0	10.6	0.0	814.40
(C)	9.1	8.4	55.7	464.66

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	-999.9	-999.9	00/00/00	00:00	(B) -999.9 (C) -999.9
(B) 30.0	16.0	-999.9	05/01/82	02:00	(A) -999.9 (C) 12.4
(C) 9.1	14.0	57.3	05/20/82	18:00	(A) -999.9 (B) 15.8

 NOTES:

1. SITE ELEVATION: 61 METERS ABOVE SEA LEVEL.

SITE ID: IP
 SITE LOCATION: ILIO PT., MOLOKAI, HI
 DATA : JANUARY 1982 THROUGH MAY 1982

 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	0.0	0.0	10.7	0.0	8.2	57.5
01:00	0.0	0.0	10.6	0.0	8.0	56.4
02:00	0.0	0.0	10.8	0.0	8.2	55.8
03:00	0.0	0.0	10.8	0.0	8.3	53.8
04:00	0.0	0.0	10.8	0.0	8.5	56.4
05:00	0.0	0.0	10.7	0.0	8.5	54.3
06:00	0.0	0.0	10.8	0.0	8.6	55.8
07:00	0.0	0.0	10.9	0.0	8.7	53.2
08:00	0.0	0.0	10.7	0.0	8.4	55.4
09:00	0.0	0.0	10.3	0.0	8.4	54.5
10:00	0.0	0.0	10.5	0.0	8.5	52.6
11:00	0.0	0.0	10.5	0.0	8.7	53.6
12:00	0.0	0.0	10.9	0.0	8.6	50.5
13:00	0.0	0.0	10.8	0.0	8.7	54.9
14:00	0.0	0.0	10.5	0.0	8.6	55.3
15:00	0.0	0.0	10.6	0.0	8.6	58.5
16:00	0.0	0.0	10.4	0.0	8.6	57.0
17:00	0.0	0.0	10.3	0.0	8.2	58.0
18:00	0.0	0.0	10.7	0.0	8.5	56.0
19:00	0.0	0.0	10.4	0.0	8.1	57.5
20:00	0.0	0.0	10.3	0.0	8.0	58.9
21:00	0.0	0.0	10.2	0.0	7.8	58.5
22:00	0.0	0.0	10.2	0.0	7.7	57.1
23:00	0.0	0.0	10.6	0.0	8.2	56.5

SITE ID: IP
 SITE LOCATION: ILIO PT., MOLOKAI, HI
 DATA : JANUARY 1982 THROUGH MAY 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	COUNT	%	COUNT	%	COUNT	%
0.0- 0.5	0	0.0	0	0.0	0	0.0
0.5- 1.0	0	0.0	0	0.0	1	0.2
1.0- 1.5	0	0.0	0	0.0	12	2.1
1.5- 2.0	0	0.0	0	0.0	13	2.2
2.0- 2.5	0	0.0	0	0.0	17	2.9
2.5- 3.0	0	0.0	5	0.9	17	2.9
3.0- 3.5	0	0.0	2	0.4	13	2.2
3.5- 4.0	0	0.0	4	0.8	8	1.4
4.0- 4.5	0	0.0	6	1.1	6	1.0
4.5- 5.0	0	0.0	5	0.9	7	1.2
5.0- 5.5	0	0.0	7	1.3	5	0.9
5.5- 6.0	0	0.0	6	1.1	6	1.0
6.0- 6.5	0	0.0	7	1.3	6	1.0
6.5- 7.0	0	0.0	9	1.7	10	1.7
7.0- 7.5	0	0.0	5	0.9	23	4.0
7.5- 8.0	0	0.0	2	0.4	27	4.7
8.0- 8.5	0	0.0	14	2.6	48	8.3
8.5- 9.0	0	0.0	8	1.5	52	9.0
9.0- 9.5	0	0.0	39	7.3	59	10.2
9.5-10.0	0	0.0	36	6.8	63	10.9
10.0-11.0	0	0.0	108	20.3	111	19.2
11.0-12.0	0	0.0	132	24.9	62	10.7
12.0-13.0	0	0.0	82	15.4	10	1.7
13.0-14.0	0	0.0	43	8.1	2	0.3
14.0-15.0	0	0.0	9	1.7	0	0.0
15.0-16.0	0	0.0	2	0.4	0	0.0
16.0-17.0	0	0.0	0	0.0	0	0.0
17.0-18.0	0	0.0	0	0.0	0	0.0
18.0-19.0	0	0.0	0	0.0	0	0.0
19.0-20.0	0	0.0	0	0.0	0	0.0
20.0-21.0	0	0.0	0	0.0	0	0.0
>21.0	0	0.0	0	0.0	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 0.0 14.7 15.9

SITE ID: IP
 SITE LOCATION: ILIO PT., MOLOKAI, HI
 DATA : JANUARY 1982 THROUGH MAY 1982

 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	0	0.00	0	0.00	0	0.00
1.0	0	0.00	0	0.00	1	0.17
1.5	0	0.00	0	0.00	13	2.25
2.0	0	0.00	0	0.00	26	4.50
2.5	0	0.00	0	0.00	43	7.44
3.0	0	0.00	5	0.94	60	10.38
3.5	0	0.00	7	1.32	73	12.63
4.0	0	0.00	11	2.07	81	14.01
4.5	0	0.00	17	3.20	87	15.05
5.0	0	0.00	22	4.14	94	16.26
5.5	0	0.00	29	5.46	99	17.13
6.0	0	0.00	35	6.59	105	18.17
6.5	0	0.00	42	7.91	111	19.20
7.0	0	0.00	51	9.60	121	20.93
7.5	0	0.00	56	10.55	144	24.91
8.0	0	0.00	58	10.92	171	29.58
8.5	0	0.00	72	13.56	219	37.89
9.0	0	0.00	80	15.07	271	46.89
9.5	0	0.00	119	22.41	330	57.09
10.0	0	0.00	155	29.19	393	67.99
11.0	0	0.00	263	49.53	504	87.20
12.0	0	0.00	395	74.39	566	97.92
13.0	0	0.00	477	89.83	576	99.65
14.0	0	0.00	520	97.93	578	100.00
15.0	0	0.00	529	99.62	578	100.00
16.0	0	0.00	531	100.00	578	100.00
17.0	0	0.00	531	100.00	578	100.00
18.0	0	0.00	531	100.00	578	100.00
19.0	0	0.00	531	100.00	578	100.00
20.0	0	0.00	531	100.00	578	100.00
21.0	0	0.00	531	100.00	578	100.00
>21.0	0	0.00	531	100.00	578	100.00

SITE ID: IP
 SITE LOCATION: ILIO PT., MOLOKAI, HI
 DATA : JANUARY 1982 THROUGH MAY 1982

 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	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	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: IP
 SITE LOCATION: ILIO PT., MOLOKAI, HI
 DATA : JANUARY 1982 THROUGH MAY 1982

 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	0.18	0.52	0.70	0.00	0.00	0.00	0.87
NNE	0.18	0.52	0.70	0.00	0.00	0.00	3.11
NE	0.18	0.52	0.70	0.00	0.00	0.00	23.18
ENE	0.18	0.52	0.70	0.00	0.00	0.00	57.61
E	0.18	0.52	0.70	0.00	0.00	0.00	6.57
ESE	0.18	0.52	0.70	0.00	0.00	0.00	1.38
SE	0.18	0.52	0.70	0.00	0.00	0.00	1.04
SSE	0.18	0.52	0.70	0.00	0.00	0.00	0.69
S	0.18	0.52	0.70	0.00	0.00	0.00	1.04
SSW	0.18	0.52	0.70	0.00	0.00	0.00	1.04
SW	0.18	0.52	0.70	0.00	0.00	0.00	0.87
WSW	0.18	0.52	0.70	0.00	0.00	0.00	1.04
W	0.18	0.52	0.70	0.00	0.00	0.00	0.52
WNW	0.18	0.52	0.70	0.00	0.00	0.00	0.17
NW	0.18	0.52	0.70	0.00	0.00	0.00	0.35
NNW	0.18	0.52	0.70	0.00	0.00	0.00	0.52

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

KAHUA RANCH, HAWAII, HAWAII



SITE ID: KR
 SITE LOCATION: KAHUA RANCH, HI.
 DATA : JANUARY 1982 THROUGH FEBRUARY 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 1416

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	0.0
WD(A)	100.0	0.6
WS(B)	100.0	12.9
WD(B)	100.0	35.2
WS(C)	100.0	34.9
WD(C)	100.0	35.2

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	-99.9	-99.9	0.00
(B)	30.0	6.8	154.3	354.36
(C)	9.1	5.3	123.4	237.09

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	-999.9	-999.9	00/00/00	00:00	(B)-999.9 (C)-999.9
(B) 30.0	18.7	54.5	01/28/82	01:00	(A)-999.9 (C) 16.4
(C) 9.1	16.4	62.3	01/28/82	01:00	(A)-999.9 (B) 18.7

 NOTES:

1. SITE ELEVATION: 1030 METERS ABOVE SEA LEVEL.

SITE ID: KR
 SITE LOCATION: KAHUA RANCH, HI.
 DATA : JANUARY 1982 THROUGH FEBRUARY 1982

 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	0.0	0.0	6.7	123.8	5.4	110.2
01:00	0.0	0.0	7.7	130.2	6.1	191.4
02:00	0.0	0.0	8.5	108.4	6.0	209.4
03:00	0.0	0.0	8.2	104.1	6.4	181.2
04:00	0.0	0.0	7.0	106.3	6.0	163.9
05:00	0.0	0.0	7.6	131.9	6.2	173.9
06:00	0.0	0.0	8.0	154.4	5.9	144.5
07:00	0.0	0.0	7.8	153.6	5.8	130.7
08:00	0.0	0.0	6.8	176.0	6.0	116.0
09:00	0.0	0.0	6.7	196.7	5.6	124.2
10:00	0.0	0.0	7.5	183.6	5.8	121.2
11:00	0.0	0.0	6.5	193.9	5.3	123.0
12:00	0.0	0.0	6.3	201.5	4.6	105.5
13:00	0.0	0.0	5.9	230.5	4.9	93.1
14:00	0.0	0.0	5.4	240.4	4.3	124.5
15:00	0.0	0.0	5.1	236.9	4.4	127.6
16:00	0.0	0.0	6.2	249.8	4.8	102.9
17:00	0.0	0.0	6.7	215.6	4.9	123.3
18:00	0.0	0.0	6.6	143.5	4.8	130.0
19:00	0.0	0.0	7.3	71.6	4.8	122.4
20:00	0.0	0.0	7.2	79.1	4.6	107.9
21:00	0.0	0.0	6.7	84.6	4.3	103.8
22:00	0.0	0.0	5.2	121.8	4.3	102.7
23:00	0.0	0.0	5.7	129.4	4.8	87.6

SITE ID: KR
 SITE LOCATION: KAHUA RANCH, HI.
 DATA : JANUARY 1982 THROUGH FEBRUARY 1982

 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	0	0.0	0	0.0	0	0.0
0.5- 1.0	0	0.0	1	0.5	11	2.2
1.0- 1.5	0	0.0	5	2.7	50	10.1
1.5- 2.0	0	0.0	4	2.2	35	7.1
2.0- 2.5	0	0.0	6	3.3	35	7.1
2.5- 3.0	0	0.0	10	5.5	42	8.5
3.0- 3.5	0	0.0	5	2.7	48	9.7
3.5- 4.0	0	0.0	10	5.5	31	6.3
4.0- 4.5	0	0.0	10	5.5	16	3.2
4.5- 5.0	0	0.0	19	10.4	29	5.9
5.0- 5.5	0	0.0	15	8.2	22	4.5
5.5- 6.0	0	0.0	7	3.8	18	3.6
6.0- 6.5	0	0.0	7	3.8	12	2.4
6.5- 7.0	0	0.0	10	5.5	14	2.8
7.0- 7.5	0	0.0	16	8.8	10	2.0
7.5- 8.0	0	0.0	6	3.3	16	3.2
8.0- 8.5	0	0.0	3	1.6	10	2.0
8.5- 9.0	0	0.0	4	2.2	6	1.2
9.0- 9.5	0	0.0	4	2.2	10	2.0
9.5-10.0	0	0.0	2	1.1	6	1.2
10.0-11.0	0	0.0	9	4.9	14	2.8
11.0-12.0	0	0.0	6	3.3	11	2.2
12.0-13.0	0	0.0	8	4.4	19	3.8
13.0-14.0	0	0.0	8	4.4	16	3.2
14.0-15.0	0	0.0	1	0.5	6	1.2
15.0-16.0	0	0.0	2	1.1	4	0.8
16.0-17.0	0	0.0	2	1.1	3	0.6
17.0-18.0	0	0.0	1	0.5	0	0.0
18.0-19.0	0	0.0	1	0.5	0	0.0
19.0-20.0	0	0.0	0	0.0	0	0.0
20.0-21.0	0	0.0	0	0.0	0	0.0
>21.0	0	0.0	0	0.0	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 0.0 12.9 34.9

SITE ID: KR
 SITE LOCATION: KAHUA RANCH, HI.
 DATA : JANUARY 1982 THROUGH FEBRUARY 1982

 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	0	0.00	0	0.00	0	0.00
1.0	0	0.00	1	0.55	11	2.23
1.5	0	0.00	6	3.30	61	12.35
2.0	0	0.00	10	5.49	96	19.43
2.5	0	0.00	16	8.79	131	26.52
3.0	0	0.00	26	14.29	173	35.02
3.5	0	0.00	31	17.03	221	44.74
4.0	0	0.00	41	22.53	252	51.01
4.5	0	0.00	51	28.02	268	54.25
5.0	0	0.00	70	38.46	297	60.12
5.5	0	0.00	85	46.70	319	64.57
6.0	0	0.00	92	50.55	337	68.22
6.5	0	0.00	99	54.40	349	70.65
7.0	0	0.00	109	59.89	363	73.48
7.5	0	0.00	125	68.68	373	75.51
8.0	0	0.00	131	71.98	389	78.74
8.5	0	0.00	134	73.63	399	80.77
9.0	0	0.00	138	75.82	405	81.98
9.5	0	0.00	142	78.02	415	84.01
10.0	0	0.00	144	79.12	421	85.22
11.0	0	0.00	153	84.07	435	88.06
12.0	0	0.00	159	87.36	446	90.28
13.0	0	0.00	167	91.76	465	94.13
14.0	0	0.00	175	96.15	481	97.37
15.0	0	0.00	176	96.70	487	98.58
16.0	0	0.00	178	97.80	491	99.39
17.0	0	0.00	180	98.90	494	100.00
18.0	0	0.00	181	99.45	494	100.00
19.0	0	0.00	182	100.00	494	100.00
20.0	0	0.00	182	100.00	494	100.00
21.0	0	0.00	182	100.00	494	100.00
>21.0	0	0.00	182	100.00	494	100.00

SITE ID: KR
 SITE LOCATION: KAHUA RANCH, HI.
 DATA : JANUARY 1982 THROUGH FEBRUARY 1982

 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	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	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: KR
 SITE LOCATION: KAHUA RANCH, HI.
 DATA : JANUARY 1982 THROUGH FEBRUARY 1982

 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	0.18	0.11	0.70	0.00	0.00	0.55	1.62
NNE	0.18	0.69	0.70	0.00	0.00	3.30	1.42
NE	0.18	0.36	0.70	0.00	0.00	26.92	8.50
ENE	0.18	-0.15	0.70	0.00	0.00	14.84	19.84
E	0.18	0.12	0.70	0.00	0.00	8.79	11.54
ESE	0.18	0.14	0.70	0.00	0.00	3.30	8.10
SE	0.18	-0.33	0.70	0.00	0.00	0.55	5.06
SSE	0.18	-0.08	0.70	0.00	0.00	3.85	6.07
S	0.18	0.21	0.70	0.00	0.00	10.44	9.51
SSW	0.18	0.32	0.70	0.00	0.00	8.79	8.30
SW	0.18	-0.05	0.70	0.00	0.00	14.84	10.32
WSW	0.18	0.11	0.70	0.00	0.00	2.20	4.45
W	0.18	-0.55	0.70	0.00	0.00	0.55	2.43
WNW	0.18	-0.32	0.70	0.00	0.00	1.10	1.42
NW	0.18	0.52	0.70	0.00	0.00	0.00	0.81
NNW	0.18	0.52	0.70	0.00	0.00	0.00	0.61

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

KAHUKU MOD-OA, HAWAII



SITE ID: KU
 SITE LOCATION: KAHUKU MOD-0A, HI.
 DATA : JANUARY 1982 THROUGH MAY 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 3624

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	22.2
WD(A)	100.0	4.4
WS(B)	100.0	22.2
WD(B)	100.0	22.2
WS(C)	100.0	22.2
WD(C)	100.0	17.9

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	8.1	87.3	568.55
(B)	30.0	7.8	91.2	501.77
(C)	9.1	7.4	93.5	466.40

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	23.5	-999.9	03/05/82	16:00	(B) 22.7 (C) 23.7
(B) 30.0	22.7	181.3	03/05/82	16:00	(A) 23.5 (C) 23.7
(C) 9.1	23.7	185.3	03/05/82	16:00	(A) 23.5 (B) 22.7

 NOTES:

1. SITE ELEVATION: 108 METERS ABOVE SEA LEVEL.

SITE ID: KU
 SITE LOCATION: KAHUKU MOD-0A, HI.
 DATA : JANUARY 1982 THROUGH MAY 1982

 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	8.4	94.1	8.0	96.9	7.5	99.1
01:00	7.9	92.0	7.4	93.8	6.9	95.4
02:00	7.8	93.3	7.4	97.6	6.9	101.3
03:00	7.9	91.7	7.4	96.8	7.0	101.5
04:00	7.5	91.6	7.3	101.4	6.7	106.9
05:00	7.7	89.0	7.3	94.7	6.7	95.3
06:00	7.5	85.4	7.1	100.2	6.6	105.7
07:00	8.0	86.7	7.6	102.9	7.2	109.3
08:00	7.9	85.6	7.5	106.6	7.2	111.7
09:00	7.7	86.3	7.5	92.7	7.2	95.9
10:00	8.0	86.0	7.8	82.7	7.7	82.8
11:00	8.4	86.8	8.2	85.5	8.2	86.6
12:00	8.4	84.5	8.2	80.1	8.2	79.5
13:00	8.3	82.9	8.2	74.3	8.1	72.6
14:00	8.9	82.4	8.7	84.5	8.6	87.2
15:00	8.7	80.8	8.5	83.8	8.3	85.2
16:00	8.2	79.7	7.9	80.1	7.7	82.0
17:00	8.0	80.6	7.7	83.8	7.5	87.8
18:00	7.9	82.6	7.5	89.5	7.0	91.0
19:00	8.2	84.5	7.8	90.8	7.3	95.1
20:00	8.5	87.2	8.0	91.9	7.5	94.8
21:00	8.5	97.0	8.0	91.8	7.5	92.3
22:00	8.3	96.4	8.1	92.1	7.4	91.8
23:00	8.4	93.3	8.1	92.3	7.3	91.3

