
Argonne Mesa Wind Monitoring Program

ANNUAL REPORT

For

September 2002 – August 2003

Prepared for:

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TABLE OF CONTENTS

SECTION I: PROJECT BACKGROUND 1

EQUIPMENT 2

DATA COLLECTION 2

DATA PROCESSING 2

SECTION II: DATA SUMMARY 3

DATA RECOVERY 3

WIND DATA SUMMARY 3

LIST OF FIGURES

FIGURE 1. LOCATION OF ARGONNE MESA WIND MONITORING STATION 1

FIGURE 2. MONTHLY WIND SPEEDS – SEPTEMBER 2002-AUGUST 2003 4

FIGURE 3. DIURNAL WIND SPEED PATTERN – SEPTEMBER 2002-AUGUST 2003 5

FIGURE 4. MONTHLY WIND ROSE – SEPTEMBER 2002-AUGUST 2003 6

FIGURE 5. ANNUAL WIND ROSE – SEPTEMBER 2002-AUGUST 2003 7

LIST OF TABLES

TABLE 1. WIND SPEED DATA RECOVERY – SEPTEMBER 2002-AUGUST 2003 3

TABLE 2. MONTHLY AVERAGE WIND SPEEDS – SEPTEMBER 2002-AUGUST 2003 4

TABLE 3. TURBULENCE INTENSITY AND WIND SHEAR – SEPTEMBER 2002-AUGUST 2003 8

TABLE 4. TEMPERATURE SUMMARY – SEPTEMBER 2002-AUGUST 2003 8

TABLE 5. MONTHLY FREQUENCY DISTRIBUTIONS – SEPTEMBER 2002-AUGUST 2003 9

SECTION I: PROJECT BACKGROUND

New Mexico Energy, Minerals and Natural Resources Department (EMNRD), hired Global Energy Concepts (GEC) to conduct a two-year wind monitoring program at a site on Argonne Mesa, near Santa Rosa, New Mexico. The wind resource assessment study includes monthly data validation and transmittal, one annual report and one final report.

This annual report covers the period of September 2002 through August 2003. The final report will be prepared in September 2004 with data collection through August 2004.

The monitoring site is located on Argonne Mesa southwest of Santa Rosa, at 34° 49' 39" N – 104° 59' 55" W with an elevation of 1,786 m (5,860 ft). The site was commissioned on August 7, 2002. Figure 1 provides a map indicating the general site location.



Figure 1. Location of Argonne Mesa Wind Monitoring Station

EQUIPMENT

The Argonne Mesa monitoring station is equipped with four wind speed sensors, two wind direction sensors, one temperature sensor, and a cellular data logger with a solar panel and battery. The station measures wind speed at 10, 25, and 40 m (two) and wind direction at 25 and 40 m. The 40 m anemometers are calibrated and the temperature sensor is located at 3 m.

DATA COLLECTION

The data were collected remotely through the cellular data logger. The logger was programmed to call a BaseStation computer at GEC and download data on a weekly basis. The data were maintained with a data collection log that tracked the call status, battery voltage, temperature, and cellular signal strength. Data recovery of 100% was achieved at all three sensor levels during the first annual period.

DATA PROCESSING

All data were reviewed for accuracy and invalid data removed to create a validated data set. Data are considered invalid if they do not represent the actual wind conditions at the site. Typical causes of invalid data include sensor icing, tower shadow, and equipment damage due to lightning, electrostatic discharge, failed components, or vandalism. The specific causes of invalid data are discussed in the next section of the report under Data Recovery.

For the data summary, the validated data set was used. At the end of a monitoring program, the erroneous or missing data are replaced to create a representative data set. Data are replaced using the following methods in the order presented. In the case where only a few hours are missing, the average of the hour before and the hour after the outage is used to replace the invalid data. When a longer period of data is affected and another wind speed sensor is operating at the site, the data are filled in based on a correlation between the sensors. When all sensors are affected by the outage, the standard methodology for data replacement is to develop a correlation to a nearby reference site that has data concurrent with the affected hours.

SECTION II: DATA SUMMARY

This section summarizes the data collected for September 1, 2002 through August 31, 2003.

DATA RECOVERY

Although 100% of the data were recorded and recovered from the logger, a small percentage of the data were invalid. Table 1 provides the recovery rates for valid wind speed data collected at 10, 25, and 40 m. The “Hours Lost” column indicates the number of hourly data points that were missing or removed during the data validation process for each monitoring height. For example, if at the 50-m level, data were removed from 12:00 – 2:00, this would be considered three hourly data points. The remaining data are expressed as a percentage of total sensor hours in the period on the “Recovery Rate” column. All removed data was due to icing.

Table 1. Wind Speed Data Recovery – September 2002-August 2003

Month	Total Hours In Period	Hours Lost			Recovery Rate	
		10m	25m	40m	All Heights	40m Level
September	720	0	0	0	100.0%	100.0%
October	744	0	0	0	100.0%	100.0%
November	720	0	0	0	100.0%	100.0%
December	744	34	33	18	96.2%	97.6%
January	744	0	0	0	100.0%	100.0%
February	672	37	19	32	95.6%	95.2%
March	744	0	0	0	100.0%	100.0%
April	720	0	0	0	100.0%	100.0%
May	744	0	0	0	100.0%	100.0%
June	720	0	0	0	100.0%	100.0%
July	744	0	0	0	100.0%	100.0%
August	744	0	0	0	100.0%	100.0%
Annual	8,760	71	52	50	99.3%	99.4%

WIND DATA SUMMARY

The average monthly wind speeds are summarized in Table 2 and illustrated in Figure 2. As shown in the table and figure, the winds were highest during the winter and spring and lowest during the summer.

Table 2. Monthly Average Wind Speeds – September 2002-August 2003

	10M		25M		40M	
	m/s	mph	m/s	mph	m/s	mph
September	4.2	9.3	5.6	12.6	6.1	13.7
October	4.2	9.4	5.7	12.7	6.2	13.9
November	5.1	11.4	6.7	15.1	7.4	16.6
December	5.7	12.8	7.4	16.5	8.1	18.1
January	5.2	11.6	6.7	15.0	7.3	16.4
February	5.5	12.4	7.0	15.7	7.7	17.2
March	5.8	12.9	7.5	16.7	8.3	18.5
April	6.4	14.4	8.2	18.3	9.0	20.1
May	5.3	11.8	6.7	15.0	7.3	16.4
June	4.9	10.9	6.1	13.6	6.7	15.1
July	4.4	9.7	5.6	12.4	6.3	14.0
August	3.9	8.7	4.9	11.0	5.5	12.3
Annual	5.0	11.3	6.5	14.5	7.2	16.0