SITE ID: KU
 SITE LOCATION: KAHUKU MOD-0A, HI.
 DATA : JANUARY 1982 THROUGH MAY 1982

 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	0	0.0	0	0.0	0	0.0
0.5- 1.0	1	0.1	0	0.0	8	1.0
1.0- 1.5	7	0.9	11	1.4	9	1.1
1.5- 2.0	15	1.9	12	1.5	17	2.1
2.0- 2.5	21	2.6	20	2.5	21	2.6
2.5- 3.0	19	2.4	29	3.6	31	3.8
3.0- 3.5	34	4.2	32	4.0	39	4.8
3.5- 4.0	33	4.1	33	4.1	33	4.1
4.0- 4.5	35	4.3	33	4.1	37	4.6
4.5- 5.0	31	3.8	29	3.6	47	5.8
5.0- 5.5	35	4.3	43	5.4	28	3.5
5.5- 6.0	28	3.5	27	3.4	45	5.6
6.0- 6.5	28	3.5	43	5.4	49	6.1
6.5- 7.0	41	5.1	34	4.2	34	4.2
7.0- 7.5	42	5.2	51	6.4	30	3.7
7.5- 8.0	49	6.1	37	4.6	35	4.3
8.0- 8.5	32	4.0	43	5.4	44	5.5
8.5- 9.0	49	6.1	42	5.2	33	4.1
9.0- 9.5	33	4.1	28	3.5	34	4.2
9.5-10.0	16	2.0	33	4.1	44	5.5
10.0-11.0	81	10.0	71	8.8	67	8.3
11.0-12.0	54	6.7	57	7.1	44	5.5
12.0-13.0	41	5.1	40	5.0	31	3.8
13.0-14.0	29	3.6	21	2.6	17	2.1
14.0-15.0	18	2.2	13	1.6	9	1.1
15.0-16.0	13	1.6	6	0.7	4	0.5
16.0-17.0	8	1.0	3	0.4	4	0.5
17.0-18.0	2	0.2	2	0.2	2	0.2
18.0-19.0	1	0.1	0	0.0	0	0.0
19.0-20.0	0	0.0	1	0.1	0	0.0
20.0-21.0	2	0.2	2	0.2	1	0.1
>21.0	8	1.0	7	0.9	9	1.1

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 22.2 22.2 22.2

SITE ID: KU
 SITE LOCATION: KAHUKU MOD-0A, HI.
 DATA : JANUARY 1982 THROUGH MAY 1982

 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	0	0.00	0	0.00	0	0.00
1.0	1	0.12	0	0.00	8	0.99
1.5	8	0.99	11	1.37	17	2.11
2.0	23	2.85	23	2.86	34	4.22
2.5	44	5.46	43	5.35	55	6.82
3.0	63	7.82	72	8.97	86	10.67
3.5	97	12.03	104	12.95	125	15.51
4.0	130	16.13	137	17.06	158	19.60
4.5	165	20.47	170	21.17	195	24.19
5.0	196	24.32	199	24.78	242	30.02
5.5	231	28.66	242	30.14	270	33.50
6.0	259	32.13	269	33.50	315	39.08
6.5	287	35.61	312	38.85	364	45.16
7.0	328	40.69	346	43.09	398	49.38
7.5	370	45.91	397	49.44	428	53.10
8.0	419	51.99	434	54.05	463	57.44
8.5	451	55.96	477	59.40	507	62.90
9.0	500	62.03	519	64.63	540	67.00
9.5	533	66.13	547	68.12	574	71.22
10.0	549	68.11	580	72.23	618	76.67
11.0	630	78.16	651	81.07	685	84.99
12.0	684	84.86	708	88.17	729	90.45
13.0	725	89.95	748	93.15	760	94.29
14.0	754	93.55	769	95.77	777	96.40
15.0	772	95.78	782	97.38	786	97.52
16.0	785	97.39	788	98.13	790	98.01
17.0	793	98.39	791	98.51	794	98.51
18.0	795	98.64	793	98.75	796	98.76
19.0	796	98.76	793	98.75	796	98.76
20.0	796	98.76	794	98.88	796	98.76
21.0	798	99.01	796	99.13	797	98.88
>21.0	806	100.00	803	100.00	806	100.00

SITE ID: KU
 SITE LOCATION: KAHUKU MOD-0A, HI.
 DATA : JANUARY 1982 THROUGH MAY 1982

 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	11	18	25	19	21	28	20	2
2	3	10	4	11	9	6	3	0
3	5	3	6	3	2	3	0	1
4	2	2	2	2	1	4	2	0
5	0	1	1	1	0	2	1	1
6	0	0	0	0	1	2	0	0
7	0	0	0	0	0	1	0	0
8	0	0	0	0	1	2	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	1	0	0
13	0	0	0	0	0	2	0	0
14	0	0	0	0	0	1	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	1	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	1	0	0
19	0	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: KU
 SITE LOCATION: KAHUKU MOD-0A, HI.
 DATA : JANUARY 1982 THROUGH MAY 1982

 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	0.18	0.01	0.70	0.00	0.00	1.87	1.49
NNE	0.18	0.01	0.70	0.00	0.00	6.72	5.21
NE	0.59	0.14	0.26	0.23	1.86	8.97	7.94
ENE	-0.14	0.01	-0.03	-0.02	4.22	13.95	11.54
E	-0.01	0.07	0.05	0.05	9.06	26.03	17.37
ESE	0.76	0.07	0.25	0.21	4.47	20.42	14.39
SE	0.18	0.04	0.70	0.21	0.00	10.83	9.68
SSE	0.18	0.10	0.70	0.21	0.00	3.24	3.72
S	0.18	0.21	0.70	0.21	0.00	1.99	2.61
SSW	0.18	0.12	0.70	0.21	0.00	1.12	1.36
SW	0.18	-0.21	0.70	0.21	0.00	1.12	0.74
WSW	0.18	-0.09	0.70	0.21	0.00	0.62	0.74
W	0.18	0.45	0.70	0.21	0.00	0.50	1.12
WNW	0.18	0.03	0.70	0.21	0.00	0.87	1.12
NW	0.18	-0.06	0.70	0.21	0.00	1.12	0.62
NNW	0.18	0.36	0.70	0.21	0.00	0.62	0.74

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

LIVINGSTON, MONTANA



SITE ID: MT
 SITE LOCATION: LIVINGSTON, MT.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 6552

SENSOR	% ON-LINE	% RECOVERED
WS(A)	95.9	51.8
WD(A)	95.9	52.2
WS(B)	95.9	51.3
WD(B)	95.9	51.1
WS(C)	95.9	42.3
WD(C)	95.9	52.2

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	8.3	228.0	991.89
(B)	30.0	7.7	223.3	754.51
(C)	9.1	6.7	189.8	505.13

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	33.1	221.1	01/08/82	03:00	(B) 29.4 (C) 24.3
(B) 30.0	29.4	216.6	01/08/82	03:00	(A) 33.1 (C) 24.3
(C) 9.1	26.5	216.1	01/08/82	04:00	(A) 31.6 (B) 28.5

 NOTES:

1. SITE ELEVATION: 1420 METERS ABOVE SEA LEVEL.

SITE ID: MT
 SITE LOCATION: LIVINGSTON, MT.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	8.2	230.2	7.4	222.2	6.3	196.1
01:00	8.3	228.0	7.7	222.4	6.3	186.1
02:00	7.9	221.4	7.3	215.6	6.1	187.8
03:00	8.0	232.8	7.4	219.2	6.1	192.3
04:00	7.9	233.5	7.3	230.7	6.2	196.9
05:00	7.6	233.4	7.2	229.2	6.2	191.0
06:00	8.0	231.0	7.4	223.8	6.3	187.0
07:00	7.8	230.4	7.4	226.5	6.3	188.7
08:00	8.2	227.9	7.7	220.0	6.7	188.2
09:00	8.4	222.7	8.0	216.9	7.0	181.3
10:00	8.3	232.5	7.7	229.1	7.0	194.7
11:00	8.4	236.4	7.7	235.2	7.1	194.5
12:00	8.2	232.7	7.7	233.4	7.0	178.4
13:00	8.4	233.7	7.7	235.2	7.0	189.5
14:00	8.5	237.4	8.0	241.6	7.3	199.3
15:00	9.0	237.9	8.2	246.1	7.6	200.9
16:00	8.8	250.7	8.1	253.4	7.6	189.6
17:00	8.8	227.3	8.1	222.7	7.3	176.8
18:00	8.9	221.8	8.3	218.0	7.1	181.4
19:00	8.7	216.6	7.9	215.4	6.8	185.8
20:00	8.5	221.0	7.8	213.9	6.6	190.0
21:00	8.2	217.2	7.6	213.1	6.4	190.8
22:00	8.1	221.0	7.5	215.5	6.3	189.9
23:00	8.0	218.1	7.3	211.6	6.2	189.4

SITE ID: MT
 SITE LOCATION: LIVINGSTON, MT.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0	0.0	0	0.0	0	0.0
0.5- 1.0	60	1.8	26	0.8	36	1.3
1.0- 1.5	167	4.9	164	4.9	181	6.5
1.5- 2.0	214	6.3	226	6.7	220	7.9
2.0- 2.5	201	5.9	215	6.4	196	7.1
2.5- 3.0	178	5.2	183	5.4	164	5.9
3.0- 3.5	144	4.2	159	4.7	167	6.0
3.5- 4.0	129	3.8	164	4.9	123	4.4
4.0- 4.5	128	3.8	139	4.1	120	4.3
4.5- 5.0	117	3.4	136	4.0	104	3.8
5.0- 5.5	121	3.6	107	3.2	96	3.5
5.5- 6.0	96	2.8	108	3.2	90	3.2
6.0- 6.5	95	2.8	99	2.9	128	4.6
6.5- 7.0	88	2.6	124	3.7	108	3.9
7.0- 7.5	114	3.4	113	3.4	88	3.2
7.5- 8.0	106	3.1	102	3.0	71	2.6
8.0- 8.5	94	2.8	123	3.7	83	3.0
8.5- 9.0	96	2.8	85	2.5	78	2.8
9.0- 9.5	95	2.8	91	2.7	71	2.6
9.5-10.0	83	2.4	83	2.5	74	2.7
10.0-11.0	164	4.8	170	5.1	102	3.7
11.0-12.0	155	4.6	122	3.6	66	2.4
12.0-13.0	103	3.0	75	2.2	49	1.8
13.0-14.0	86	2.5	54	1.6	45	1.6
14.0-15.0	51	1.5	51	1.5	54	1.9
15.0-16.0	45	1.3	45	1.3	52	1.9
16.0-17.0	37	1.1	66	2.0	39	1.4
17.0-18.0	49	1.4	50	1.5	39	1.4
18.0-19.0	58	1.7	58	1.7	43	1.6
19.0-20.0	48	1.4	66	2.0	33	1.2
20.0-21.0	49	1.4	49	1.5	20	0.7
>21.0	221	6.5	108	3.2	30	1.1

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 51.8 51.3 42.3

SITE ID: MT
 SITE LOCATION: LIVINGSTON, MT.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0	0.00	0	0.00	0	0.00
1.0	60	1.77	26	0.77	36	1.30
1.5	227	6.69	190	5.65	217	7.83
2.0	441	13.00	416	12.38	437	15.78
2.5	642	18.93	631	18.77	633	22.85
3.0	820	24.17	814	24.22	797	28.77
3.5	964	28.42	973	28.95	964	34.80
4.0	1093	32.22	1137	33.83	1087	39.24
4.5	1221	36.00	1276	37.96	1207	43.57
5.0	1338	39.45	1412	42.01	1311	47.33
5.5	1459	43.01	1519	45.19	1407	50.79
6.0	1555	45.84	1627	48.41	1497	54.04
6.5	1650	48.64	1726	51.35	1625	58.66
7.0	1738	51.24	1850	55.04	1733	62.56
7.5	1852	54.60	1963	58.41	1821	65.74
8.0	1958	57.72	2065	61.44	1892	68.30
8.5	2052	60.50	2188	65.10	1975	71.30
9.0	2148	63.33	2273	67.63	2053	74.12
9.5	2243	66.13	2364	70.34	2124	76.68
10.0	2326	68.57	2447	72.81	2198	79.35
11.0	2490	73.41	2617	77.86	2300	83.03
12.0	2645	77.98	2739	81.49	2366	85.42
13.0	2748	81.01	2814	83.73	2415	87.18
14.0	2834	83.55	2868	85.33	2460	88.81
15.0	2885	85.05	2919	86.85	2514	90.76
16.0	2930	86.38	2964	88.19	2566	92.64
17.0	2967	87.47	3030	90.15	2605	94.04
18.0	3016	88.92	3080	91.64	2644	95.45
19.0	3074	90.63	3138	93.37	2687	97.00
20.0	3122	92.04	3204	95.33	2720	98.19
21.0	3171	93.48	3253	96.79	2740	98.92
>21.0	3392	100.00	3361	100.00	2770	100.00

SITE ID: MT
 SITE LOCATION: LIVINGSTON, MT.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	104	160	169	161	127	114	73	25
2	32	34	23	14	17	58	28	6
3	17	7	8	4	1	31	11	2
4	15	4	0	3	2	16	13	4
5	6	1	0	0	0	17	6	1
6	9	0	0	0	0	11	7	2
7	5	0	0	0	0	3	2	1
8	4	0	0	0	1	4	3	0
9	1	0	0	0	0	3	1	1
10	3	0	0	0	0	0	2	1
11	0	0	0	0	0	3	2	0
12	2	0	0	0	0	0	0	1
13	0	0	0	0	1	2	0	1
14	0	0	0	0	0	1	0	0
15	0	0	0	0	0	0	1	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	1	0	0
18	1	0	0	0	0	0	0	0
19	0	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: MT
 SITE LOCATION: LIVINGSTON, MT.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	-0.05	0.08	0.04	0.05	2.65	2.05	1.84
NNE	-0.11	0.10	0.05	0.06	1.53	1.61	1.52
NE	0.34	0.05	0.12	0.10	1.39	1.90	1.88
ENE	-0.38	-0.06	-0.14	-0.12	2.03	2.86	2.49
E	-0.27	0.18	0.06	0.08	3.98	5.50	3.75
ESE	0.20	0.02	0.07	0.06	10.26	10.50	10.40
SE	0.31	0.09	0.15	0.14	9.35	7.83	9.10
SSE	-0.44	0.29	0.10	0.14	3.15	3.27	4.69
S	-2.63	1.13	0.14	0.36	1.62	3.09	2.74
SSW	0.09	0.14	0.13	0.13	5.81	7.94	8.92
SW	0.58	0.09	0.22	0.19	16.89	11.04	14.77
WSW	0.08	0.14	0.12	0.12	13.24	12.97	13.36
W	0.27	0.11	0.15	0.14	12.56	11.93	10.29
WNW	0.04	0.09	0.08	0.08	7.61	7.44	6.79
NW	0.02	-0.03	-0.01	-0.02	5.19	5.18	5.23
NNW	0.05	0.07	0.07	0.07	2.56	2.56	2.02

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

MEADE, KANSAS



SITE ID: MK
 SITE LOCATION: MEADE, KANSAS
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 6552

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	69.8
WD(A)	100.0	68.9
WS(B)	100.0	25.6
WD(B)	100.0	49.0
WS(C)	100.0	66.3
WD(C)	100.0	71.2

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	8.8	133.0	581.24
(B)	30.0	7.5	94.8	354.33
(C)	9.1	6.1	147.3	245.59

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	24.6	279.3	05/26/82	15:00	(B)-999.9 (C) 16.0
(B) 30.0	18.2	161.5	01/01/82	13:00	(A)-999.9 (C) 12.8
(C) 9.1	19.5	325.7	04/02/82	14:00	(A) 23.8 (B)-999.9

 NOTES:

1. SITE ELEVATION: 756 METERS ABOVE SEA LEVEL.

SITE ID: MK
 SITE LOCATION: MEADE, KANSAS
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	8.9	135.1	7.3	98.8	5.8	142.5
01:00	8.6	132.0	6.9	95.4	5.6	144.1
02:00	8.3	140.7	6.9	99.5	5.5	149.8
03:00	8.4	138.7	7.1	98.4	5.5	154.3
04:00	8.4	136.3	7.1	95.8	5.4	152.8
05:00	8.3	142.5	7.1	99.2	5.3	163.7
06:00	8.3	144.1	7.0	95.9	5.4	169.3
07:00	8.4	153.0	7.1	92.7	5.8	173.9
08:00	8.7	158.7	7.4	93.8	6.4	177.7
09:00	8.9	167.6	7.7	92.9	6.6	183.6
10:00	9.1	156.5	8.1	91.1	6.9	177.4
11:00	9.1	147.9	8.0	91.0	7.0	171.0
12:00	9.0	148.3	8.1	95.9	6.9	167.1
13:00	9.0	143.2	8.2	91.2	6.9	162.5
14:00	9.3	144.3	8.0	101.4	7.1	164.2
15:00	9.3	138.3	8.0	101.0	7.1	151.2
16:00	9.2	137.0	7.9	99.4	7.0	146.1
17:00	9.0	133.0	7.6	96.5	6.6	140.2
18:00	8.8	122.1	7.5	95.2	6.0	124.2
19:00	9.0	115.7	7.5	92.9	5.7	117.9
20:00	9.1	112.8	7.6	88.3	5.7	116.5
21:00	9.2	112.2	7.6	90.3	5.8	121.0
22:00	9.0	115.6	7.7	90.2	5.8	125.0
23:00	9.0	124.5	7.6	88.6	5.9	136.3

SITE ID: MK
 SITE LOCATION: MEADE, KANSAS
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C COUNT	LEVEL C %
0.0- 0.5	0	0.0	0	0.0
0.5- 1.0	0	0.0	8	0.5
1.0- 1.5	0	0.0	14	0.8
1.5- 2.0	6	0.1	22	1.3
2.0- 2.5	14	0.3	33	2.0
2.5- 3.0	42	0.9	48	2.9
3.0- 3.5	65	1.4	62	3.7
3.5- 4.0	100	2.2	52	3.1
4.0- 4.5	118	2.6	60	3.6
4.5- 5.0	127	2.8	49	2.9
5.0- 5.5	185	4.0	75	4.5
5.5- 6.0	232	5.1	72	4.3
6.0- 6.5	316	6.9	87	5.2
6.5- 7.0	328	7.2	99	5.9
7.0- 7.5	341	7.5	141	8.4
7.5- 8.0	323	7.1	112	6.7
8.0- 8.5	256	5.6	89	5.3
8.5- 9.0	250	5.5	80	4.8
9.0- 9.5	228	5.0	139	8.3
9.5-10.0	195	4.3	148	8.8
10.0-11.0	305	6.7	114	6.8
11.0-12.0	235	5.1	78	4.6
12.0-13.0	215	4.7	35	2.1
13.0-14.0	277	6.1	34	2.0
14.0-15.0	243	5.3	15	0.9
15.0-16.0	69	1.5	7	0.4
16.0-17.0	36	0.8	6	0.4
17.0-18.0	22	0.5	0	0.0
18.0-19.0	20	0.4	1	0.1
19.0-20.0	9	0.2	0	0.0
20.0-21.0	5	0.1	0	0.0
>21.0	14	0.3	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 69.8 25.6 66.3

SITE ID: MK
 SITE LOCATION: MEADE, KANSAS
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0	0.00	0	0.00	0	0.00
1.0	0	0.00	8	0.48	13	0.30
1.5	0	0.00	22	1.31	103	2.37
2.0	6	0.13	44	2.62	242	5.57
2.5	20	0.44	77	4.58	435	10.01
3.0	62	1.35	125	7.44	671	15.45
3.5	127	2.78	187	11.13	932	21.45
4.0	227	4.96	239	14.23	1193	27.46
4.5	345	7.54	299	17.80	1475	33.95
5.0	472	10.31	348	20.71	1764	40.61
5.5	657	14.36	423	25.18	2045	47.08
6.0	889	19.43	495	29.46	2345	53.98
6.5	1205	26.33	582	34.64	2615	60.20
7.0	1533	33.50	681	40.54	2871	66.09
7.5	1874	40.95	822	48.93	3093	71.20
8.0	2197	48.01	934	55.60	3283	75.58
8.5	2453	53.61	1023	60.89	3462	79.70
9.0	2703	59.07	1103	65.65	3596	82.78
9.5	2931	64.05	1242	73.93	3694	85.04
10.0	3126	68.31	1390	82.74	3806	87.62
11.0	3431	74.98	1504	89.52	3988	91.80
12.0	3666	80.11	1582	94.17	4130	95.07
13.0	3881	84.81	1617	96.25	4234	97.47
14.0	4158	90.87	1651	98.27	4275	98.41
15.0	4401	96.18	1666	99.17	4303	99.06
16.0	4470	97.68	1673	99.58	4318	99.40
17.0	4506	98.47	1679	99.94	4328	99.63
18.0	4528	98.95	1679	99.94	4337	99.84
19.0	4548	99.39	1680	100.00	4342	99.95
20.0	4557	99.58	1680	100.00	4344	100.00
21.0	4562	99.69	1680	100.00	4344	100.00
>21.0	4576	100.00	1680	100.00	4344	100.00