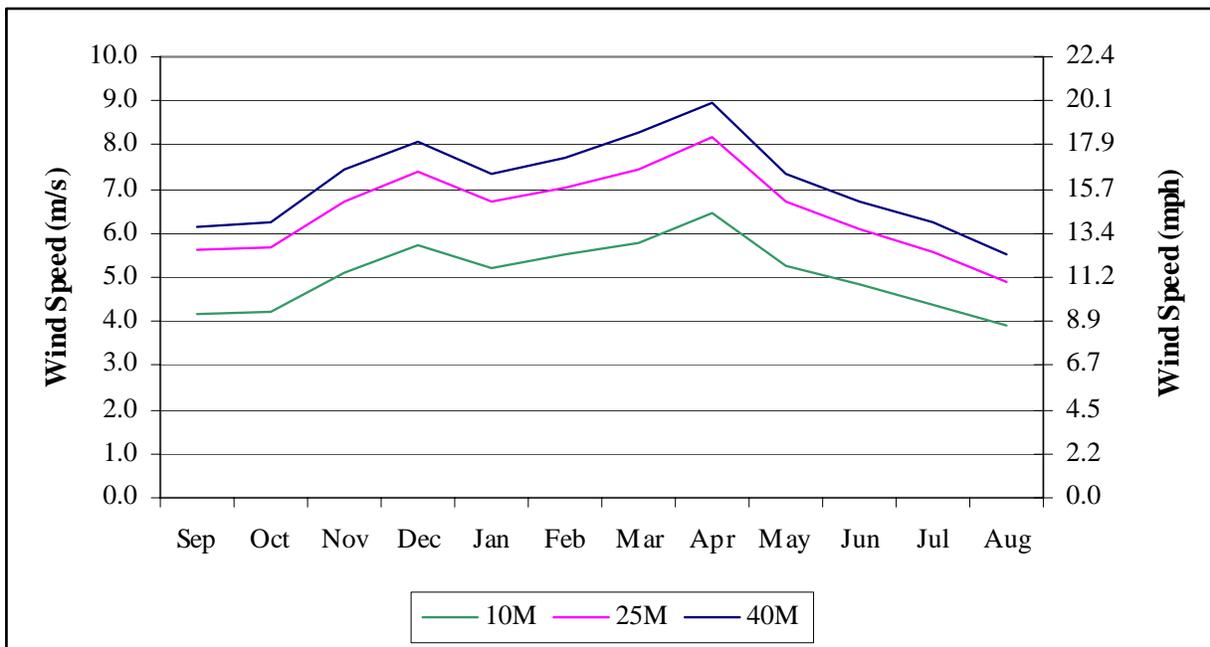


Figure 2. Monthly Wind Speeds – September 2002-August 2003

The average diurnal wind speeds are shown in Figure 3. As shown in the figure, the wind speeds are highest from about 5:00 p.m. throughout the night and into the early morning. Commonly, the diurnal wind speed pattern at a site is relatively consistent from year to year.

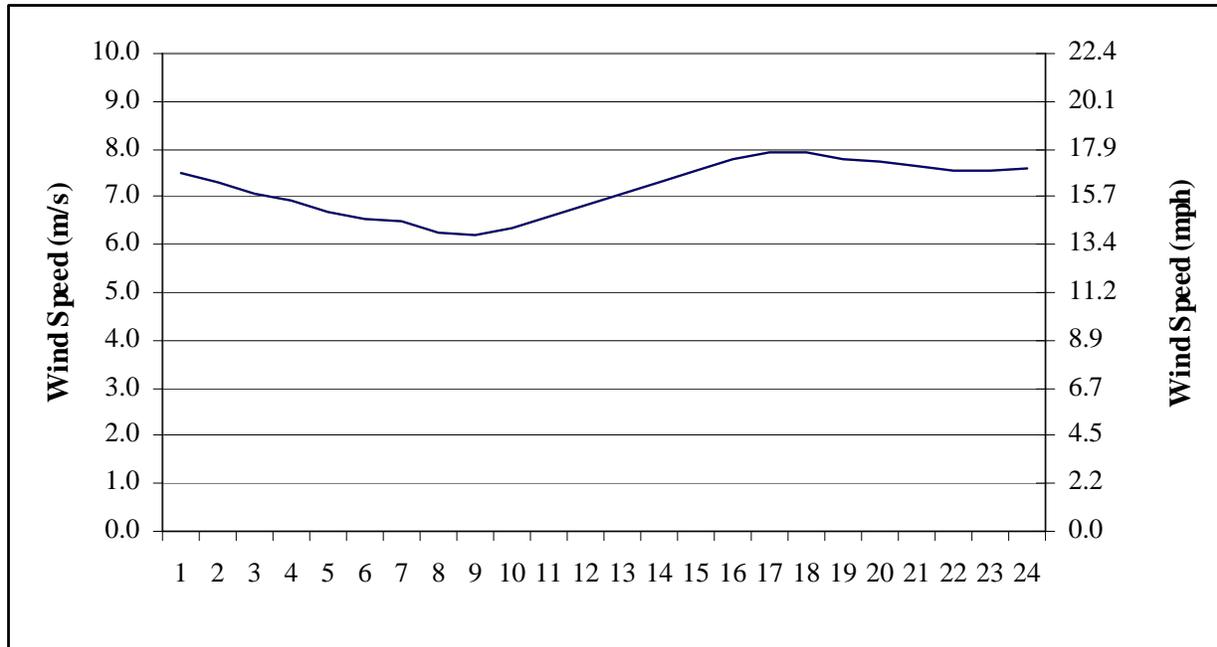


Figure 3. Diurnal Wind Speed Pattern – September 2002-August 2003

Figures 4 and 5 illustrate the monthly and annual wind direction patterns for Argonne Mesa during the period of record. The wind rose graphs consist of two bars in each of the 16 wind direction sectors that represent the percent of total time and the percent of total wind energy. During this period, the predominant wind energy direction at the site was west-northwest. Commonly, the directional wind speed pattern at a site is similar from year to year.

Wind shear exponent values are provided in Table 3. The wind shear exponent represents the degree to which wind speed increases with height. For the purposes of this report, the wind shear exponent was calculated between 25 and 40 m. The theoretically derived value for wind shear over smooth, flat terrain is 0.14. During this period the wind shear exponent in operable winds (winds above 4 m/s) was 0.21. During wind project development, wind shear is used when determining an appropriate wind turbine hub height.

Turbulence intensity (TI) is a relative indicator of turbulence and not an absolute value. The average turbulence intensity at the 50-m level is also provided in Table 3. The International Electrotechnical Commission (IEC) wind turbine design standards specify a turbine to be designed for TI levels up to 0.18 in 15 m/s winds. The TI values shown in the table are calculated from winds between 14 and 16 m/s. The number of data points used in the calculations is also indicated in the table. The TI values to date indicate no concerns for wind energy development at this location.

The temperature data collected during the period of record is summarized in Table 4. As shown in the table, the average site temperature for the time period was 55°F (12.7°C). The maximum hourly average temperature was 95°F (35.2°C), which occurred in July. The minimum hourly temperature was 6°F (-14.3°C) and was recorded during February.

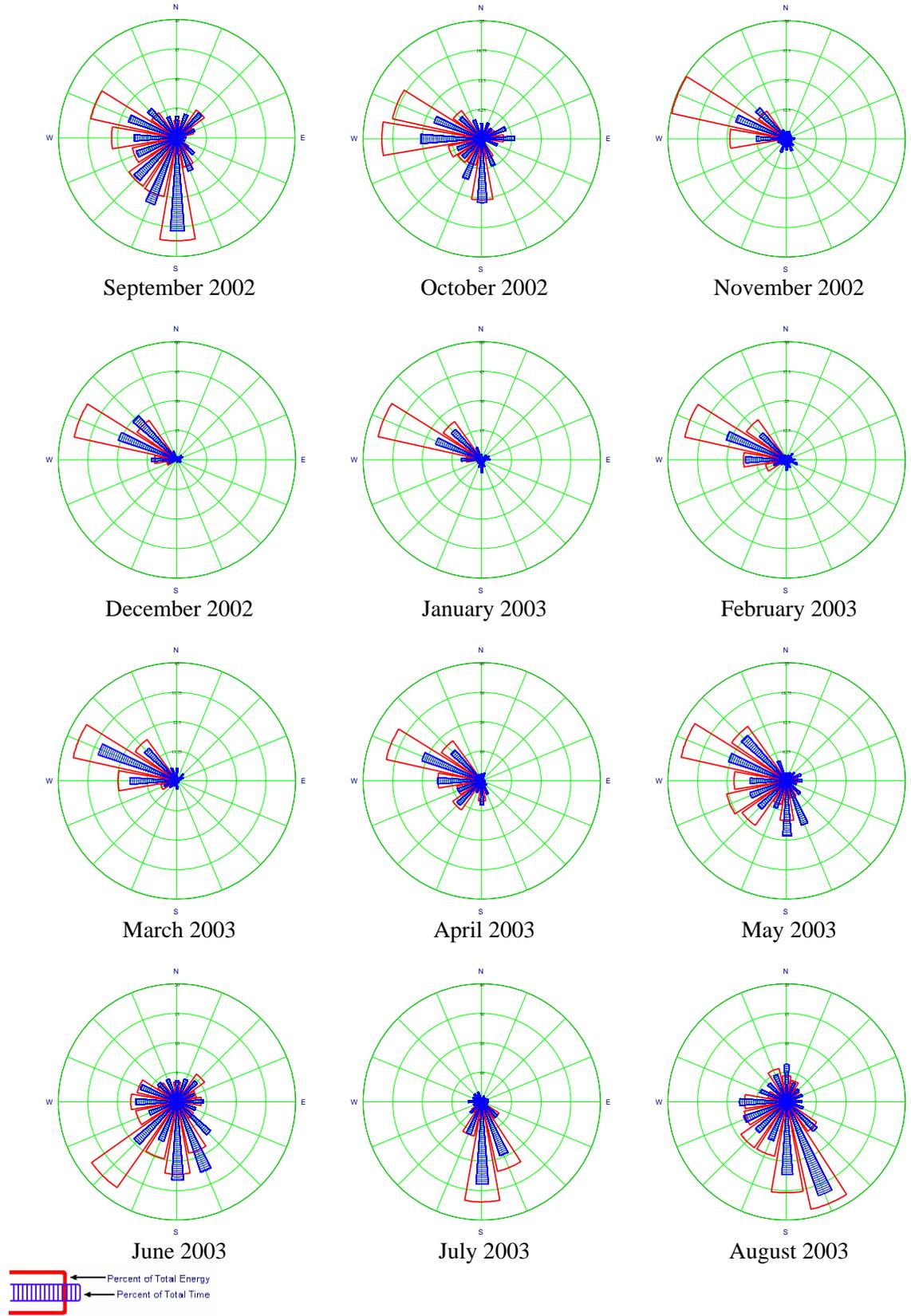


Figure 4. Monthly Wind Rose – September 2002-August 2003

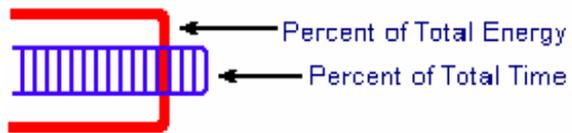
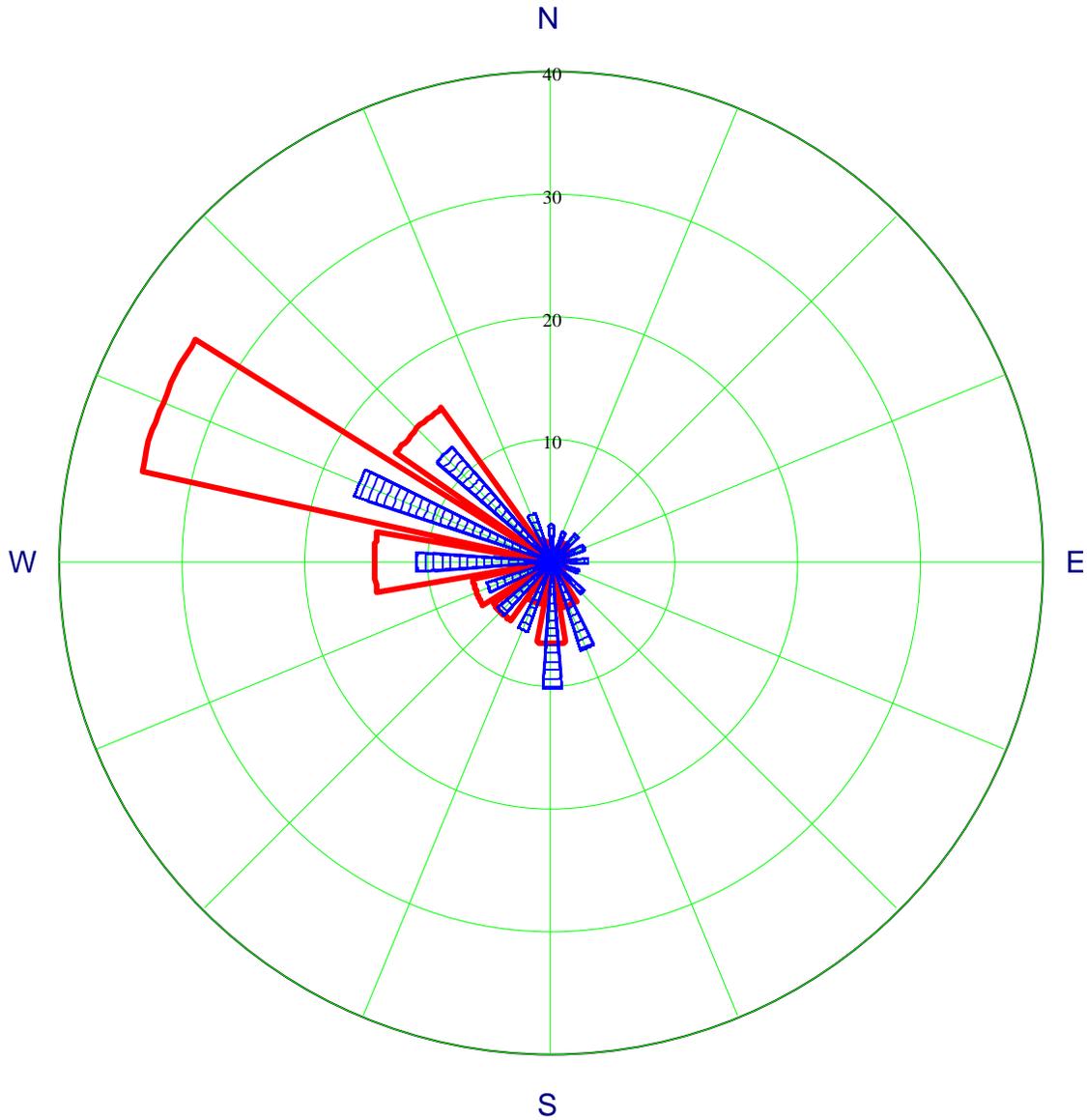