SITE ID: MK
 SITE LOCATION: MEADE, KANSAS
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	17	69	106	163	217	196	86	7
2	11	19	25	51	75	48	29	4
3	2	10	7	19	27	39	11	1
4	1	5	4	6	14	32	7	0
5	0	0	1	4	7	14	10	0
6	0	1	0	3	8	17	7	0
7	0	0	0	1	2	13	5	0
8	0	0	0	0	0	12	3	0
9	0	0	0	0	0	10	4	0
10	0	0	0	1	0	7	0	0
11	0	0	0	0	0	5	2	0
12	0	0	1	0	0	4	1	0
13	0	0	0	0	0	5	1	0
14	0	0	0	0	0	2	1	0
15	0	0	0	0	0	3	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	4	0	0
18	0	0	0	0	0	0	0	0
19	0	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: MK
 SITE LOCATION: MEADE, KANSAS
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	1.10	-0.20	0.14	0.07	7.65	1.79	9.65
NNE	0.84	-0.01	0.21	0.16	6.71	2.26	6.22
NE	0.22	0.18	0.19	0.18	3.50	1.25	2.60
ENE	1.06	-0.02	0.26	0.20	3.52	3.21	2.92
E	1.26	0.11	0.41	0.35	4.26	4.17	3.71
ESE	1.09	0.12	0.37	0.32	10.12	5.48	7.53
SE	0.39	0.25	0.28	0.28	11.65	9.40	12.36
SSE	-0.09	0.26	0.17	0.19	12.41	16.31	16.00
S	0.22	0.21	0.21	0.21	10.86	6.07	9.83
SSW	0.40	0.21	0.26	0.25	7.41	2.74	7.64
SW	0.06	0.31	0.25	0.26	3.74	1.43	2.44
WSW	0.82	0.05	0.25	0.21	1.88	0.89	1.80
W	-0.26	0.36	0.20	0.24	1.55	0.48	2.19
WNW	-0.35	0.53	0.30	0.35	2.12	1.31	3.45
NW	0.46	0.00	0.12	0.09	3.32	0.65	3.59
NNW	-0.20	0.29	0.16	0.19	5.31	2.08	7.39

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

MINOT, NORTH DAKOTA



SITE ID: MR
 SITE LOCATION: MINOT, ND.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 6552

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	96.6
WD(A)	100.0	98.9
WS(B)	100.0	95.4
WD(B)	100.0	97.0
WS(C)	100.0	93.4
WD(C)	100.0	97.3

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	8.4	262.2	547.63
(B)	30.0	7.9	275.9	455.47
(C)	9.1	7.1	296.1	322.93

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	23.4	291.2	03/12/82	21:00	(B) 23.2 (C) 19.8
(B) 30.0	23.2	299.2	03/12/82	21:00	(A) 23.4 (C) 19.8
(C) 9.1	20.4	295.9	03/12/82	18:00	(A) 23.1 (B) 22.8

 NOTES:

1. SITE ELEVATION: 675 METERS ABOVE SEA LEVEL.

SITE ID: MR
 SITE LOCATION: MINOT, ND.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	8.8	194.8	8.0	196.1	6.8	156.1
01:00	8.9	202.2	8.1	212.6	6.9	184.3
02:00	9.0	218.7	8.1	227.4	6.9	233.4
03:00	8.9	224.6	8.1	233.3	6.9	240.6
04:00	9.0	232.9	8.2	238.0	6.9	242.9
05:00	8.9	245.8	8.1	251.0	6.9	256.0
06:00	8.7	240.5	7.9	248.8	6.8	252.8
07:00	8.5	248.9	7.7	260.8	6.8	273.6
08:00	8.2	252.9	7.6	262.9	7.1	272.2
09:00	8.0	266.1	7.6	276.1	7.2	286.5
10:00	8.0	271.4	7.7	284.5	7.4	299.0
11:00	8.0	280.2	7.8	303.7	7.5	324.5
12:00	8.0	276.4	7.9	301.7	7.5	323.0
13:00	8.2	266.4	8.0	293.7	7.8	304.1
14:00	8.2	269.9	8.0	295.0	7.7	307.9
15:00	8.2	271.7	8.0	294.5	7.6	305.8
16:00	8.2	278.4	8.0	294.7	7.5	316.6
17:00	8.2	283.6	7.9	302.6	7.4	325.1
18:00	8.3	293.6	7.9	312.2	7.3	336.0
19:00	8.2	311.8	7.7	329.7	7.0	8.6
20:00	8.2	334.8	7.6	355.9	6.6	53.1
21:00	8.4	4.3	7.8	29.9	6.5	72.3
22:00	8.6	90.3	7.9	92.3	6.6	112.6
23:00	8.8	151.5	8.1	159.6	6.8	130.0

SITE ID: MR
 SITE LOCATION: MINOT, ND.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	%	LEVEL B COUNT	%	LEVEL C COUNT	%
0.0- 0.5	0	0.0	0	0.0	0	0.0
0.5- 1.0	1	0.0	0	0.0	1	0.0
1.0- 1.5	26	0.4	23	0.4	10	0.2
1.5- 2.0	61	1.0	48	0.8	46	0.8
2.0- 2.5	100	1.6	120	1.9	94	1.5
2.5- 3.0	119	1.9	139	2.2	153	2.5
3.0- 3.5	160	2.5	196	3.1	250	4.1
3.5- 4.0	212	3.4	231	3.7	320	5.2
4.0- 4.5	241	3.8	274	4.4	331	5.4
4.5- 5.0	244	3.9	305	4.9	326	5.3
5.0- 5.5	280	4.4	314	5.0	381	6.2
5.5- 6.0	299	4.7	332	5.3	451	7.4
6.0- 6.5	309	4.9	352	5.6	450	7.4
6.5- 7.0	310	4.9	372	6.0	453	7.4
7.0- 7.5	330	5.2	357	5.7	411	6.7
7.5- 8.0	332	5.2	332	5.3	408	6.7
8.0- 8.5	337	5.3	376	6.0	345	5.6
8.5- 9.0	369	5.8	349	5.6	268	4.4
9.0- 9.5	301	4.8	314	5.0	262	4.3
9.5-10.0	336	5.3	290	4.6	237	3.9
10.0-11.0	542	8.6	483	7.7	324	5.3
11.0-12.0	432	6.8	313	5.0	212	3.5
12.0-13.0	303	4.8	230	3.7	133	2.2
13.0-14.0	231	3.7	168	2.7	101	1.7
14.0-15.0	148	2.3	124	2.0	65	1.1
15.0-16.0	113	1.8	69	1.1	34	0.6
16.0-17.0	54	0.9	53	0.8	26	0.4
17.0-18.0	60	0.9	40	0.6	6	0.1
18.0-19.0	33	0.5	16	0.3	13	0.2
19.0-20.0	14	0.2	10	0.2	6	0.1
20.0-21.0	16	0.3	11	0.2	3	0.0
>21.0	15	0.2	9	0.1	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 96.6 95.4 93.4

SITE ID: MR
 SITE LOCATION: MINOT, ND.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0	0.00	0	0.00	0	0.00
1.0	1	0.02	0	0.00	1	0.02
1.5	27	0.43	23	0.37	11	0.18
2.0	88	1.39	71	1.14	57	0.93
2.5	188	2.97	191	3.06	151	2.47
3.0	307	4.85	330	5.28	304	4.97
3.5	467	7.38	526	8.42	554	9.05
4.0	679	10.73	757	12.11	874	14.28
4.5	920	14.54	1031	16.50	1205	19.69
5.0	1164	18.39	1336	21.38	1531	25.02
5.5	1444	22.82	1650	26.40	1912	31.24
6.0	1743	27.54	1982	31.71	2363	38.61
6.5	2052	32.43	2334	37.34	2813	45.96
7.0	2362	37.33	2706	43.30	3266	53.37
7.5	2692	42.54	3063	49.01	3677	60.08
8.0	3024	47.79	3395	54.32	4085	66.75
8.5	3361	53.11	3771	60.34	4430	72.39
9.0	3730	58.94	4120	65.92	4698	76.76
9.5	4031	63.70	4434	70.94	4960	81.05
10.0	4367	69.01	4724	75.58	5197	84.92
11.0	4909	77.58	5207	83.31	5521	90.21
12.0	5341	84.40	5520	88.32	5733	93.68
13.0	5644	89.19	5750	92.00	5866	95.85
14.0	5875	92.84	5918	94.69	5967	97.50
15.0	6023	95.18	6042	96.67	6032	98.56
16.0	6136	96.97	6111	97.78	6066	99.12
17.0	6190	97.82	6164	98.62	6092	99.54
18.0	6250	98.77	6204	99.26	6098	99.64
19.0	6283	99.29	6220	99.52	6111	99.85
20.0	6297	99.51	6230	99.68	6117	99.95
21.0	6313	99.76	6241	99.86	6120	100.00
>21.0	6328	100.00	6250	100.00	6120	100.00

SITE ID: MR
 SITE LOCATION: MINOT, ND.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	65	156	220	255	255	209	102	2	
2	27	49	56	78	75	71	17	1	
3	19	14	30	23	24	37	16	2	
4	4	9	2	10	12	40	14	1	
5	6	3	2	4	4	25	5	0	
6	2	1	2	1	3	17	4	0	
7	2	0	2	2	2	14	4	0	
8	1	1	0	0	0	12	4	1	
9	0	0	0	0	0	6	4	1	
10	1	0	0	0	1	9	0	0	
11	0	0	0	0	0	6	2	0	
12	0	0	0	0	0	6	4	0	
13	0	0	0	0	0	4	1	0	
14	1	0	0	0	0	1	3	0	
15	0	0	0	0	0	2	0	0	
16	0	0	0	0	0	5	0	0	
17	0	0	0	0	0	3	1	0	
18	0	0	0	0	0	1	2	0	
19	0	0	0	0	0	0	0	0	
20	0	0	0	0	0	2	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: MR
 SITE LOCATION: MINOT, ND.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0.01	0.00	0.00	0.00	6.62	6.40	7.29
NNE	0.03	0.03	0.03	0.03	5.44	5.22	6.24
NE	0.20	0.25	0.24	0.24	4.98	5.44	4.79
ENE	-0.01	0.19	0.14	0.15	4.93	4.61	5.18
E	-0.01	0.12	0.09	0.09	4.11	4.99	5.10
ESE	0.14	0.01	0.04	0.03	4.08	4.08	3.84
SE	0.28	0.03	0.09	0.08	4.85	4.34	4.56
SSE	0.46	0.06	0.17	0.14	6.68	4.56	4.75
S	0.06	0.10	0.09	0.09	9.91	10.13	10.28
SSW	0.10	0.06	0.07	0.07	6.45	7.82	8.55
SW	0.23	0.09	0.12	0.11	4.69	5.10	5.60
WSW	0.29	0.11	0.16	0.15	6.40	5.73	4.74
W	0.39	0.10	0.18	0.16	7.10	6.83	6.34
WNW	0.19	0.12	0.14	0.13	7.76	7.22	6.62
NW	0.09	0.10	0.10	0.10	7.89	7.26	6.00
NNW	0.14	0.04	0.06	0.06	7.92	8.10	8.14

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

MONTAUK, NEW YORK



SITE ID: NY
 SITE LOCATION: MONTAUK POINT, NY.
 DATA : JANUARY 1982 THROUGH MAY 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 3624

SENSOR % ON-LINE % RECOVERED

WS(A)	100.0	57.3
WD(A)	100.0	2.8
WS(C)	100.0	57.1
WD(C)	100.0	54.6

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 45.7	6.9	251.9	445.30
	(C) 18.2	6.5	286.8	339.17

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	22.5	-999.9	04/12/82	06:00	(B)-999.9 (C) 19.0
(C) 18.2	19.9	310.4	04/12/82	08:00	(A) 22.5 (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 1982 THROUGH MAY 1982

 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	6.6	271.5	0.0	0.0	6.4	298.5
01:00	6.5	273.7	0.0	0.0	6.3	298.7
02:00	6.7	271.0	0.0	0.0	6.4	302.1
03:00	6.7	262.8	0.0	0.0	6.5	302.4
04:00	6.8	257.1	0.0	0.0	6.5	303.1
05:00	6.6	239.3	0.0	0.0	6.3	306.5
06:00	6.8	238.5	0.0	0.0	6.4	301.9
07:00	7.1	245.7	0.0	0.0	6.5	301.0
08:00	7.2	248.8	0.0	0.0	6.6	303.5
09:00	7.1	249.0	0.0	0.0	6.5	302.0
10:00	7.2	257.4	0.0	0.0	6.4	297.6
11:00	7.2	223.9	0.0	0.0	6.6	285.5
12:00	7.3	204.0	0.0	0.0	6.6	269.4
13:00	7.5	213.3	0.0	0.0	6.7	260.1
14:00	7.7	218.7	0.0	0.0	6.9	250.5
15:00	7.6	232.4	0.0	0.0	6.8	258.5
16:00	7.1	232.3	0.0	0.0	6.6	260.1
17:00	6.9	263.0	0.0	0.0	6.6	256.8
18:00	6.8	264.9	0.0	0.0	6.6	256.4
19:00	6.6	258.4	0.0	0.0	6.4	266.5
20:00	6.6	265.9	0.0	0.0	6.4	274.4
21:00	6.4	264.0	0.0	0.0	6.2	279.4
22:00	6.4	258.0	0.0	0.0	6.2	285.4
23:00	6.3	254.2	0.0	0.0	6.1	296.8

SITE ID: NY
 SITE LOCATION: MONTAUK POINT, NY.
 DATA : JANUARY 1982 THROUGH MAY 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	COUNT	%	COUNT	%	COUNT	%
0.0- 0.5	0	0.0	0	0.0	1	0.0
0.5- 1.0	16	0.8	0	0.0	29	1.4
1.0- 1.5	73	3.5	0	0.0	48	2.3
1.5- 2.0	66	3.2	0	0.0	82	4.0
2.0- 2.5	72	3.5	0	0.0	78	3.8
2.5- 3.0	73	3.5	0	0.0	97	4.7
3.0- 3.5	89	4.3	0	0.0	101	4.9
3.5- 4.0	98	4.7	0	0.0	96	4.6
4.0- 4.5	95	4.6	0	0.0	102	4.9
4.5- 5.0	128	6.2	0	0.0	112	5.4
5.0- 5.5	135	6.5	0	0.0	147	7.1
5.5- 6.0	125	6.0	0	0.0	130	6.3
6.0- 6.5	117	5.6	0	0.0	122	5.9
6.5- 7.0	117	5.6	0	0.0	126	6.1
7.0- 7.5	119	5.7	0	0.0	125	6.0
7.5- 8.0	95	4.6	0	0.0	92	4.4
8.0- 8.5	114	5.5	0	0.0	105	5.1
8.5- 9.0	78	3.8	0	0.0	76	3.7
9.0- 9.5	79	3.8	0	0.0	61	2.9
9.5-10.0	53	2.6	0	0.0	55	2.7
10.0-11.0	61	2.9	0	0.0	64	3.1
11.0-12.0	57	2.7	0	0.0	59	2.9
12.0-13.0	49	2.4	0	0.0	40	1.9
13.0-14.0	32	1.5	0	0.0	31	1.5
14.0-15.0	31	1.5	0	0.0	33	1.6
15.0-16.0	20	1.0	0	0.0	19	0.9
16.0-17.0	25	1.2	0	0.0	8	0.4
17.0-18.0	16	0.8	0	0.0	13	0.6
18.0-19.0	12	0.6	0	0.0	12	0.6
19.0-20.0	9	0.4	0	0.0	4	0.2
20.0-21.0	7	0.3	0	0.0	0	0.0
>21.0	15	0.7	0	0.0	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 57.3 0.0 57.1

SITE ID: NY
 SITE LOCATION: MONTAUK POINT, NY.
 DATA : JANUARY 1982 THROUGH MAY 1982

 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	0	0.00	0	0.00	1	0.05
1.0	16	0.77	0	0.00	30	1.45
1.5	89	4.29	0	0.00	78	3.77
2.0	155	7.47	0	0.00	160	7.74
2.5	227	10.93	0	0.00	238	11.51
3.0	300	14.45	0	0.00	335	16.20
3.5	389	18.74	0	0.00	436	21.08
4.0	487	23.46	0	0.00	532	25.73
4.5	582	28.03	0	0.00	634	30.66
5.0	710	34.20	0	0.00	746	36.07
5.5	845	40.70	0	0.00	893	43.18
6.0	970	46.72	0	0.00	1023	49.47
6.5	1087	52.36	0	0.00	1145	55.37
7.0	1204	58.00	0	0.00	1271	61.46
7.5	1323	63.73	0	0.00	1396	67.50
8.0	1418	68.30	0	0.00	1488	71.95
8.5	1532	73.80	0	0.00	1593	77.03
9.0	1610	77.55	0	0.00	1669	80.71
9.5	1689	81.36	0	0.00	1730	83.66
10.0	1742	83.91	0	0.00	1785	86.32
11.0	1803	86.85	0	0.00	1849	89.41
12.0	1860	89.60	0	0.00	1908	92.26
13.0	1909	91.96	0	0.00	1948	94.20
14.0	1941	93.50	0	0.00	1979	95.70
15.0	1972	94.99	0	0.00	2012	97.29
16.0	1992	95.95	0	0.00	2031	98.21
17.0	2017	97.16	0	0.00	2039	98.60
18.0	2033	97.93	0	0.00	2052	99.23
19.0	2045	98.51	0	0.00	2064	99.81
20.0	2054	98.94	0	0.00	2068	100.00
21.0	2061	99.28	0	0.00	2068	100.00
>21.0	2076	100.00	0	0.00	2068	100.00

SITE ID: NY
 SITE LOCATION: MONTAUK POINT, NY.
 DATA : JANUARY 1982 THROUGH MAY 1982

 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	32	71	95	134	111	65	21	4
2	14	22	32	27	36	24	8	0
3	6	11	9	9	8	22	4	0
4	9	4	5	2	2	9	4	0
5	4	3	0	1	2	7	1	0
6	4	0	1	1	0	6	1	0
7	2	0	0	1	1	3	1	1
8	0	0	0	0	0	3	1	0
9	0	0	0	0	0	4	0	0
10	1	0	0	0	0	2	0	0
11	1	0	0	0	0	0	0	0
12	1	0	0	0	0	0	0	0
13	0	0	0	0	0	1	0	0
14	0	0	0	0	0	1	0	0
15	0	0	0	0	0	1	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	1	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: NY
 SITE LOCATION: MONTAUK POINT, NY.
 DATA : JANUARY 1982 THROUGH MAY 1982

 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	0.40	0.00	0.00	0.00	5.08
NNE	0.00	0.00	-0.92	0.00	0.05	0.00	3.24
NE	0.00	0.00	-0.76	0.00	0.10	0.00	2.61
ENE	0.00	0.00	0.18	0.00	0.34	0.00	4.45
E	0.00	0.00	0.58	0.00	0.24	0.00	3.77
ESE	0.00	0.00	0.19	0.00	0.10	0.00	3.34
SE	0.00	0.00	0.40	0.00	0.00	0.00	3.38
SSE	0.00	0.00	-0.01	0.00	0.19	0.00	4.59
S	0.00	0.00	0.18	0.00	0.19	0.00	3.72
SSW	0.00	0.00	0.06	0.00	0.14	0.00	4.84
SW	0.00	0.00	0.08	0.00	0.77	0.00	5.95
WSW	0.00	0.00	0.18	0.00	1.06	0.00	6.48
W	0.00	0.00	0.07	0.00	0.72	0.00	12.81
WNW	0.00	0.00	-0.27	0.00	0.82	0.00	11.32
NW	0.00	0.00	-1.18	0.00	0.10	0.00	11.85
NNW	0.00	0.00	-1.11	0.00	0.14	0.00	7.64

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

PROVINCETOWN, MASSACHUSETTS



SITE ID: PT
 SITE LOCATION: PROVINCETOWN, MA.
 DATA : JANUARY 1982 THROUGH AUGUST 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 5832

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	23.6
WD(A)	100.0	24.2
WS(B)	100.0	36.4
WD(B)	100.0	23.3
WS(C)	100.0	11.6
WD(C)	100.0	22.9

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	42.7	10.0	245.6	831.64
(B)	30.0	8.3	240.2	582.30
(C)	9.1	5.6	234.2	239.59

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 42.7	26.3	-999.9	04/03/82	21:00	(B) 18.6 (C) 17.2
(B) 30.0	21.5	340.4	04/06/82	20:00	(A)-999.9 (C)-999.9
(C) 9.1	20.6	-999.9	04/07/82	17:00	(A)-999.9 (B) 19.0

NOTES:

1. SITE ELEVATION: 10 METERS ABOVE SEA LEVEL.

SITE ID: PT
 SITE LOCATION: PROVINCETOWN, MA.
 DATA : JANUARY 1982 THROUGH AUGUST 1982

 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	10.2	269.2	8.2	239.5	4.6	239.0
01:00	10.1	282.4	7.9	250.1	4.4	240.9
02:00	9.8	284.5	8.0	255.5	4.8	245.0
03:00	9.6	291.5	8.1	244.4	4.4	239.7
04:00	9.5	286.4	8.0	247.3	4.6	238.7
05:00	9.6	284.0	7.8	234.1	4.7	234.1
06:00	9.8	263.6	7.9	235.5	4.9	231.1
07:00	10.1	262.7	8.6	242.3	6.1	235.6
08:00	10.5	253.3	10.0	248.5	6.9	229.3
09:00	10.5	281.5	9.8	257.2	7.3	250.4
10:00	10.0	280.4	9.3	254.6	7.4	238.6
11:00	9.8	260.4	9.1	264.5	6.7	238.2
12:00	9.6	247.8	8.6	266.8	6.2	227.6
13:00	9.7	219.3	8.6	248.5	6.1	227.8
14:00	9.9	215.9	8.7	227.9	6.4	233.8
15:00	10.2	210.3	8.4	229.7	6.1	238.7
16:00	10.1	194.5	7.9	232.7	5.9	225.6
17:00	9.9	188.5	7.6	200.0	5.2	222.9
18:00	9.7	208.5	7.7	206.3	5.2	216.6
19:00	10.0	219.4	7.5	216.8	5.5	224.5
20:00	10.0	231.4	7.8	224.5	6.0	234.1
21:00	10.3	237.2	8.1	223.3	5.3	234.0
22:00	10.0	247.6	8.3	224.5	5.0	237.2
23:00	10.2	249.5	8.2	242.6	4.5	243.4

SITE ID: PT
 SITE LOCATION: PROVINCETOWN, MA.
 DATA : JANUARY 1982 THROUGH AUGUST 1982

 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	0	0.0	0	0.0	0	0.0
0.5- 1.0	4	0.3	11	0.5	6	0.9
1.0- 1.5	1	0.1	16	0.8	13	1.9
1.5- 2.0	6	0.4	32	1.5	27	4.0
2.0- 2.5	9	0.7	49	2.3	32	4.7
2.5- 3.0	6	0.4	51	2.4	60	8.9
3.0- 3.5	12	0.9	52	2.4	48	7.1
3.5- 4.0	11	0.8	55	2.6	65	9.6
4.0- 4.5	17	1.2	65	3.1	57	8.5
4.5- 5.0	21	1.5	87	4.1	59	8.8
5.0- 5.5	23	1.7	81	3.8	37	5.5
5.5- 6.0	33	2.4	92	4.3	37	5.5
6.0- 6.5	32	2.3	109	5.1	27	4.0
6.5- 7.0	46	3.3	120	5.6	38	5.6
7.0- 7.5	66	4.8	114	5.4	17	2.5
7.5- 8.0	67	4.9	120	5.6	19	2.8
8.0- 8.5	77	5.6	137	6.4	18	2.7
8.5- 9.0	78	5.7	120	5.6	17	2.5
9.0- 9.5	141	10.2	91	4.3	11	1.6
9.5-10.0	123	8.9	88	4.1	12	1.8
10.0-11.0	166	12.1	164	7.7	16	2.4
11.0-12.0	129	9.4	145	6.8	26	3.9
12.0-13.0	92	6.7	96	4.5	11	1.6
13.0-14.0	59	4.3	59	2.8	6	0.9
14.0-15.0	48	3.5	40	1.9	5	0.7
15.0-16.0	35	2.5	43	2.0	2	0.3
16.0-17.0	24	1.7	34	1.6	3	0.4
17.0-18.0	17	1.2	35	1.6	3	0.4
18.0-19.0	15	1.1	11	0.5	1	0.1
19.0-20.0	3	0.2	2	0.1	0	0.0
20.0-21.0	6	0.4	4	0.2	1	0.1
>21.0	9	0.7	2	0.1	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 23.6 36.4 11.6

SITE ID: PT
 SITE LOCATION: PROVINCETOWN, MA.
 DATA : JANUARY 1982 THROUGH AUGUST 1982

 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	0	0.00	0	0.00	0	0.00
1.0	4	0.29	11	0.52	6	0.89
1.5	5	0.36	27	1.27	19	2.82
2.0	11	0.80	59	2.78	46	6.82
2.5	20	1.45	108	5.08	78	11.57
3.0	26	1.89	159	7.48	138	20.47
3.5	38	2.76	211	9.93	186	27.60
4.0	49	3.56	266	12.52	251	37.24
4.5	66	4.80	331	15.58	308	45.70
5.0	87	6.32	418	19.67	367	54.45
5.5	110	7.99	499	23.48	404	59.94
6.0	143	10.39	591	27.81	441	65.43
6.5	175	12.72	700	32.94	468	69.44
7.0	221	16.06	820	38.59	506	75.07
7.5	287	20.86	934	43.95	523	77.60
8.0	354	25.73	1054	49.60	542	80.42
8.5	431	31.32	1191	56.05	560	83.09
9.0	509	36.99	1311	61.69	577	85.61
9.5	650	47.24	1402	65.98	588	87.24
10.0	773	56.18	1490	70.12	600	89.02
11.0	939	68.24	1654	77.84	616	91.39
12.0	1068	77.62	1799	84.66	642	95.25
13.0	1160	84.30	1895	89.18	653	96.88
14.0	1219	88.59	1954	91.95	659	97.77
15.0	1267	92.08	1994	93.84	664	98.52
16.0	1302	94.62	2037	95.86	666	98.81
17.0	1326	96.37	2071	97.46	669	99.26
18.0	1343	97.60	2106	99.11	672	99.70
19.0	1358	98.69	2117	99.62	673	99.85
20.0	1361	98.91	2119	99.72	673	99.85
21.0	1367	99.35	2123	99.91	674	100.00
>21.0	1376	100.00	2125	100.00	674	100.00

SITE ID: PT
 SITE LOCATION: PROVINCETOWN, MA.
 DATA : JANUARY 1982 THROUGH AUGUST 1982

 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	13	20	28	34	71	41	6	
2	1	2	3	2	12	18	11	1	
3	2	0	4	1	5	11	5	0	
4	2	1	0	2	1	11	6	1	
5	1	0	0	1	0	5	4	0	
6	0	0	0	0	0	5	7	0	
7	0	0	0	1	0	3	1	0	
8	0	0	0	0	0	2	1	0	
9	0	0	0	0	0	1	1	0	
10	0	0	0	0	0	2	0	0	
11	0	0	0	0	0	1	1	0	
12	0	0	0	0	0	0	0	0	
13	0	0	0	0	0	1	0	0	
14	0	0	0	0	0	1	1	0	
15	0	0	0	0	0	0	0	0	
16	0	0	0	0	0	0	0	0	
17	0	0	0	0	0	1	0	0	
18	0	0	0	0	0	0	0	0	
19	0	0	0	0	0	1	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: PT
 SITE LOCATION: PROVINCETOWN, MA.
 DATA : JANUARY 1982 THROUGH AUGUST 1982

 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	-0.27	0.37	0.23	0.26	1.96	3.25	2.08
NNE	0.09	0.48	0.39	0.42	4.94	2.78	5.49
NE	0.94	0.05	0.25	0.20	3.13	1.55	3.41
ENE	0.88	0.29	0.42	0.39	2.18	1.36	4.15
E	0.78	0.50	0.56	0.55	2.69	1.32	4.30
ESE	1.06	0.30	0.48	0.43	2.91	1.08	4.30
SE	0.66	0.02	0.17	0.13	4.80	2.45	5.64
SSE	0.30	0.26	0.27	0.27	3.56	4.99	3.71
S	-0.52	0.52	0.28	0.34	2.91	5.93	5.64
SSW	0.26	0.46	0.41	0.43	3.56	6.64	3.56
SW	0.67	0.50	0.54	0.53	4.65	4.28	1.93
WSW	0.54	0.77	0.72	0.73	9.88	4.80	2.97
W	0.28	0.85	0.72	0.75	16.35	5.93	2.37
WNW	-0.86	0.48	0.18	0.26	5.31	6.64	2.67
NW	0.43	0.50	0.48	0.48	4.94	2.40	1.19
NNW	0.60	0.70	0.68	0.69	4.51	2.73	0.15

 NOTES:

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

$$2. \text{ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{array}{l} Z=\text{ELEVATION} \\ WS=\text{WIND SPEED} \end{array}$$

ROMERO OVERLOOK, CALIFORNIA



SITE ID: RO
 SITE LOCATION: ROMERO OVERLOOK, CA.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 6552

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	82.5
WD(A)	100.0	46.6
WS(B)	100.0	82.7
WD(B)	100.0	83.4
WS(C)	100.0	82.8
WD(C)	100.0	83.4

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 45.7	7.3	218.1	419.51
	(B) 30.0	5.9	240.0	213.84
	(C) 9.1	5.4	242.3	165.13

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	22.2	-999.9	05/26/82	22:00	(B) 16.3 (C) 15.4
(B) 30.0	16.4	244.0	04/11/82	15:00	(A) 20.9 (C) 14.4
(C) 9.1	15.6	240.4	05/26/82	21:00	(A) 22.0 (B) 16.3

 NOTES:

1. SITE ELEVATION: 458 METERS ABOVE SEA LEVEL.

SITE ID: RO
 SITE LOCATION: ROMERO OVERLOOK, CA.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	8.0	243.7	6.4	249.1	5.6	252.2
01:00	7.9	241.9	6.3	247.9	5.5	252.5
02:00	7.7	243.9	6.1	250.1	5.4	252.2
03:00	7.7	240.1	6.1	248.0	5.3	251.6
04:00	7.4	247.5	5.9	250.9	5.2	252.7
05:00	7.3	247.8	5.8	251.4	5.1	253.8
06:00	7.0	253.6	5.5	250.4	5.0	251.6
07:00	6.7	250.5	5.3	247.0	4.9	245.5
08:00	6.5	233.2	5.2	239.2	4.9	236.2
09:00	6.6	205.0	5.2	230.7	5.0	228.1
10:00	6.7	185.3	5.4	221.1	5.1	220.6
11:00	7.0	173.3	5.7	216.6	5.4	215.9
12:00	7.2	165.5	5.8	215.2	5.4	213.5
13:00	7.2	165.1	6.0	217.1	5.7	216.9
14:00	7.5	146.5	6.3	217.1	5.9	217.6
15:00	7.4	140.4	6.3	218.6	5.9	218.1
16:00	7.2	151.6	6.2	219.8	5.8	218.7
17:00	7.4	160.4	6.2	228.9	5.7	229.5
18:00	7.4	184.9	6.2	236.2	5.5	239.4
19:00	7.5	214.6	6.2	239.0	5.5	245.4
20:00	7.5	225.2	6.1	242.0	5.4	246.4
21:00	7.6	237.0	6.1	246.2	5.3	250.5
22:00	7.6	237.9	6.1	247.4	5.4	252.8
23:00	7.8	240.7	6.2	247.9	5.4	251.1

SITE ID: RO
 SITE LOCATION: ROMERO OVERLOOK, CA.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

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	0	0.0	0	0.0	0	0.0
0.5- 1.0	12	0.2	10	0.2	45	0.8
1.0- 1.5	38	0.7	87	1.6	214	3.9
1.5- 2.0	77	1.4	261	4.8	294	5.4
2.0- 2.5	137	2.5	295	5.4	349	6.4
2.5- 3.0	203	3.8	335	6.2	358	6.6
3.0- 3.5	231	4.3	332	6.1	354	6.5
3.5- 4.0	231	4.3	321	5.9	356	6.6
4.0- 4.5	214	4.0	285	5.3	349	6.4
4.5- 5.0	310	5.7	297	5.5	358	6.6
5.0- 5.5	325	6.0	317	5.8	309	5.7
5.5- 6.0	415	7.7	358	6.6	315	5.8
6.0- 6.5	359	6.6	343	6.3	338	6.2
6.5- 7.0	342	6.3	298	5.5	294	5.4
7.0- 7.5	328	6.1	310	5.7	260	4.8
7.5- 8.0	328	6.1	230	4.2	216	4.0
8.0- 8.5	266	4.9	239	4.4	215	4.0
8.5- 9.0	202	3.7	213	3.9	206	3.8
9.0- 9.5	192	3.6	211	3.9	173	3.2
9.5-10.0	173	3.2	175	3.2	136	2.5
10.0-11.0	304	5.6	255	4.7	152	2.8
11.0-12.0	75	1.4	129	2.4	76	1.4
12.0-13.0	71	1.3	61	1.1	27	0.5
13.0-14.0	213	3.9	31	0.6	25	0.5
14.0-15.0	157	2.9	20	0.4	5	0.1
15.0-16.0	80	1.5	5	0.1	2	0.0
16.0-17.0	44	0.8	3	0.1	0	0.0
17.0-18.0	30	0.6	0	0.0	0	0.0
18.0-19.0	19	0.4	0	0.0	0	0.0
19.0-20.0	14	0.3	0	0.0	0	0.0
20.0-21.0	12	0.2	0	0.0	0	0.0
>21.0	4	0.1	0	0.0	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 82.5 82.7 82.8

SITE ID: RO
 SITE LOCATION: ROMERO OVERLOOK, CA.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0	0.00	0	0.00	0	0.00
1.0	12	0.22	10	0.18	45	0.83
1.5	50	0.92	97	1.79	259	4.77
2.0	127	2.35	358	6.60	553	10.19
2.5	264	4.88	653	12.05	902	16.62
3.0	467	8.64	988	18.23	1260	23.22
3.5	698	12.91	1320	24.35	1614	29.75
4.0	929	17.18	1641	30.27	1970	36.31
4.5	1143	21.14	1926	35.53	2319	42.74
5.0	1453	26.88	2223	41.01	2677	49.34
5.5	1778	32.89	2540	46.85	2986	55.03
6.0	2193	40.57	2898	53.46	3301	60.84
6.5	2552	47.21	3241	59.79	3639	67.07
7.0	2894	53.53	3539	65.28	3933	72.48
7.5	3222	59.60	3849	71.00	4193	77.28
8.0	3550	65.67	4079	75.24	4409	81.26
8.5	3816	70.59	4318	79.65	4624	85.22
9.0	4018	74.32	4531	83.58	4830	89.02
9.5	4210	77.88	4742	87.47	5003	92.20
10.0	4383	81.08	4917	90.70	5139	94.71
11.0	4687	86.70	5172	95.41	5291	97.51
12.0	4762	88.09	5301	97.79	5367	98.91
13.0	4833	89.40	5362	98.91	5394	99.41
14.0	5046	93.34	5393	99.48	5419	99.87
15.0	5203	96.24	5413	99.85	5424	99.96
16.0	5283	97.72	5418	99.94	5426	100.00
17.0	5327	98.54	5421	100.00	5426	100.00
18.0	5357	99.09	5421	100.00	5426	100.00
19.0	5376	99.45	5421	100.00	5426	100.00
20.0	5390	99.70	5421	100.00	5426	100.00
21.0	5402	99.93	5421	100.00	5426	100.00
>21.0	5406	100.00	5421	100.00	5426	100.00

SITE ID: RO
 SITE LOCATION: ROMERO OVERLOOK, CA.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	95	189	201	238	236	181	84	7
2	38	58	58	90	90	52	12	0
3	27	22	18	25	30	37	11	0
4	12	9	12	18	14	28	7	0
5	4	1	3	5	8	31	2	0
6	1	4	4	4	5	14	2	0
7	4	0	1	2	2	11	5	0
8	0	0	2	0	0	5	2	0
9	2	0	0	1	0	8	0	0
10	0	0	0	2	0	10	0	0
11	0	0	0	0	0	3	2	0
12	0	0	0	0	0	2	1	0
13	0	0	0	0	0	3	0	0
14	0	1	0	0	0	1	0	0
15	0	0	0	0	0	0	1	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	1	0
18	0	0	0	0	0	1	0	0
19	0	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: RO
 SITE LOCATION: ROMERO OVERLOOK, CA.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0.81	0.31	0.44	0.41	0.46	0.44	0.55
NNE	0.78	0.35	0.46	0.44	0.33	0.35	1.11
NE	0.99	0.17	0.38	0.34	0.61	1.13	3.46
ENE	0.92	0.13	0.34	0.29	5.16	8.52	10.34
E	0.81	0.10	0.29	0.25	10.12	8.23	4.07
ESE	0.47	0.04	0.15	0.13	3.05	2.14	1.35
SE	0.82	0.09	0.28	0.24	0.85	0.83	0.68
SSE	0.62	0.04	0.19	0.16	0.72	0.85	0.68
S	1.29	0.02	0.35	0.28	1.04	0.83	0.65
SSW	1.25	0.10	0.40	0.33	1.70	1.20	1.25
SW	0.40	0.00	0.10	0.08	7.70	9.74	14.01
WSW	-0.17	0.07	0.01	0.02	16.19	57.74	53.17
W	0.32	0.19	0.22	0.21	4.50	6.00	6.86
WNW	1.02	0.14	0.37	0.32	1.57	1.03	0.79
NW	1.54	0.10	0.47	0.39	0.70	0.50	0.53
NNW	0.83	0.21	0.37	0.33	0.87	0.46	0.50

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

SAN AUGUSTIN PASS, NEW MEXICO



SITE ID: EP
 SITE LOCATION: SAN AUGUSTIN PASS, NM
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 6552

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	64.1
WD(A)	100.0	72.7
WS(B)	100.0	64.1
WD(B)	100.0	71.9
WS(C)	100.0	65.9
WD(C)	100.0	67.3