Figure 5. Annual Wind Rose – September 2002-August 2003

Table 3. Turbulence Intensity and Wind Shear – September 2002-August 2003

Month	25-40m Wind Shear [1]	Turbulence Intensity at 15 m/s [2]	Hours in 15 m/s bin
September	0.18	0.14	2
October	0.20	0.13	2
November	0.21	0.15	17
December	0.21	0.14	29
January	0.20	0.15	28
February	0.20	0.15	23
March	0.23	0.15	24
April	0.20	0.15	29
May	0.19	0.17	24
June	0.22	0.15	8
July	0.26	0.00	0
August	0.26	0.00	0
Annual	0.21	0.15	186

[1] Wind Shear was calculated when the 25-m wind speed was greater than 4 m/s.

[2] TI was calculated using the 40-m wind speeds between 14 and 16 m/s.

Table 4. Temperature Summary – September 2002-August 2003

Month	Average Temperature		Maximum Temperature		Minimum Temperature	
	Celsius	Fahrenheit	Celsius	Fahrenheit	Celsius	Fahrenheit
September	17.9	64	30.8	87	4.8	41
October	10.8	52	24.7	76	-1.2	30
November	6.0	43	18.3	65	-6.3	21
December	2.0	36	13.3	56	-9.4	15
January	5.5	42	18.6	65	-9.3	15
February	3.0	37	18.5	65	-14.3	6
March	8.1	47	21.3	70	-5.8	22
April	12.7	55	25.0	77	-3.0	27
May	17.9	64	31.7	89	3.1	38
June	19.5	67	31.9	89	6.2	43
July	24.7	76	35.2	95	14.6	58
August	23.0	73	33.8	93	11.9	53
Annual	12.7	55	35.2	95	-14.3	6

Table 5 provides the monthly frequency distributions for the 40-m wind speeds collected during the year.