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 45.7	10.4	261.6	895.52
	(B) 30.0	9.3	277.9	815.25
	(C) 9.1	8.7	305.9	700.66

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	33.1	280.3	03/30/82	13:00	(B) 33.3 (C)-999.9
(B) 30.0	33.3	292.5	03/30/82	13:00	(A) 33.1 (C)-999.9
(C) 9.1	28.9	297.4	04/08/82	11:00	(A) 28.7 (B) 29.8

 NOTES:

1. SITE ELEVATION: 1859 METERS ABOVE SEA LEVEL.

SITE ID: EP
 SITE LOCATION: SAN AUGUSTIN PASS, NM
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	10.3	272.5	9.3	292.1	8.7	331.7
01:00	10.3	278.8	9.3	298.1	8.7	333.8
02:00	10.2	276.5	9.2	294.1	8.7	328.0
03:00	9.9	281.4	8.8	300.4	8.3	331.1
04:00	9.7	280.0	8.4	299.4	8.0	332.3
05:00	9.2	275.7	8.0	297.6	7.4	334.5
06:00	9.2	282.8	7.9	304.7	7.3	345.4
07:00	9.2	286.3	7.9	309.5	7.4	344.8
08:00	9.1	286.6	8.0	303.9	7.6	327.2
09:00	9.2	261.4	8.1	269.7	7.8	299.1
10:00	9.6	232.2	8.5	241.2	8.0	258.6
11:00	9.9	234.1	8.8	245.8	8.2	254.5
12:00	10.5	248.3	9.4	260.7	8.7	267.9
13:00	11.1	244.6	9.9	255.6	9.2	261.2
14:00	11.5	249.9	10.3	261.9	9.6	268.1
15:00	11.7	251.4	10.5	262.5	9.9	268.0
16:00	11.9	252.2	10.8	264.1	10.1	269.8
17:00	11.8	251.5	10.8	264.1	10.2	272.8
18:00	11.5	256.4	10.6	271.4	10.0	291.2
19:00	11.2	258.9	10.3	276.4	9.6	305.9
20:00	10.6	258.7	9.6	279.1	9.0	323.1
21:00	10.3	258.0	9.3	280.2	8.7	332.3
22:00	10.2	263.3	9.1	283.7	8.6	325.4
23:00	10.4	265.0	9.4	284.8	8.8	328.6

SITE ID: EP
 SITE LOCATION: SAN AUGUSTIN PASS, NM
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	%	LEVEL B COUNT	%	LEVEL C COUNT	%
0.0- 0.5	0	0.0	0	0.0	0	0.0
0.5- 1.0	0	0.0	0	0.0	5	0.1
1.0- 1.5	0	0.0	3	0.1	30	0.7
1.5- 2.0	0	0.0	27	0.6	53	1.2
2.0- 2.5	7	0.2	56	1.3	87	2.0
2.5- 3.0	9	0.2	111	2.6	141	3.3
3.0- 3.5	37	0.9	149	3.5	162	3.8
3.5- 4.0	52	1.2	161	3.8	178	4.1
4.0- 4.5	90	2.1	175	4.2	194	4.5
4.5- 5.0	109	2.6	175	4.2	195	4.5
5.0- 5.5	123	2.9	190	4.5	218	5.0
5.5- 6.0	154	3.7	191	4.5	231	5.3
6.0- 6.5	185	4.4	227	5.4	243	5.6
6.5- 7.0	174	4.1	208	5.0	199	4.6
7.0- 7.5	166	4.0	195	4.6	198	4.6
7.5- 8.0	191	4.5	157	3.7	180	4.2
8.0- 8.5	242	5.8	173	4.1	164	3.8
8.5- 9.0	249	5.9	150	3.6	155	3.6
9.0- 9.5	273	6.5	151	3.6	126	2.9
9.5-10.0	206	4.9	133	3.2	140	3.2
10.0-11.0	397	9.4	274	6.5	260	6.0
11.0-12.0	304	7.2	231	5.5	198	4.6
12.0-13.0	282	6.7	186	4.4	177	4.1
13.0-14.0	236	5.6	172	4.1	156	3.6
14.0-15.0	170	4.0	170	4.0	147	3.4
15.0-16.0	126	3.0	109	2.6	120	2.8
16.0-17.0	86	2.0	82	2.0	80	1.9
17.0-18.0	78	1.9	78	1.9	59	1.4
18.0-19.0	69	1.6	59	1.4	52	1.2
19.0-20.0	32	0.8	53	1.3	44	1.0
20.0-21.0	46	1.1	32	0.8	24	0.6
>21.0	109	2.6	123	2.9	102	2.4

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 64.1 64.1 65.9

SITE ID: EP
 SITE LOCATION: SAN AUGUSTIN PASS, NM
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0	0.00	0	0.00	0	0.00
1.0	0	0.00	0	0.00	5	0.12
1.5	0	0.00	3	0.07	35	0.81
2.0	0	0.00	30	0.71	88	2.04
2.5	7	0.17	86	2.05	175	4.05
3.0	16	0.38	197	4.69	316	7.32
3.5	53	1.26	346	8.24	478	11.07
4.0	105	2.50	507	12.07	656	15.19
4.5	195	4.64	682	16.23	850	19.69
5.0	304	7.23	857	20.40	1045	24.20
5.5	427	10.16	1047	24.92	1263	29.25
6.0	581	13.83	1238	29.47	1494	34.60
6.5	766	18.23	1465	34.87	1737	40.23
7.0	940	22.37	1673	39.82	1936	44.84
7.5	1106	26.32	1868	44.47	2134	49.42
8.0	1297	30.87	2025	48.20	2314	53.59
8.5	1539	36.63	2198	52.32	2478	57.39
9.0	1788	42.55	2348	55.89	2633	60.98
9.5	2061	49.05	2499	59.49	2759	63.90
10.0	2267	53.95	2632	62.65	2899	67.14
11.0	2664	63.40	2906	69.17	3159	73.16
12.0	2968	70.63	3137	74.67	3357	77.74
13.0	3250	77.34	3323	79.10	3534	81.84
14.0	3486	82.96	3495	83.19	3690	85.46
15.0	3656	87.01	3665	87.24	3837	88.86
16.0	3782	90.00	3774	89.84	3957	91.64
17.0	3868	92.05	3856	91.79	4037	93.49
18.0	3946	93.91	3934	93.64	4096	94.86
19.0	4015	95.55	3993	95.05	4148	96.06
20.0	4047	96.31	4046	96.31	4192	97.08
21.0	4093	97.41	4078	97.07	4216	97.64
>21.0	4202	100.00	4201	100.00	4318	100.00

SITE ID: EP
 SITE LOCATION: SAN AUGUSTIN PASS, NM
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	9	46	96	126	187	195	112	11	
2	3	11	29	35	33	61	27	7	
3	0	4	5	15	11	40	16	2	
4	0	1	1	3	6	29	17	4	
5	0	0	1	3	2	21	6	4	
6	0	0	1	0	1	20	8	2	
7	0	0	0	0	2	14	10	1	
8	0	0	1	0	0	9	5	0	
9	0	0	0	0	0	7	4	2	
10	0	0	0	0	1	7	6	2	
11	0	0	0	0	0	4	3	1	
12	0	0	0	0	0	3	1	0	
13	0	0	0	0	0	0	1	0	
14	0	0	0	0	0	2	0	0	
15	0	0	0	0	0	2	0	0	
16	0	0	0	0	0	1	0	0	
17	0	0	0	0	0	1	0	0	
18	0	0	0	0	0	1	0	0	
19	0	0	0	0	0	0	1	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: EP
 SITE LOCATION: SAN AUGUSTIN PASS, NM
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0.74	0.03	0.21	0.17	0.43	0.36	0.49
NNE	0.63	-0.23	-0.01	-0.06	0.33	0.33	0.83
NE	1.76	-0.32	0.22	0.10	0.33	0.21	0.67
ENE	1.00	-0.04	0.23	0.17	2.21	0.95	1.60
E	0.59	0.00	0.15	0.12	8.61	5.90	7.76
ESE	0.40	-0.02	0.09	0.06	20.37	18.50	18.92
SE	0.09	0.23	0.19	0.20	4.05	9.74	6.44
SSE	0.58	0.23	0.32	0.30	0.69	1.05	0.79
S	0.98	0.04	0.28	0.23	0.76	0.76	0.51
SSW	0.73	0.24	0.37	0.34	0.90	0.64	0.46
SW	1.31	0.13	0.44	0.37	1.48	1.00	0.86
WSW	0.99	0.20	0.41	0.36	7.00	2.62	1.53
W	0.60	0.13	0.25	0.23	31.01	13.31	9.01
WNW	-0.18	-0.01	-0.05	-0.04	15.90	31.42	25.73
NW	0.05	-0.06	-0.03	-0.04	5.12	11.45	18.41
NNW	0.21	0.31	0.28	0.29	0.81	1.76	1.34

 NOTES:

$$1. \quad \text{ALPHA} = \frac{\text{WS(UP)} \cdot \text{Z(UP)}}{\text{WS(LO)} \cdot \text{Z(LO)}}$$

$$2. \quad \text{ALPHA} = \frac{\text{LOG(WS(UP)/WS(LO))}}{\text{LOG(Z(UP)/Z(LO))}} \quad \text{WHERE; } \begin{array}{l} \text{Z=ELEVATION} \\ \text{WS=WIND SPEED} \end{array}$$

SAN GORGONIO, CALIFORNIA



SITE ID: SG
 SITE LOCATION: SAN GORGONIO PASS, CA
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 6552

SENSOR	% ON-LINE	% RECOVERED
WS(A)	77.2	31.2
WD(A)	77.2	59.0
WS(B)	77.2	58.5
WD(B)	77.2	59.0
WS(C)	77.2	53.9
WD(C)	77.2	40.0

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 45.7	7.5	173.3	551.18
	(B) 30.0	7.2	253.0	523.81
	(C) 9.1	6.8	263.3	422.80

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	24.9	239.2	03/29/82	22:00	(B) 21.9 (C) 16.9
(B) 30.0	23.8	237.0	06/17/82	13:00	(A) -999.9 (C) 18.0
(C) 9.1	19.7	263.3	03/16/82	06:00	(A) 22.0 (B) 21.1

 NOTES:

1. SITE ELEVATION: 344 METERS ABOVE SEA LEVEL.

SITE ID: SG
 SITE LOCATION: SAN GORGONIO PASS, CA
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	8.0	215.4	7.2	263.1	6.9	268.8
01:00	8.1	202.5	7.1	260.6	6.9	266.8
02:00	7.6	198.3	6.8	263.2	6.7	267.8
03:00	7.4	185.2	6.8	260.4	6.6	270.0
04:00	7.5	162.8	6.8	265.2	6.9	270.8
05:00	7.4	177.3	6.6	260.6	6.3	268.9
06:00	7.9	193.4	6.8	258.1	6.4	269.9
07:00	7.5	174.0	6.7	252.6	6.3	264.9
08:00	6.7	150.5	6.4	244.4	6.0	250.1
09:00	6.8	146.4	6.4	217.8	6.2	238.0
10:00	6.8	143.3	6.4	222.0	6.2	234.8
11:00	7.2	150.6	6.6	228.4	6.4	239.4
12:00	6.9	147.5	6.7	228.0	6.4	239.7
13:00	6.7	146.2	6.8	231.5	6.5	249.1
14:00	6.9	142.5	7.1	235.2	6.8	257.4
15:00	7.3	153.6	7.4	238.4	7.0	256.4
16:00	7.2	153.4	7.6	250.3	7.1	264.0
17:00	7.7	197.4	7.9	254.9	7.4	262.5
18:00	7.7	208.1	8.1	256.2	7.7	265.2
19:00	7.8	215.2	8.1	258.2	7.6	269.6
20:00	7.9	203.4	8.1	257.6	7.5	265.3
21:00	7.8	214.4	7.7	259.7	7.3	270.0
22:00	8.2	226.0	7.8	264.6	7.3	270.9
23:00	8.2	209.8	7.7	261.5	7.2	268.3

SITE ID: SG
 SITE LOCATION: SAN GORGONIO PASS, CA
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	COUNT	%	COUNT	%	COUNT	%
0.0- 0.5	0	0.0	176	4.6	114	3.2
0.5- 1.0	42	2.1	204	5.3	105	3.0
1.0- 1.5	12	0.6	175	4.6	199	5.6
1.5- 2.0	22	1.1	201	5.2	204	5.8
2.0- 2.5	165	8.1	132	3.4	168	4.8
2.5- 3.0	139	6.8	132	3.4	143	4.0
3.0- 3.5	107	5.2	100	2.6	120	3.4
3.5- 4.0	120	5.9	121	3.2	109	3.1
4.0- 4.5	109	5.3	108	2.8	122	3.5
4.5- 5.0	96	4.7	119	3.1	139	3.9
5.0- 5.5	73	3.6	106	2.8	103	2.9
5.5- 6.0	60	2.9	117	3.1	91	2.6
6.0- 6.5	59	2.9	115	3.0	110	3.1
6.5- 7.0	78	3.8	115	3.0	117	3.3
7.0- 7.5	64	3.1	142	3.7	121	3.4
7.5- 8.0	60	2.9	125	3.3	110	3.1
8.0- 8.5	59	2.9	120	3.1	116	3.3
8.5- 9.0	59	2.9	123	3.2	135	3.8
9.0- 9.5	55	2.7	127	3.3	134	3.8
9.5-10.0	61	3.0	141	3.7	149	4.2
10.0-11.0	120	5.9	250	6.5	238	6.7
11.0-12.0	100	4.9	210	5.5	201	5.7
12.0-13.0	98	4.8	185	4.8	191	5.4
13.0-14.0	72	3.5	160	4.2	112	3.2
14.0-15.0	69	3.4	109	2.8	91	2.6
15.0-16.0	51	2.5	78	2.0	45	1.3
16.0-17.0	42	2.1	66	1.7	22	0.6
17.0-18.0	26	1.3	35	0.9	16	0.5
18.0-19.0	8	0.4	20	0.5	6	0.2
19.0-20.0	7	0.3	12	0.3	1	0.0
20.0-21.0	4	0.2	5	0.1	0	0.0
>21.0	5	0.2	4	0.1	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 31.2 58.5 53.9

SITE ID: SG
 SITE LOCATION: SAN GORGONIO PASS, CA
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0	0.00	176	4.59	114	3.23
1.0	42	2.06	380	9.91	219	6.20
1.5	54	2.64	555	14.48	418	11.83
2.0	76	3.72	756	19.72	622	17.61
2.5	241	11.80	888	23.17	790	22.37
3.0	380	18.61	1020	26.61	933	26.42
3.5	487	23.85	1120	29.22	1053	29.81
4.0	607	29.73	1241	32.38	1162	32.90
4.5	716	35.06	1349	35.19	1284	36.35
5.0	812	39.76	1468	38.30	1423	40.29
5.5	885	43.34	1574	41.06	1526	43.20
6.0	945	46.28	1691	44.12	1617	45.78
6.5	1004	49.17	1806	47.12	1727	48.90
7.0	1082	52.99	1921	50.12	1844	52.21
7.5	1146	56.12	2063	53.82	1965	55.63
8.0	1206	59.06	2188	57.08	2075	58.75
8.5	1265	61.95	2308	60.21	2191	62.03
9.0	1324	64.84	2431	63.42	2326	65.86
9.5	1379	67.53	2558	66.74	2460	69.65
10.0	1440	70.52	2699	70.41	2609	73.87
11.0	1560	76.40	2949	76.94	2847	80.61
12.0	1660	81.29	3159	82.42	3048	86.30
13.0	1758	86.09	3344	87.24	3239	91.70
14.0	1830	89.62	3504	91.42	3351	94.88
15.0	1899	93.00	3613	94.26	3442	97.45
16.0	1950	95.49	3691	96.30	3487	98.73
17.0	1992	97.55	3757	98.02	3509	99.35
18.0	2018	98.82	3792	98.93	3525	99.80
19.0	2026	99.22	3812	99.45	3531	99.97
20.0	2033	99.56	3824	99.77	3532	100.00
21.0	2037	99.76	3829	99.90	3532	100.00
>21.0	2042	100.00	3833	100.00	3532	100.00

SITE ID: SG
 SITE LOCATION: SAN GORGONIO PASS, CA
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	49	87	90	75	99	79	43	4
2	23	23	15	13	6	40	14	1
3	10	11	7	9	2	15	10	1
4	6	5	2	0	0	11	4	0
5	6	3	1	0	1	8	4	0
6	4	2	3	0	0	4	1	0
7	3	1	0	0	0	2	3	0
8	1	0	0	0	0	5	2	0
9	0	0	1	0	0	2	0	0
10	0	0	0	0	0	2	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	1	0	0	0	0	1	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	1	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	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: SG
 SITE LOCATION: SAN GORGONIO PASS, CA
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0.96	0.33	0.49	0.45	5.53	3.78	1.84
NNE	0.17	0.07	0.09	0.09	2.94	2.30	1.78
NE	0.72	-0.21	0.03	-0.02	2.79	1.83	1.16
ENE	0.99	0.42	0.57	0.54	2.25	1.57	1.42
E	0.94	0.04	0.27	0.22	4.11	2.64	1.67
ESE	0.81	0.07	0.26	0.22	6.02	5.37	2.52
SE	1.51	-0.30	0.17	0.07	4.11	3.03	3.00
SSE	1.29	-0.28	0.13	0.04	1.32	1.33	2.07
S	0.94	0.03	0.27	0.22	1.13	1.36	1.27
SSW	0.92	-0.45	-0.09	-0.17	2.94	2.06	2.55
SW	0.29	-0.03	0.05	0.04	7.54	9.08	4.64
WSW	0.17	0.23	0.21	0.22	34.62	42.37	13.82
W	0.12	-0.23	-0.14	-0.16	8.47	11.45	18.40
WNW	0.97	-1.06	-0.53	-0.65	3.72	3.55	7.62
NW	0.73	-0.09	0.13	0.08	7.49	5.90	4.11
NNW	0.52	0.26	0.33	0.31	5.00	2.40	1.27

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

TUCUMCARI, NEW MEXICO



SITE ID: TU
 SITE LOCATION: TUCUMCARI NM.
 DATA : JANUARY 1982 THROUGH AUGUST 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 5832

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	69.2
WD(A)	100.0	84.8
WS(B)	100.0	72.1
WD(B)	100.0	82.9
WS(C)	100.0	86.7
WD(C)	100.0	85.2

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	8.7	223.7	568.72
(B)	30.0	8.2	230.2	472.79
(C)	9.1	6.5	213.8	255.57

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	25.6	224.8	03/29/82	13:00	(B) 24.8 (C) 21.8
(B) 30.0	24.8	228.8	03/29/82	13:00	(A) 25.6 (C) 21.8
(C) 9.1	21.8	233.9	03/29/82	13:00	(A) 25.6 (B) 24.8

NOTES:

1. SITE ELEVATION: 1354 METERS ABOVE SEA LEVEL.

SITE ID: TU
 SITE LOCATION: TUCUMCARI NM.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	9.1	227.0	8.4	231.9	6.3	215.0
01:00	9.1	232.3	8.3	237.9	6.2	221.9
02:00	8.7	243.2	8.1	247.5	6.0	225.5
03:00	8.5	249.9	7.7	259.4	5.8	227.6
04:00	8.2	260.7	7.5	272.3	5.6	237.0
05:00	8.1	276.7	7.5	287.0	5.5	244.5
06:00	8.0	280.1	7.4	287.1	5.5	235.8
07:00	7.8	275.7	7.2	281.3	5.7	236.9
08:00	7.6	288.6	7.2	294.9	6.0	250.8
09:00	7.5	295.3	7.3	298.3	6.1	258.6
10:00	7.7	285.1	7.4	264.6	6.4	243.0
11:00	7.8	258.5	7.6	228.0	6.5	227.4
12:00	8.2	218.7	7.9	212.1	6.8	210.4
13:00	8.4	210.6	8.2	213.4	7.0	205.9
14:00	8.6	195.5	8.3	206.2	7.2	195.7
15:00	9.0	194.7	8.7	210.5	7.5	197.1
16:00	9.6	202.3	9.1	215.1	7.8	201.0
17:00	9.6	198.5	9.1	212.3	7.7	195.6
18:00	9.7	195.6	9.1	208.7	7.4	194.0
19:00	9.7	191.4	9.1	204.2	7.1	190.8
20:00	9.6	200.6	8.9	211.7	6.7	198.4
21:00	9.4	202.3	8.7	211.0	6.6	200.7
22:00	9.5	204.3	8.7	212.6	6.6	202.3
23:00	9.4	211.0	8.6	216.1	6.4	204.2

SITE ID: TU
 SITE LOCATION: TUCUMCARI NM.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A		LEVEL B		LEVEL C	
	COUNT	%	COUNT	%	COUNT	%
0.0- 0.5	0	0.0	0	0.0	0	0.0
0.5- 1.0	5	0.1	2	0.0	10	0.2
1.0- 1.5	14	0.3	3	0.1	37	0.7
1.5- 2.0	18	0.4	17	0.4	89	1.8
2.0- 2.5	41	1.0	44	1.0	189	3.7
2.5- 3.0	75	1.9	67	1.6	222	4.4
3.0- 3.5	99	2.5	139	3.3	301	6.0
3.5- 4.0	134	3.3	178	4.2	287	5.7
4.0- 4.5	146	3.6	194	4.6	303	6.0
4.5- 5.0	190	4.7	206	4.9	336	6.6
5.0- 5.5	155	3.8	233	5.5	331	6.5
5.5- 6.0	191	4.7	209	5.0	372	7.4
6.0- 6.5	169	4.2	232	5.5	317	6.3
6.5- 7.0	182	4.5	217	5.2	292	5.8
7.0- 7.5	214	5.3	250	5.9	314	6.2
7.5- 8.0	218	5.4	237	5.6	243	4.8
8.0- 8.5	234	5.8	218	5.2	214	4.2
8.5- 9.0	219	5.4	228	5.4	193	3.8
9.0- 9.5	211	5.2	189	4.5	177	3.5
9.5-10.0	193	4.8	187	4.4	161	3.2
10.0-11.0	305	7.6	297	7.1	228	4.5
11.0-12.0	257	6.4	234	5.6	177	3.5
12.0-13.0	219	5.4	209	5.0	87	1.7
13.0-14.0	173	4.3	142	3.4	75	1.5
14.0-15.0	123	3.0	84	2.0	45	0.9
15.0-16.0	86	2.1	71	1.7	23	0.5
16.0-17.0	54	1.3	44	1.0	13	0.3
17.0-18.0	41	1.0	25	0.6	8	0.2
18.0-19.0	25	0.6	19	0.5	5	0.1
19.0-20.0	23	0.6	13	0.3	3	0.1
20.0-21.0	8	0.2	5	0.1	1	0.0
>21.0	15	0.4	12	0.3	1	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 61.6 64.2 77.1

SITE ID: TU
 SITE LOCATION: TUCUMCARI NM.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0	0.00	0	0.00	0	0.00
1.0	5	0.12	2	0.05	10	0.20
1.5	19	0.47	5	0.12	47	0.93
2.0	37	0.92	22	0.52	136	2.69
2.5	78	1.93	66	1.57	325	6.43
3.0	153	3.79	133	3.16	547	10.82
3.5	252	6.24	272	6.47	848	16.78
4.0	386	9.56	450	10.70	1135	22.46
4.5	532	13.18	644	15.32	1438	28.45
5.0	722	17.88	850	20.21	1774	35.10
5.5	877	21.72	1083	25.76	2105	41.65
6.0	1068	26.46	1292	30.73	2477	49.01
6.5	1237	30.64	1524	36.24	2794	55.28
7.0	1419	35.15	1741	41.40	3086	61.06
7.5	1633	40.45	1991	47.35	3400	67.27
8.0	1851	45.85	2228	52.98	3643	72.08
8.5	2085	51.65	2446	58.17	3857	76.32
9.0	2304	57.07	2674	63.59	4050	80.13
9.5	2515	62.30	2863	68.09	4227	83.64
10.0	2708	67.08	3050	72.53	4388	86.82
11.0	3013	74.63	3347	79.60	4616	91.33
12.0	3270	81.00	3581	85.16	4793	94.84
13.0	3489	86.43	3790	90.13	4880	96.56
14.0	3662	90.71	3932	93.51	4955	98.04
15.0	3785	93.76	4016	95.51	5000	98.93
16.0	3871	95.89	4087	97.19	5023	99.39
17.0	3925	97.23	4131	98.24	5036	99.64
18.0	3966	98.24	4156	98.83	5044	99.80
19.0	3991	98.86	4175	99.29	5049	99.90
20.0	4014	99.43	4188	99.60	5052	99.96
21.0	4022	99.63	4193	99.71	5053	99.98
>21.0	4037	100.00	4205	100.00	5054	100.00

SITE ID: TU
 SITE LOCATION: TUCUMCARI NM.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	41	94	143	172	173	207	106	3
2	17	31	56	45	50	69	30	2
3	6	13	16	17	15	55	15	1
4	3	5	3	2	2	37	16	1
5	2	2	1	1	1	23	11	0
6	2	1	0	0	1	11	4	0
7	0	0	0	0	0	12	6	0
8	1	0	0	0	0	5	4	0
9	1	0	0	0	0	7	2	1
10	0	0	0	0	0	3	3	0
11	0	0	0	0	0	2	3	0
12	0	0	0	0	0	5	1	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	2	1	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	1	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	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: TU
 SITE LOCATION: TUCUMCARI NM.
 DATA : JANUARY 1982 THROUGH SEPTEMBER 1982

 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	0.49	0.24	0.30	0.29	2.80	2.00	1.92
NNE	0.36	0.18	0.23	0.22	3.32	3.35	3.78
NE	0.19	0.16	0.16	0.16	6.32	5.42	5.58
ENE	-0.25	0.18	0.07	0.09	7.90	6.28	7.74
E	-0.13	0.33	0.21	0.24	4.31	3.45	4.33
ESE	-0.10	0.27	0.18	0.20	3.44	4.54	3.13
SE	0.21	0.22	0.22	0.22	3.24	5.87	3.23
SSE	0.14	0.21	0.19	0.20	3.37	4.04	4.21
S	0.15	0.20	0.19	0.19	8.62	7.13	6.81
SSW	0.23	0.17	0.18	0.18	15.56	12.06	16.44
SW	0.31	0.13	0.18	0.17	9.36	7.66	11.83
WSW	0.31	0.19	0.22	0.22	11.59	9.30	10.76
W	0.13	0.19	0.18	0.18	10.45	11.80	11.12
WNW	-0.42	0.26	0.08	0.12	2.25	4.30	3.01
NW	-0.89	0.60	0.21	0.30	1.81	6.16	1.92
NNW	-0.38	0.45	0.23	0.28	1.88	3.00	1.66

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

APPENDIX B



APPENDIX B

Summarized cumulative meteorological data are provided for six "original" sites with operational measurement programs in 1982. The sites for which data are provided are Block Island, Rhode Island; Clayton, New Mexico; Culebra, Puerto Rico; Huron, South Dakota; Montauk, New York; and San Geronio, California. Cumulative data collected at these sites through December 1981 and other "original" sites decommissioned prior to December 1981 are provided in another report (Sandusky et al. 1982b).



BLOCK ISLAND, RHODE ISLAND



SITE ID: RI
 SITE LOCATION: BLOCK ISLAND, RI.
 DATA : DECEMBER 1976 THROUGH JUNE 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 48912

SENSOR	% ON-LINE	% RECOVERED
WS(A)	98.9	78.0
WD(A)	98.9	72.8
WS(B)	98.9	37.7
WD(B)	98.9	37.1
WS(C)	98.9	79.4
WD(C)	98.9	72.3

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 45.7	7.4	279.9	407.90
	(B) 30.0	6.4	277.5	254.24
	(C) 9.1	5.0	271.5	133.43

 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 JUNE 1982

 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	7.5	290.4	6.4	283.3	4.7	278.9
01:00	7.5	295.9	6.3	287.2	4.7	282.7
02:00	7.4	298.9	6.3	290.0	4.6	284.1
03:00	7.3	300.8	6.2	293.0	4.6	286.7
04:00	7.3	303.1	6.2	295.3	4.6	289.3
05:00	7.2	305.8	6.2	297.6	4.6	291.8
06:00	7.1	307.1	6.1	297.8	4.7	294.9
07:00	7.1	307.6	6.1	301.2	4.8	300.5
08:00	7.0	310.2	6.2	304.5	5.0	307.2
09:00	7.0	308.5	6.2	303.9	5.2	306.4
10:00	7.0	298.4	6.3	299.5	5.2	296.7
11:00	7.1	280.4	6.3	285.8	5.3	279.1
12:00	7.2	263.6	6.4	270.6	5.4	263.3
13:00	7.3	253.0	6.5	257.5	5.4	253.2
14:00	7.4	248.4	6.6	249.9	5.4	247.8
15:00	7.5	246.7	6.6	246.9	5.3	245.2
16:00	7.6	246.2	6.6	247.0	5.2	244.2
17:00	7.7	249.2	6.6	250.5	5.1	245.1
18:00	7.8	253.3	6.5	254.1	5.0	246.9
19:00	7.8	257.1	6.5	256.8	4.9	249.8
20:00	7.8	264.4	6.5	262.5	4.9	254.9
21:00	7.7	272.0	6.4	268.6	4.8	261.7
22:00	7.6	279.6	6.4	273.0	4.7	265.9
23:00	7.6	284.8	6.4	277.9	4.7	272.4

SITE ID: RI
 SITE LOCATION: BLOCK ISLAND, RI.
 DATA : DECEMBER 1976 THROUGH JUNE 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL C %
0.0- 0.5	69	0.2 39	0.2 317	0.8
0.5- 1.0	160	0.4 48	0.3 684	1.8
1.0- 1.5	318	0.8 146	0.8 1050	2.7
1.5- 2.0	548	1.4 285	1.5 1653	4.3
2.0- 2.5	854	2.2 514	2.8 2253	5.8
2.5- 3.0	1033	2.7 741	4.0 2476	6.4
3.0- 3.5	1206	3.2 914	5.0 2661	6.9
3.5- 4.0	1497	3.9 1057	5.7 3331	8.6
4.0- 4.5	2046	5.4 1102	6.0 3963	10.2
4.5- 5.0	1742	4.6 1308	7.1 3017	7.8
5.0- 5.5	1943	5.1 1389	7.5 3088	8.0
5.5- 6.0	1961	5.1 1443	7.8 2540	6.5
6.0- 6.5	2535	6.6 1395	7.6 2813	7.2
6.5- 7.0	2305	6.0 1279	6.9 1876	4.8
7.0- 7.5	2385	6.3 1192	6.5 1619	4.2
7.5- 8.0	2163	5.7 1027	5.6 1217	3.1
8.0- 8.5	2730	7.2 878	4.8 1168	3.0
8.5- 9.0	1975	5.2 767	4.2 728	1.9
9.0- 9.5	1628	4.3 610	3.3 549	1.4
9.5-10.0	1534	4.0 490	2.7 475	1.2
10.0-11.0	2566	6.7 700	3.8 669	1.7
11.0-12.0	1650	4.3 448	2.4 333	0.9
12.0-13.0	1183	3.1 294	1.6 191	0.5
13.0-14.0	731	1.9 170	0.9 92	0.2
14.0-15.0	489	1.3 109	0.6 23	0.1
15.0-16.0	287	0.8 71	0.4 11	0.0
16.0-17.0	230	0.6 29	0.2 7	0.0
17.0-18.0	166	0.4 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
 78.0 37.7 79.4

SITE ID: RI
 SITE LOCATION: BLOCK ISLAND, RI.
 DATA : DECEMBER 1976 THROUGH JUNE 1982

 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	0.18	39	0.21	317	0.82
1.0	229	0.60	87	0.47	1001	2.58
1.5	547	1.43	233	1.26	2051	5.28
2.0	1095	2.87	518	2.81	3704	9.54
2.5	1949	5.11	1032	5.59	5957	15.35
3.0	2982	7.82	1773	9.61	8433	21.73
3.5	4188	10.98	2687	14.56	11094	28.58
4.0	5685	14.91	3744	20.28	14425	37.16
4.5	7731	20.28	4846	26.25	18388	47.37
5.0	9473	24.85	6154	33.34	21405	55.15
5.5	11416	29.94	7543	40.86	24493	63.10
6.0	13377	35.09	8986	48.68	27033	69.65
6.5	15912	41.73	10381	56.24	29846	76.89
7.0	18217	47.78	11660	63.17	31722	81.73
7.5	20602	54.04	12852	69.62	33341	85.90
8.0	22765	59.71	13879	75.19	34558	89.03
8.5	25495	66.87	14757	79.94	35726	92.04
9.0	27470	72.05	15524	84.10	36454	93.92
9.5	29098	76.32	16134	87.40	37003	95.33
10.0	30632	80.34	16624	90.06	37478	96.56
11.0	33198	87.07	17324	93.85	38147	98.28
12.0	34848	91.40	17772	96.28	38480	99.14
13.0	36031	94.50	18066	97.87	38671	99.63
14.0	36762	96.42	18236	98.79	38763	99.87
15.0	37251	97.70	18345	99.38	38786	99.93
16.0	37538	98.46	18416	99.77	38797	99.95
17.0	37768	99.06	18445	99.92	38804	99.97
18.0	37934	99.49	18453	99.97	38805	99.97
19.0	38040	99.77	18457	99.99	38811	99.99
20.0	38083	99.88	18459	100.00	38814	100.00
21.0	38099	99.93	18459	100.00	38815	100.00
>21.0	38127	100.00	18459	100.00	38815	100.00

SITE ID: RI
 SITE LOCATION: BLOCK ISLAND, RI.
 DATA : DECEMBER 1976 THROUGH JUNE 1982

 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	397	100	413	741	541	1808	1249	348	8
2	155	330	469	510	550	321	93	3	
3	97	135	150	162	236	216	47	1	
4	67	68	88	77	92	155	38	0	
5	44	25	38	39	48	153	25	0	
6	36	6	19	14	26	98	21	0	
7	23	7	6	7	11	92	10	0	
8	22	1	5	3	2	45	5	0	
9	11	2	2	1	2	47	12	0	
10	6	0	2	1	2	40	7	1	
11	5	0	0	0	0	32	7	0	
12	1	0	0	0	0	25	7	0	
13	3	0	0	0	0	23	3	1	
14	2	0	0	0	0	15	2	0	
15	0	0	0	0	0	18	1	0	
16	2	0	0	0	0	9	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	3	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 JUNE 1982

 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	0.00	0.16	0.13	3.73	3.93	3.21
NNE	0.20	0.22	0.21	0.21	4.44	5.21	3.80
NE	0.16	0.25	0.23	0.24	4.68	5.05	4.35
ENE	0.45	0.20	0.26	0.25	3.99	3.41	3.71
E	0.70	0.10	0.25	0.22	3.76	2.52	3.03
ESE	0.33	0.13	0.18	0.17	3.00	2.54	2.87
SE	0.57	0.13	0.25	0.22	2.68	2.68	2.66
SSE	0.35	0.19	0.24	0.23	2.79	3.27	2.74
S	0.43	0.26	0.31	0.30	4.01	4.98	4.09
SSW	0.41	0.25	0.29	0.28	6.26	7.24	7.29
SW	0.39	0.29	0.31	0.31	9.25	9.61	9.47
WSW	0.41	0.27	0.31	0.30	8.29	8.84	9.42
W	0.41	0.26	0.30	0.29	7.76	7.63	8.03
WNW	0.30	0.23	0.25	0.25	8.11	9.22	8.83
NW	0.16	0.19	0.18	0.19	10.32	12.41	10.65
NNW	0.46	0.07	0.17	0.15	6.86	6.45	6.10

 NOTES:

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

$$2. \text{ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{matrix} Z=\text{ELEVATION} \\ WS=\text{WIND SPEED} \end{matrix}$$

CLAYTON, NEW MEXICO



SITE ID: NM
 SITE LOCATION: CLAYTON, NM.
 DATA : MAY 1977 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 47520

SENSOR	% ON-LINE	% RECOVERED
WS(A)	97.4	73.7
WD(A)	97.4	73.0
WS(B)	97.4	62.7
WD(B)	97.4	66.3
WS(C)	97.4	78.8
WD(C)	97.4	75.8

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	7.3	224.8	334.82
(B)	30.0	6.7	227.6	267.41
(C)	9.1	5.4	233.0	162.85

 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 SEPTEMBER 1982

 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	243.9	6.0	248.3	4.3	256.5
01:00	7.0	250.5	6.1	255.2	4.3	261.6
02:00	7.0	255.7	6.1	261.4	4.3	264.8
03:00	7.0	260.7	6.1	265.0	4.3	268.3
04:00	6.9	265.2	6.1	268.8	4.2	272.4
05:00	6.8	268.8	6.0	272.4	4.2	274.4
06:00	6.7	270.4	5.9	274.1	4.4	274.1
07:00	6.8	269.9	6.2	273.0	5.1	270.9
08:00	7.0	264.6	6.6	268.0	5.9	265.2
09:00	7.2	247.1	7.0	248.7	6.3	251.3
10:00	7.4	224.7	7.2	223.3	6.5	227.2
11:00	7.4	202.3	7.2	200.4	6.5	203.9
12:00	7.5	189.9	7.3	188.2	6.7	190.5
13:00	7.8	182.9	7.5	182.3	6.8	183.6
14:00	7.9	177.6	7.6	177.6	6.9	177.1
15:00	8.0	174.7	7.7	173.4	6.9	172.9
16:00	8.0	170.0	7.6	167.9	6.6	167.0
17:00	7.9	166.8	7.4	164.3	6.2	162.2
18:00	7.8	166.7	7.0	166.4	5.6	162.4
19:00	7.6	173.7	6.7	173.9	5.0	172.3
20:00	7.4	187.7	6.4	192.1	4.7	195.5
21:00	7.2	203.1	6.3	208.7	4.6	219.1
22:00	7.1	220.6	6.2	227.6	4.5	240.2
23:00	7.1	233.6	6.1	239.3	4.4	249.6

SITE ID: NM
 SITE LOCATION: CLAYTON, NM.
 DATA : MAY 1977 THROUGH SEPTEMBER 1982

 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	23
0.5- 1.0	73	0.2	96
1.0- 1.5	183	0.5	178
1.5- 2.0	460	1.3	482
2.0- 2.5	728	2.1	811
2.5- 3.0	1051	3.0	1237
3.0- 3.5	1191	3.4	1421
3.5- 4.0	1515	4.3	1751
4.0- 4.5	2012	5.7	2080
4.5- 5.0	1783	5.1	1852
5.0- 5.5	2102	6.0	1949
5.5- 6.0	2054	5.9	1895
6.0- 6.5	2375	6.8	2093
6.5- 7.0	2024	5.8	1728
7.0- 7.5	2100	6.0	1681
7.5- 8.0	1843	5.3	1497
8.0- 8.5	2215	6.3	1617
8.5- 9.0	1751	5.0	1204
9.0- 9.5	1468	4.2	1144
9.5-10.0	1453	4.1	904
10.0-11.0	2263	6.5	1504
11.0-12.0	1501	4.3	954
12.0-13.0	1143	3.3	676
13.0-14.0	638	1.8	382
14.0-15.0	389	1.1	250
15.0-16.0	263	0.8	150
16.0-17.0	160	0.5	98
17.0-18.0	95	0.3	57
18.0-19.0	64	0.2	28
19.0-20.0	43	0.1	20
20.0-21.0	21	0.1	13
>21.0	55	0.2	35