Table 5. Monthly Frequency Distributions – September 2002-August 2003

Bin Center	Sep Hours	Oct Hours	Nov Hours	Dec Hours	Jan Hours	Feb Hours	Mar Hours	Apr Hours	May Hours	Jun Hours	Jul Hours	Aug Hours	Annual Hours
0.0	5	7	0	3	4	4	0	2	1	4	1	0	31
0.5	8	10	6	5	5	9	1	4	7	0	3	7	65
1.0	20	13	7	6	11	7	4	8	5	8	10	20	119
1.5	18	15	13	13	18	18	9	9	17	10	21	21	182
2.0	27	28	18	13	27	16	12	7	18	15	22	23	226
2.5	33	29	29	24	31	19	21	12	28	28	38	43	335
3.0	43	32	31	26	37	27	18	17	33	30	46	40	380
3.5	48	39	46	29	34	40	20	19	37	50	35	62	459
4.0	48	47	45	28	40	36	29	13	40	37	41	56	460
4.5	47	53	48	31	39	27	25	28	50	47	40	77	512
5.0	47	49	36	22	33	24	43	27	35	55	55	67	493
5.5	36	56	38	40	41	29	29	24	35	57	54	66	505
6.0	48	63	34	31	42	29	39	26	38	49	58	54	511
6.5	34	53	41	32	35	34	49	26	38	53	60	54	509
7.0	45	50	32	39	30	46	51	40	37	45	48	41	504
7.5	58	35	41	47	46	32	48	50	45	35	48	42	527
8.0	29	35	29	40	38	33	41	43	43	37	47	25	440
8.5	27	35	33	32	20	32	43	44	38	30	39	12	385
9.0	24	25	25	44	18	21	37	35	29	24	20	12	314
9.5	20	20	15	48	27	24	30	35	29	23	16	3	290
10.0	18	11	30	33	28	21	29	32	29	16	13	5	265
10.5	10	9	16	28	18	21	17	33	14	14	9	9	198
11.0	8	7	10	20	21	21	19	27	23	15	4	2	177
11.5	9	8	15	12	18	13	22	28	14	10	5	2	156
12.0	5	7	14	15	14	19	22	29	11	9	5	1	151
12.5	0	4	9	20	13	10	20	18	11	9	3	0	117
13.0	1	1	7	18	12	16	24	14	6	1	2	0	102
13.5	3	1	10	16	12	6	7	11	6	3	1	0	76
14.0	1	1	8	14	7	8	6	7	5	2	0	0	59
14.5	0	1	4	5	9	8	8	8	8	2	0	0	53
15.0	0	0	1	4	6	4	7	11	4	1	0	0	38
15.5	0	0	5	0	4	5	4	5	1	0	0	0	24
16.0	0	0	4	1	1	3	4	6	3	1	0	0	23
16.5	0	0	2	0	2	6	1	7	2	0	0	0	20
17.0	0	0	5	1	1	1	1	2	2	0	0	0	13
17.5	0	0	6	2	1	1	1	5	1	0	0	0	17
18.0	0	0	4	0	0	1	1	1	1	0	0	0	8
18.5	0	0	2	0	1	1	1	3	0	0	0	0	8
19.0	0	0	0	0	0	0	1	1	0	0	0	0	2
19.5	0	0	0	0	0	0	0	0	0	0	0	0	0
20.0	0	0	0	0	0	0	0	1	0	0	0	0	1
20.5	0	0	1	0	0	0	0	1	0	0	0	0	2
21.0	0	0	0	1	0	0	0	1	0	0	0	0	2
21.5	0	0	0	0	0	0	0	0	0	0	0	0	0
22.0	0	0	0	0	0	0	0	0	0	0	0	0	0
22.5	0	0	0	0	0	0	0	0	0	0	0	0	0
23.0+	0	0	0	1	0	0	0	0	0	0	0	0	1
Total	720	744	720	744	744	672	744	720	744	720	744	744	8,760

The Appendix contains the following reports:

- Site and Sensor Information Table
- Data Validation Table
- Summary Table for Monthly and Diurnal Wind Speeds

The forms and reports in the appendix are consistent with the reporting procedures developed for the Utility Wind Resource Assessment Program (UWRAP). Electronic copies of the raw hourly averaged data, hourly averaged validated data, and corrected hourly data files have been submitted to EMNRD.