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 73.7 62.7 78.8

SITE ID: NM
 SITE LOCATION: CLAYTON, NM.
 DATA : MAY 1977 THROUGH SEPTEMBER 1982

 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	0.07	23	0.08	87	0.23
1.0	99	0.28	119	0.40	602	1.61
1.5	282	0.80	297	1.00	1983	5.30
2.0	742	2.12	779	2.61	4046	10.80
2.5	1470	4.19	1590	5.33	6185	16.52
3.0	2521	7.19	2827	9.48	8548	22.83
3.5	3712	10.59	4248	14.25	10847	28.96
4.0	5227	14.92	5999	20.12	13519	36.10
4.5	7239	20.66	8079	27.10	16765	44.77
5.0	9022	25.75	9931	33.31	19254	51.41
5.5	11124	31.74	11880	39.85	21829	58.29
6.0	13178	37.61	13775	46.21	23878	63.76
6.5	15553	44.38	15868	53.23	26011	69.46
7.0	17577	50.16	17596	59.03	27638	73.80
7.5	19677	56.15	19277	64.67	29263	78.14
8.0	21520	61.41	20774	69.69	30542	81.55
8.5	23735	67.73	22391	75.11	32051	85.58
9.0	25486	72.73	23595	79.15	33156	88.53
9.5	26954	76.92	24739	82.99	33978	90.73
10.0	28407	81.07	25643	86.02	34731	92.74
11.0	30670	87.52	27147	91.07	35813	95.63
12.0	32171	91.81	28101	94.27	36505	97.48
13.0	33314	95.07	28777	96.53	36890	98.50
14.0	33952	96.89	29159	97.82	37138	99.17
15.0	34341	98.00	29409	98.65	37270	99.52
16.0	34604	98.75	29559	99.16	37337	99.70
17.0	34764	99.21	29657	99.49	37385	99.83
18.0	34859	99.48	29714	99.68	37406	99.88
19.0	34923	99.66	29742	99.77	37426	99.94
20.0	34966	99.78	29762	99.84	37438	99.97
21.0	34987	99.84	29775	99.88	37448	99.99
>21.0	35042	100.00	29810	100.00	37450	100.00

SITE ID: NM
 SITE LOCATION: CLAYTON, NM.
 DATA : MAY 1977 THROUGH SEPTEMBER 1982

 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	544	1293	1835	2110	2160	1398	390	10	
2	225	333	487	548	548	536	162	2	
3	147	119	159	140	183	385	89	2	
4	65	49	46	58	61	243	63	1	
5	36	10	22	16	18	196	37	3	
6	21	2	7	9	8	159	39	0	
7	9	0	4	0	3	115	17	1	
8	5	1	1	3	2	85	20	1	
9	1	1	0	1	1	56	14	0	
10	4	1	0	2	0	42	12	0	
11	0	0	0	0	0	26	8	0	
12	4	0	1	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	12	2	0	
16	1	1	0	0	0	7	0	0	
17	0	1	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 : MAY 1977 THROUGH SEPTEMBER 1982

 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	0.23	0.15	0.17	0.16	5.88	5.77	5.32
NNE	0.15	0.13	0.14	0.13	5.13	5.81	5.78
NE	0.15	0.14	0.14	0.14	4.17	4.54	4.07
ENE	0.14	0.16	0.16	0.16	3.05	3.10	2.74
E	0.19	0.14	0.16	0.15	2.85	2.86	2.68
ESE	0.24	0.18	0.20	0.19	2.81	2.93	2.87
SE	0.32	0.08	0.15	0.13	3.77	3.56	3.51
SSE	0.23	0.13	0.16	0.15	6.05	5.92	5.99
S	0.17	0.14	0.14	0.14	10.64	10.34	9.85
SSW	0.16	0.14	0.14	0.14	11.90	11.17	11.14
SW	0.18	0.17	0.17	0.17	10.82	10.23	10.12
WSW	0.31	0.23	0.26	0.25	8.94	9.83	8.61
W	0.34	0.29	0.30	0.30	6.00	7.74	7.38
WNW	0.41	0.33	0.35	0.34	3.97	5.18	5.06
NW	0.18	0.27	0.24	0.25	4.36	5.03	4.96
NNW	0.20	0.21	0.21	0.21	4.94	5.34	5.46

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

CULEBRA, PUERTO RICO



SITE ID: PR
 SITE LOCATION: CULEBRA, PR.
 DATA : MARCH 1977 THROUGH MAY 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 46032

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	70.6
WD(A)	100.0	73.4
WS(C)	100.0	76.9
WD(C)	100.0	77.3

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	7.0	83.9	291.79
(C)	9.1	6.2	83.8	209.01

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	31.7	65.3	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 MAY 1982

 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	83.3	0.0	0.0	5.9	84.7
01:00	6.8	82.7	0.0	0.0	5.8	84.8
02:00	6.7	83.7	0.0	0.0	5.7	85.3
03:00	6.7	83.8	0.0	0.0	5.7	85.3
04:00	6.8	83.7	0.0	0.0	5.8	85.0
05:00	6.8	84.2	0.0	0.0	5.8	85.0
06:00	6.8	84.0	0.0	0.0	5.9	84.2
07:00	6.8	82.9	0.0	0.0	6.1	82.1
08:00	7.0	82.6	0.0	0.0	6.4	80.9
09:00	7.3	82.7	0.0	0.0	6.7	81.1
10:00	7.4	84.2	0.0	0.0	6.8	82.2
11:00	7.4	85.5	0.0	0.0	6.8	83.1
12:00	7.4	86.2	0.0	0.0	6.7	83.9
13:00	7.3	86.3	0.0	0.0	6.6	84.2
14:00	7.2	86.0	0.0	0.0	6.5	84.1
15:00	7.1	85.8	0.0	0.0	6.4	83.6
16:00	7.0	86.1	0.0	0.0	6.2	84.1
17:00	7.0	85.6	0.0	0.0	6.1	84.7
18:00	7.0	84.6	0.0	0.0	6.0	84.6
19:00	7.1	83.4	0.0	0.0	6.1	84.1
20:00	7.0	82.0	0.0	0.0	6.1	83.2
21:00	7.0	81.5	0.0	0.0	6.1	83.4
22:00	7.0	81.7	0.0	0.0	6.0	83.4
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 MAY

1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL C %
0.0- 0.5	73	0.2	0	0.0
0.5- 1.0	52	0.2	0	0.0
1.0- 1.5	76	0.2	0	0.0
1.5- 2.0	161	0.5	0	0.0
2.0- 2.5	291	0.9	0	0.0
2.5- 3.0	381	1.2	0	0.0
3.0- 3.5	530	1.6	0	0.0
3.5- 4.0	817	2.5	0	0.0
4.0- 4.5	1617	5.0	0	0.0
4.5- 5.0	1863	5.7	0	0.0
5.0- 5.5	2390	7.4	0	0.0
5.5- 6.0	2718	8.4	0	0.0
6.0- 6.5	3605	11.1	0	0.0
6.5- 7.0	3158	9.7	0	0.0
7.0- 7.5	3058	9.4	0	0.0
7.5- 8.0	2320	7.1	0	0.0
8.0- 8.5	2459	7.6	0	0.0
8.5- 9.0	1488	4.6	0	0.0
9.0- 9.5	1018	3.1	0	0.0
9.5-10.0	902	2.8	0	0.0
10.0-11.0	1441	4.4	0	0.0
11.0-12.0	889	2.7	0	0.0
12.0-13.0	537	1.7	0	0.0
13.0-14.0	287	0.9	0	0.0
14.0-15.0	137	0.4	0	0.0
15.0-16.0	123	0.4	0	0.0
16.0-17.0	53	0.2	0	0.0
17.0-18.0	22	0.1	0	0.0
18.0-19.0	12	0.0	0	0.0
19.0-20.0	4	0.0	0	0.0
20.0-21.0	7	0.0	0	0.0
>21.0	9	0.0	0	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 70.6 0.0 76.9

SITE ID: PR
 SITE LOCATION: CULEBRA, PR.
 DATA : MARCH 1977 THROUGH MAY 1982

 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	0.22	0	0.00	111	0.31
1.0	125	0.38	0	0.00	208	0.59
1.5	201	0.62	0	0.00	387	1.09
2.0	362	1.11	0	0.00	798	2.25
2.5	653	2.01	0	0.00	1665	4.70
3.0	1034	3.18	0	0.00	2879	8.13
3.5	1564	4.81	0	0.00	4321	12.21
4.0	2381	7.33	0	0.00	5962	16.84
4.5	3998	12.30	0	0.00	8388	23.70
5.0	5861	18.03	0	0.00	10817	30.56
5.5	8251	25.39	0	0.00	14111	39.86
6.0	10969	33.75	0	0.00	17135	48.41
6.5	14574	44.85	0	0.00	20842	58.88
7.0	17732	54.56	0	0.00	23737	67.06
7.5	20790	63.97	0	0.00	26560	75.03
8.0	23110	71.11	0	0.00	28519	80.56
8.5	25569	78.68	0	0.00	30499	86.16
9.0	27057	83.26	0	0.00	31739	89.66
9.5	28075	86.39	0	0.00	32541	91.93
10.0	28977	89.17	0	0.00	33287	94.03
11.0	30418	93.60	0	0.00	34361	97.07
12.0	31307	96.34	0	0.00	34823	98.37
13.0	31844	97.99	0	0.00	35095	99.14
14.0	32131	98.87	0	0.00	35250	99.58
15.0	32268	99.29	0	0.00	35327	99.80
16.0	32391	99.67	0	0.00	35356	99.88
17.0	32444	99.83	0	0.00	35374	99.93
18.0	32466	99.90	0	0.00	35379	99.94
19.0	32478	99.94	0	0.00	35387	99.97
20.0	32482	99.95	0	0.00	35392	99.98
21.0	32489	99.97	0	0.00	35393	99.98
>21.0	32498	100.00	0	0.00	35399	100.00

SITE ID: PR
 SITE LOCATION: CULEBRA, PR.
 DATA : MARCH 1977 THROUGH MAY 1982

 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	0.20	0.00	0.67	0.00	0.48
NNE	0.00	0.00	0.10	0.00	2.02	0.00	1.23
NE	0.00	0.00	0.05	0.00	7.88	0.00	8.75
ENE	0.00	0.00	0.05	0.00	28.71	0.00	29.80
E	0.00	0.00	0.07	0.00	28.71	0.00	39.05
ESE	0.00	0.00	0.17	0.00	11.38	0.00	9.49
SE	0.00	0.00	0.23	0.00	5.45	0.00	3.22
SSE	0.00	0.00	0.30	0.00	2.83	0.00	1.68
S	0.00	0.00	0.30	0.00	1.67	0.00	1.41
SSW	0.00	0.00	0.33	0.00	0.93	0.00	1.02
SW	0.00	0.00	0.22	0.00	0.49	0.00	0.63
WSW	0.00	0.00	0.23	0.00	0.27	0.00	0.21
W	0.00	0.00	0.14	0.00	0.14	0.00	0.13
WNW	0.00	0.00	0.06	0.00	0.25	0.00	1.14
NW	0.00	0.00	0.00	0.00	0.37	0.00	0.35
NNW	0.00	0.00	0.17	0.00	0.54	0.00	0.44

 NOTES:

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

$$2. \text{ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{matrix} Z=\text{ELEVATION} \\ WS=\text{WIND SPEED} \end{matrix}$$

SITE ID: PR
 SITE LOCATION: CULEBRA, PR.
 DATA : MARCH 1977 THROUGH MAY 1982

 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	159	473	925	155	919	01	1109	151	1
2	57	152	327	485	725	372	37	0	0
3	20	63	165	272	319	196	24	1	1
4	19	27	79	118	175	152	9	0	0
5	9	17	42	49	75	106	12	0	0
6	3	4	29	29	51	81	10	1	1
7	6	8	14	20	20	66	1	0	0
8	2	2	8	10	11	50	5	0	0
9	3	0	4	3	1	41	4	0	0
10	1	1	2	3	2	45	3	0	0
11	3	0	0	1	1	29	2	0	0
12	0	0	0	0	0	29	0	0	0
13	1	0	0	1	1	18	1	0	0
14	0	0	0	0	0	19	0	0	0
15	0	0	0	0	0	19	2	0	0
16	1	0	0	0	0	12	2	0	0
17	0	0	0	0	0	8	1	0	0
18	0	0	0	0	0	3	1	0	0
19	0	0	0	0	0	4	0	0	0
20	0	0	0	0	0	4	1	0	0
21	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	1	0	0	0
23	0	0	0	0	0	1	0	0	0
>23	0	0	0	0	0	0	0	0	0

HURON, SOUTH DAKOTA



SITE ID: SD
 SITE LOCATION: HURON, SD.
 DATA : DECEMBER 1976 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 51120

SENSOR	% ON-LINE	% RECOVERED
WS(A)	100.0	82.8
WD(A)	100.0	79.0
WS(C)	100.0	79.5
WD(C)	100.0	82.3

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	6.8	166.0	332.27
(C)	9.1	4.7	97.4	131.44

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	29.9	204.9	03/26/82	13:00	(B)-999.9 (C)-999.9
(C) 9.1	22.1	216.0	03/26/82	14:00	(A) 24.1 (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 SEPTEMBER 1982

 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	137.3	0.0	0.0	4.2	118.1
01:00	6.8	148.0	0.0	0.0	4.2	121.8
02:00	6.7	158.8	0.0	0.0	4.1	121.0
03:00	6.7	169.5	0.0	0.0	4.1	120.3
04:00	6.6	170.2	0.0	0.0	4.1	120.8
05:00	6.6	172.7	0.0	0.0	4.1	111.7
06:00	6.4	163.5	0.0	0.0	4.1	108.8
07:00	6.3	167.1	0.0	0.0	4.3	103.4
08:00	6.4	168.2	0.0	0.0	4.6	100.3
09:00	6.5	195.4	0.0	0.0	5.0	125.9
10:00	6.7	226.6	0.0	0.0	5.3	228.8
11:00	6.8	251.3	0.0	0.0	5.5	280.0
12:00	7.0	262.5	0.0	0.0	5.7	281.3
13:00	7.1	265.3	0.0	0.0	5.8	281.1
14:00	7.2	275.7	0.0	0.0	5.8	291.6
15:00	7.1	284.7	0.0	0.0	5.7	314.8
16:00	7.0	301.2	0.0	0.0	5.5	341.6
17:00	6.9	336.2	0.0	0.0	5.2	15.0
18:00	6.7	49.8	0.0	0.0	4.7	58.8
19:00	6.7	71.7	0.0	0.0	4.4	73.1
20:00	6.7	83.4	0.0	0.0	4.2	84.7
21:00	6.9	99.1	0.0	0.0	4.2	93.3
22:00	7.0	112.9	0.0	0.0	4.3	98.9
23:00	6.9	127.9	0.0	0.0	4.2	113.2

SITE ID: SD
 SITE LOCATION: HURON, SD.
 DATA : DECEMBER 1976 THROUGH SEPTEMBER 1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT
0.0- 0.5	106	0.3	0
0.5- 1.0	406	1.0	0
1.0- 1.5	762	1.8	0
1.5- 2.0	1081	2.6	0
2.0- 2.5	1456	3.4	0
2.5- 3.0	1567	3.7	0
3.0- 3.5	1741	4.1	0
3.5- 4.0	1989	4.7	0
4.0- 4.5	2719	6.4	0
4.5- 5.0	2253	5.3	0
5.0- 5.5	2395	5.7	0
5.5- 6.0	2281	5.4	0
6.0- 6.5	2671	6.3	0
6.5- 7.0	2387	5.6	0
7.0- 7.5	2215	5.2	0
7.5- 8.0	2098	5.0	0
8.0- 8.5	2479	5.9	0
8.5- 9.0	1769	4.2	0
9.0- 9.5	1549	3.7	0
9.5-10.0	1423	3.4	0
10.0-11.0	2359	5.6	0
11.0-12.0	1578	3.7	0
12.0-13.0	1164	2.7	0
13.0-14.0	697	1.6	0
14.0-15.0	452	1.1	0
15.0-16.0	308	0.7	0
16.0-17.0	177	0.4	0
17.0-18.0	110	0.3	0
18.0-19.0	68	0.2	0
19.0-20.0	35	0.1	0
20.0-21.0	20	0.0	0
>21.0	31	0.1	0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 82.8 0.0 79.4

SITE ID: SD
 SITE LOCATION: HURON, SD.
 DATA : DECEMBER 1976 THROUGH SEPTEMBER 1982

 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	106	0.25	0	0.00	286	0.70
1.0	512	1.21	0	0.00	1217	3.00
1.5	1274	3.01	0	0.00	3162	7.78
2.0	2355	5.56	0	0.00	5934	14.61
2.5	3811	9.00	0	0.00	9244	22.76
3.0	5378	12.70	0	0.00	12418	30.57
3.5	7119	16.81	0	0.00	15442	38.01
4.0	9108	21.51	0	0.00	18629	45.86
4.5	11827	27.93	0	0.00	22236	54.74
5.0	14080	33.25	0	0.00	24772	60.98
5.5	16475	38.91	0	0.00	27019	66.51
6.0	18756	44.29	0	0.00	28971	71.31
6.5	21427	50.60	0	0.00	31139	76.65
7.0	23814	56.24	0	0.00	32669	80.42
7.5	26029	61.47	0	0.00	34259	84.33
8.0	28127	66.42	0	0.00	35430	87.21
8.5	30606	72.28	0	0.00	36691	90.32
9.0	32375	76.45	0	0.00	37594	92.54
9.5	33924	80.11	0	0.00	38244	94.14
10.0	35347	83.47	0	0.00	38785	95.47
11.0	37706	89.04	0	0.00	39640	97.58
12.0	39284	92.77	0	0.00	40126	98.77
13.0	40448	95.52	0	0.00	40405	99.46
14.0	41145	97.16	0	0.00	40525	99.76
15.0	41597	98.23	0	0.00	40574	99.88
16.0	41905	98.96	0	0.00	40604	99.95
17.0	42082	99.38	0	0.00	40613	99.97
18.0	42192	99.64	0	0.00	40618	99.99
19.0	42260	99.80	0	0.00	40620	99.99
20.0	42295	99.88	0	0.00	40621	99.99
21.0	42315	99.93	0	0.00	40623	100.00
>21.0	42346	100.00	0	0.00	40624	100.00

SITE ID: SD
 SITE LOCATION: HURON, SD.
 DATA : DECEMBER 1976 THROUGH SEPTEMBER 1982

 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	672	168	321	242	215	234	514	943	28
2	312	513	601	619	601	445	113	4	
3	170	177	228	154	200	296	86	3	
4	116	50	96	84	61	212	45	2	
5	79	21	35	23	33	168	38	0	
6	51	4	15	11	11	109	22	0	
7	45	1	4	3	6	78	26	1	
8	30	2	4	6	3	71	16	0	
9	29	0	3	0	0	42	16	1	
10	15	0	0	0	2	41	7	0	
11	13	0	0	0	0	33	12	0	
12	8	0	0	0	0	18	7	0	
13	11	0	0	0	0	23	11	0	
14	11	0	0	0	0	20	2	0	
15	0	0	0	0	0	11	0	0	
16	1	0	0	0	0	5	3	0	
17	2	0	0	0	0	1	1	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	2	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 SEPTEMBER 1982

 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	0.30	0.00	5.91	0.00	4.77
NNE	0.00	0.00	0.23	0.00	3.74	0.00	3.56
NE	0.00	0.00	0.24	0.00	2.84	0.00	2.60
ENE	0.00	0.00	0.21	0.00	3.03	0.00	3.05
E	0.00	0.00	0.22	0.00	4.10	0.00	4.13
ESE	0.00	0.00	0.24	0.00	5.68	0.00	6.54
SE	0.00	0.00	0.25	0.00	11.31	0.00	13.12
SSE	0.00	0.00	0.21	0.00	11.50	0.00	11.93
S	0.00	0.00	0.21	0.00	7.15	0.00	5.69
SSW	0.00	0.00	0.22	0.00	2.99	0.00	2.48
SW	0.00	0.00	0.25	0.00	2.31	0.00	2.23
WSW	0.00	0.00	0.29	0.00	2.77	0.00	3.01
W	0.00	0.00	0.27	0.00	4.52	0.00	4.36
WNW	0.00	0.00	0.22	0.00	7.11	0.00	7.11
NW	0.00	0.00	0.21	0.00	9.55	0.00	10.14
NNW	0.00	0.00	0.18	0.00	9.85	0.00	10.12

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

MONTAUK POINT, NEW YORK



SITE ID: NY
 SITE LOCATION: MONTAUK POINT, NY.
 DATA : JANUARY 1977 THROUGH MAY 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 47472

SENSOR	% ON-LINE	% RECOVERED
WS(A)	99.9	75.2
WD(A)	99.9	69.3
WS(C)	99.9	78.5
WD(C)	99.9	76.9

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA (A)	45.7	7.2	262.7	437.15
(C)	18.2	6.2	272.3	309.70

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND 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 MAY 1982

 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	283.8
01:00	7.1	276.0	0.0	0.0	6.0	286.8
02:00	7.0	279.8	0.0	0.0	6.0	290.3
03:00	7.0	282.0	0.0	0.0	6.0	291.6
04:00	7.0	283.5	0.0	0.0	5.9	293.8
05:00	7.0	285.4	0.0	0.0	5.9	295.7
06:00	6.9	287.0	0.0	0.0	5.9	296.9
07:00	6.9	288.3	0.0	0.0	6.0	298.7
08:00	7.0	289.0	0.0	0.0	6.2	298.7
09:00	7.0	285.1	0.0	0.0	6.3	294.9
10:00	7.0	278.8	0.0	0.0	6.3	288.8
11:00	7.1	268.1	0.0	0.0	6.4	278.3
12:00	7.2	255.8	0.0	0.0	6.5	264.0
13:00	7.3	247.1	0.0	0.0	6.6	253.5
14:00	7.4	239.0	0.0	0.0	6.7	245.5
15:00	7.5	236.0	0.0	0.0	6.6	242.1
16:00	7.4	234.2	0.0	0.0	6.5	240.8
17:00	7.5	234.7	0.0	0.0	6.4	240.6
18:00	7.5	238.0	0.0	0.0	6.4	243.6
19:00	7.6	241.6	0.0	0.0	6.3	247.2
20:00	7.5	247.9	0.0	0.0	6.3	256.0
21:00	7.4	253.5	0.0	0.0	6.2	262.5
22:00	7.3	260.0	0.0	0.0	6.2	269.8
23:00	7.3	268.8	0.0	0.0	6.2	279.3

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

1982

 1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C % COUNT	LEVEL C COUNT	%
0.0- 0.5	48	0.1	0	0.0	171
0.5- 1.0	283	0.8	0	0.0	654
1.0- 1.5	600	1.7	0	0.0	1017
1.5- 2.0	886	2.5	0	0.0	1291
2.0- 2.5	1130	3.2	0	0.0	1558
2.5- 3.0	1235	3.5	0	0.0	1700
3.0- 3.5	1282	3.6	0	0.0	1908
3.5- 4.0	1544	4.3	0	0.0	2053
4.0- 4.5	2028	5.7	0	0.0	2797
4.5- 5.0	1794	5.0	0	0.0	2185
5.0- 5.5	1969	5.5	0	0.0	2310
5.5- 6.0	1874	5.2	0	0.0	2133
6.0- 6.5	2265	6.3	0	0.0	2431
6.5- 7.0	1963	5.5	0	0.0	1885
7.0- 7.5	1971	5.5	0	0.0	1867
7.5- 8.0	1642	4.6	0	0.0	1552
8.0- 8.5	2094	5.9	0	0.0	1659
8.5- 9.0	1547	4.3	0	0.0	1129
9.0- 9.5	1133	3.2	0	0.0	958
9.5-10.0	1151	3.2	0	0.0	868
10.0-11.0	1923	5.4	0	0.0	1425
11.0-12.0	1451	4.1	0	0.0	1069
12.0-13.0	1148	3.2	0	0.0	871
13.0-14.0	743	2.1	0	0.0	521
14.0-15.0	639	1.8	0	0.0	461
15.0-16.0	446	1.2	0	0.0	307
16.0-17.0	368	1.0	0	0.0	191
17.0-18.0	234	0.7	0	0.0	128
18.0-19.0	121	0.3	0	0.0	76
19.0-20.0	78	0.2	0	0.0	41
20.0-21.0	64	0.2	0	0.0	28
>21.0	55	0.2	0	0.0	13

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 75.2 0.0 78.5

SITE ID: NY
 SITE LOCATION: MONTAUK POINT, NY.
 DATA : JANUARY 1977 THROUGH MAY 1982

 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	0.13	0	0.00	171	0.46
1.0	331	0.93	0	0.00	825	2.21
1.5	931	2.61	0	0.00	1842	4.94
2.0	1817	5.09	0	0.00	3133	8.41
2.5	2947	8.25	0	0.00	4691	12.59
3.0	4182	11.71	0	0.00	6391	17.15
3.5	5464	15.30	0	0.00	8299	22.28
4.0	7008	19.63	0	0.00	10352	27.79
4.5	9036	25.30	0	0.00	13149	35.29
5.0	10830	30.33	0	0.00	15334	41.16
5.5	12799	35.84	0	0.00	17644	47.36
6.0	14673	41.09	0	0.00	19777	53.08
6.5	16938	47.43	0	0.00	22208	59.61
7.0	18901	52.93	0	0.00	24093	64.67
7.5	20872	58.45	0	0.00	25960	69.68
8.0	22514	63.05	0	0.00	27512	73.84
8.5	24608	68.91	0	0.00	29171	78.30
9.0	26155	73.24	0	0.00	30300	81.33
9.5	27288	76.42	0	0.00	31258	83.90
10.0	28439	79.64	0	0.00	32126	86.23
11.0	30362	85.03	0	0.00	33551	90.05
12.0	31813	89.09	0	0.00	34620	92.92
13.0	32961	92.30	0	0.00	35491	95.26
14.0	33704	94.39	0	0.00	36012	96.66
15.0	34343	96.17	0	0.00	36473	97.90
16.0	34789	97.42	0	0.00	36780	98.72
17.0	35157	98.45	0	0.00	36971	99.23
18.0	35391	99.11	0	0.00	37099	99.58
19.0	35512	99.45	0	0.00	37175	99.78
20.0	35590	99.67	0	0.00	37216	99.89
21.0	35654	99.85	0	0.00	37244	99.97
>21.0	35709	100.00	0	0.00	37257	100.00

SITE ID: NY
 SITE LOCATION: MONTAUK POINT, NY.
 DATA : JANUARY 1977 THROUGH MAY 1982

 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	548	1259	1459	1700	1695	1138	356	26	
2	184	354	475	484	547	373	110	5	
3	107	123	192	159	193	248	54	6	
4	84	48	78	58	73	175	43	2	
5	52	25	20	21	39	122	35	0	
6	46	5	16	13	6	104	20	0	
7	29	3	9	7	9	71	21	2	
8	25	2	2	0	1	46	17	1	
9	15	0	2	1	3	38	11	0	
10	12	0	1	1	0	39	6	0	
11	11	0	1	0	0	26	9	0	
12	6	0	0	0	0	21	3	0	
13	1	0	0	0	0	18	8	0	
14	2	0	0	0	0	20	4	0	
15	1	0	0	1	0	12	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	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	0	0	0	
>23	0	0	0	0	0	0	0	0	

SITE ID: NY
 SITE LOCATION: MONTAUK POINT, NY.
 DATA : JANUARY 1977 THROUGH MAY 1982

 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	0.07	0.00	2.83	0.00	3.33
NNE	0.00	0.00	0.21	0.00	2.79	0.00	3.31
NE	0.00	0.00	0.18	0.00	4.07	0.00	4.61
ENE	0.00	0.00	0.22	0.00	3.73	0.00	4.32
E	0.00	0.00	0.21	0.00	3.04	0.00	3.56
ESE	0.00	0.00	0.31	0.00	2.46	0.00	2.43
SE	0.00	0.00	0.26	0.00	3.21	0.00	4.21
SSE	0.00	0.00	0.28	0.00	3.69	0.00	4.00
S	0.00	0.00	0.25	0.00	4.45	0.00	5.27
SSW	0.00	0.00	0.24	0.00	6.52	0.00	7.03
SW	0.00	0.00	0.16	0.00	9.06	0.00	9.06
WSW	0.00	0.00	0.15	0.00	7.07	0.00	7.60
W	0.00	0.00	0.11	0.00	9.60	0.00	10.04
WNW	0.00	0.00	0.17	0.00	9.81	0.00	10.76
NW	0.00	0.00	0.06	0.00	10.41	0.00	11.69
NNW	0.00	0.00	0.09	0.00	5.47	0.00	6.52

 NOTES:

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

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

WHERE; Z=ELEVATION
 WS=WIND SPEED

SAN GORGONIO PASS, CALIFORNIA



SITE ID: SG
 SITE LOCATION: SAN GORGONIO PASS, CA
 DATA : DECEMBER 1976 THROUGH SEPTEMBER 1982

 1.1 SENSOR PERFORMANCE

TOTAL POSSIBLE SAMPLES: 51120

SENSOR	% ON-LINE	% RECOVERED
WS(A)	97.1	74.1
WD(A)	97.1	78.7
WS(B)	97.1	15.4
WD(B)	97.1	15.4
WS(C)	97.1	77.6
WD(C)	97.1	77.4

 1.2 ANNUAL MEANS AND STANDARD DEVIATIONS

	HEIGHT (METERS)	MEAN WS	MEAN WD	POWER WATTS/M**2
SITE DATA	(A) 45.7	7.7	254.3	712.93
	(B) 30.0	7.0	247.6	491.10
	(C) 9.1	6.2	264.2	351.29

 1.3 MAXIMUM WIND SPEED

ELEVATION (METERS)	WIND SPEED	WIND DIR.	DATE	TIME	OTHER LEVELS
(A) 45.7	27.0	260.0	12/15/77	12:00	(B)-999.9 (C) 21.0
(B) 30.0	23.8	237.0	06/17/82	13:00	(A)-999.9 (C) 18.0
(C) 9.1	23.9	266.0	12/05/78	12:00	(A) 18.9 (B)-999.9

 NOTES:

1. SITE ELEVATION: 344 METERS ABOVE SEA LEVEL.

SITE ID: SG
 SITE LOCATION: SAN GORGONIO PASS, CA
 DATA : DECEMBER 1976 THROUGH SEPTEMBER 1982

 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	271.5	6.9	258.4	6.3	278.5
01:00	7.7	273.6	6.7	257.6	6.1	281.6
02:00	7.5	277.2	6.6	260.7	6.0	283.5
03:00	7.2	277.4	6.4	256.7	5.8	283.4
04:00	7.1	279.3	6.3	257.0	5.7	284.9
05:00	6.8	278.8	6.1	253.5	5.5	285.8
06:00	6.6	278.8	6.3	248.2	5.3	284.4
07:00	6.4	271.8	6.3	239.7	5.2	275.5
08:00	6.3	239.4	6.2	224.1	5.2	243.7
09:00	6.4	188.5	6.3	204.7	5.4	194.9
10:00	6.7	178.6	6.5	207.8	5.6	185.2
11:00	7.1	178.0	6.7	214.8	5.9	184.4
12:00	7.4	182.9	6.8	220.4	6.1	188.8
13:00	7.8	189.6	7.0	225.6	6.4	196.8
14:00	8.1	199.2	7.3	232.3	6.6	208.4
15:00	8.3	210.3	7.6	236.0	6.7	218.3
16:00	8.6	225.5	7.7	243.0	6.8	237.5
17:00	8.9	248.4	8.0	252.9	7.0	261.7
18:00	9.1	260.9	8.1	253.7	7.2	268.3
19:00	9.2	263.0	8.0	255.2	7.2	269.9
20:00	9.1	263.9	8.0	256.3	7.2	270.4
21:00	8.8	265.3	7.7	257.0	6.9	272.5
22:00	8.5	266.9	7.6	259.5	6.7	274.8
23:00	8.2	269.3	7.3	258.0	6.5	277.1

SITE ID: SG
 SITE LOCATION: SAN GORGONIO PASS, CA
 DATA : DECEMBER 1976 THROUGH SEPTEMBER 1982

1.5 FREQUENCY DISTRIBUTION OF WIND SPEED

WIND SPEED	LEVEL A COUNT	LEVEL B % COUNT	LEVEL C COUNT	%
0.0- 0.5	467	1.2	182	0.8
0.5- 1.0	1548	4.1	327	2.7
1.0- 1.5	1775	4.7	408	5.0
1.5- 2.0	2023	5.3	442	7.2
2.0- 2.5	2275	6.0	392	7.8
2.5- 3.0	1942	5.1	386	6.7
3.0- 3.5	1585	4.2	298	5.4
3.5- 4.0	1509	4.0	289	4.7
4.0- 4.5	1615	4.3	256	5.0
4.5- 5.0	1042	2.8	275	3.5
5.0- 5.5	1086	2.9	205	3.2
5.5- 6.0	868	2.3	241	2.6
6.0- 6.5	991	2.6	245	2.7
6.5- 7.0	775	2.0	215	2.4
7.0- 7.5	824	2.2	264	2.7
7.5- 8.0	725	1.9	217	2.7
8.0- 8.5	851	2.2	212	3.5
8.5- 9.0	745	2.0	224	3.1
9.0- 9.5	733	1.9	238	2.9
9.5-10.0	836	2.2	262	3.2
10.0-11.0	1815	4.8	497	6.1
11.0-12.0	1970	5.2	485	5.4
12.0-13.0	2112	5.6	425	4.5
13.0-14.0	1751	4.6	320	2.7
14.0-15.0	1583	4.2	208	1.6
15.0-16.0	1319	3.5	130	1.0
16.0-17.0	1281	3.4	108	0.5
17.0-18.0	715	1.9	56	0.2
18.0-19.0	424	1.1	33	0.1
19.0-20.0	307	0.8	24	0.1
20.0-21.0	163	0.4	12	0.0
>21.0	202	0.5	4	0.0

RECOVERY RATES
 LEVEL A LEVEL B LEVEL C
 74.0 15.4 77.5

SITE ID: SG
 SITE LOCATION: SAN GORGONIO PASS, CA
 DATA : DECEMBER 1976 THROUGH SEPTEMBER 1982

 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	1.23	182	2.31	337	0.85
1.0	2015	5.32	509	6.46	1421	3.58
1.5	3790	10.01	917	11.64	3410	8.60
2.0	5813	15.36	1359	17.25	6267	15.80
2.5	8088	21.36	1751	22.22	9375	23.64
3.0	10030	26.49	2137	27.12	12019	30.30
3.5	11615	30.68	2435	30.90	14145	35.66
4.0	13124	34.67	2724	34.57	16007	40.36
4.5	14739	38.93	2980	37.82	17992	45.36
5.0	15781	41.69	3255	41.31	19375	48.85
5.5	16867	44.55	3460	43.91	20630	52.01
6.0	17735	46.85	3701	46.97	21652	54.59
6.5	18726	49.47	3946	50.08	22732	57.31
7.0	19501	51.51	4161	52.80	23673	59.69
7.5	20325	53.69	4425	56.15	24730	62.35
8.0	21050	55.60	4642	58.91	25815	65.09
8.5	21901	57.85	4854	61.60	27205	68.59
9.0	22646	59.82	5078	64.44	28449	71.73
9.5	23379	61.76	5316	67.46	29593	74.61
10.0	24215	63.96	5578	70.79	30882	77.86
11.0	26030	68.76	6075	77.09	33291	83.94
12.0	28000	73.96	6560	83.25	35426	89.32
13.0	30112	79.54	6985	88.64	37207	93.81
14.0	31863	84.17	7305	92.70	38272	96.50
15.0	33446	88.35	7513	95.34	38905	98.09
16.0	34765	91.83	7643	96.99	39291	99.06
17.0	36046	95.22	7751	98.36	39497	99.58
18.0	36761	97.10	7807	99.07	39586	99.81
19.0	37185	98.22	7840	99.49	39624	99.90
20.0	37492	99.04	7864	99.80	39645	99.96
21.0	37655	99.47	7876	99.95	39657	99.99
>21.0	37857	100.00	7880	100.00	39662	100.00

SITE ID: SG
 SITE LOCATION: SAN GORGONIO PASS, CA
 DATA : DECEMBER 1976 THROUGH SEPTEMBER 1982

 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	939	154	714	291	207	1120	1141	689	75
2	343	368	275	207	183	483	168	26	
3	247	121	106	55	53	308	103	12	
4	164	42	36	16	6	213	78	5	
5	120	29	13	5	5	116	58	5	
6	86	9	7	1	1	83	45	4	
7	55	3	2	1	1	53	43	2	
8	25	1	0	0	0	42	31	0	
9	33	1	1	0	0	28	30	0	
10	18	0	0	0	0	17	21	0	
11	21	0	0	0	0	8	16	0	
12	7	0	0	0	0	8	19	1	
13	7	0	0	0	0	8	11	0	
14	5	0	0	0	0	2	9	0	
15	6	0	0	0	0	3	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
 DATA : DECEMBER 1976 THROUGH SEPTEMBER 1982

 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	0.02	0.20	0.15	0.16	3.47	3.52	2.26
NNE	-0.23	0.09	0.01	0.02	2.64	2.50	2.11
NE	0.04	-0.01	0.00	0.00	2.34	1.85	1.82
ENE	0.28	-0.05	0.03	0.01	2.22	1.51	1.80
E	0.27	0.00	0.07	0.05	3.67	3.27	2.88
ESE	0.06	0.08	0.08	0.08	6.16	6.69	5.38
SE	0.63	-0.16	0.05	0.00	5.37	2.84	5.24
SSE	0.30	-0.15	-0.03	-0.06	2.25	1.48	1.98
S	-0.53	0.17	-0.01	0.03	1.35	1.42	1.01
SSW	-0.89	0.31	0.00	0.07	2.06	3.85	1.68
SW	0.31	0.11	0.16	0.15	10.40	14.20	8.16
WSW	0.20	0.13	0.15	0.14	23.07	34.63	21.18
W	1.07	-0.23	0.11	0.04	17.91	8.77	19.05
WNW	2.21	-0.46	0.23	0.08	5.08	3.78	8.72
NW	0.23	0.13	0.16	0.15	5.25	5.88	8.11
NNW	0.33	0.02	0.10	0.08	4.60	2.91	5.10

 NOTES:

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

$$2. \text{ALPHA} = \frac{\text{LOG}(WS(UP)/WS(LO))}{\text{LOG}(Z(UP)/Z(LO))} \quad \text{WHERE; } \begin{matrix} Z=\text{ELEVATION} \\ WS=\text{WIND SPEED} \end{matrix}$$

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