APPENDIX

SITE 703 – ARGONNE MESA

DATA REPORT -- ARGONNE MESA WIND MONITORING PROGRAM

Station Name: Argonne Mesa
Station Number: 703
Period: September 2002 - August 2003

SITE INFORMATION

Site Number: 703
Client Name: New Mexico EMNRD
Client Code: NM5
Project: Wind Monitoring Project
Location: Argonne Mesa
Latitude: 34o 49.644' N
Longitude: 104o 59.916' W
Elevation: 1786M
Serial Number: 100271
Time Zone: -7 (MTN STD)
Magnetic Declination: 9E
Interval: 10 min

SENSOR INFORMATION

Channel Number	Sensor Type	Height	Scale	Offset	Units	Description
1	Anemometer	10M	0.765	0.35	m/s	Maximum 40 (calibrated)
2	Anemometer	25M	0.765	0.35	m/s	Maximum 40 (calibrated)
3	Anemometer	39.4M	0.7589	0.375	m/s	Maximum 40 (calibrated/grounded)
4	Anemometer	39.7M	0.7609	0.359	m/s	Maximum 40 (standard)
7	Direction Vane	25M	1	0	Degrees	NRG 200P
8	Direction Vane	39.4M	1	0	Degrees	NRG 200P
12	Temperature Probe	3.6M	0.1356	-86.39	Celsius	NRG 110S

Site 703 - Argonne Mesa

Commissioning Date/Time August 7, 2002

Diurnal Wind Speed Summary

10 M	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	
Sep-02	4.7	4.3	4.0	3.8	3.6	3.5	3.2	2.8	3.4	3.8	3.9	3.8	4.3	4.2	4.4	4.9	5.2	5.1	4.5	4.5	4.6	4.5	4.6	4.6	4.6
Oct-02	3.8	3.9	3.8	3.7	3.5	3.4	3.7	3.6	3.6	3.8	3.9	4.3	4.6	5.1	5.4	5.4	5.6	5.2	4.6	4.4	4.2	4.2	3.8	3.8	3.8
Nov-02	5.3	4.9	5.1	5.2	5.0	4.9	4.8	4.7	4.8	5.1	5.5	5.6	5.6	5.6	5.5	5.3	4.8	4.5	4.8	5.0	5.0	4.9	5.4	5.5	5.5
Dec-02	6.1	5.8	5.6	5.5	5.7	5.6	5.6	5.7	5.7	6.0	5.9	5.8	5.6	5.7	6.1	5.8	5.1	5.3	5.6	5.9	5.7	5.7	5.7	6.1	6.1
Jan-03	4.6	4.8	5.3	5.1	5.2	5.1	5.2	5.1	5.2	5.3	5.5	5.8	5.8	5.7	5.8	5.8	5.4	4.9	5.0	5.0	4.8	4.8	4.9	4.6	4.6
Feb-03	5.4	5.5	5.3	5.3	5.3	5.2	5.0	4.8	5.1	5.4	6.1	6.5	6.5	6.7	6.5	6.4	6.3	5.5	5.0	4.9	4.9	5.0	5.0	5.1	5.1
Mar-03	5.5	5.6	5.4	5.6	5.5	5.5	5.3	5.5	5.9	6.6	6.6	6.6	6.6	6.6	6.5	6.5	6.2	5.5	4.8	4.9	5.3	5.4	5.2	5.6	5.6
Apr-03	6.6	6.3	5.9	5.7	5.3	5.2	5.4	5.5	6.2	6.6	6.9	7.0	7.5	7.7	7.8	7.6	7.7	7.5	6.7	6.0	5.8	5.7	5.8	6.2	6.2
May-03	5.0	4.5	4.0	3.7	3.8	3.7	4.2	4.5	4.6	4.9	5.2	5.8	6.1	6.5	6.9	6.9	6.6	6.5	6.2	5.6	5.5	5.4	5.5	5.3	5.3
Jun-03	4.3	4.3	4.1	4.1	4.0	3.8	4.2	4.2	4.3	4.3	4.6	4.7	5.2	5.2	5.6	6.2	6.6	6.4	5.7	5.4	4.9	5.1	5.1	4.8	4.8
Jul-03	4.5	4.1	3.9	3.7	3.2	2.9	3.1	3.3	3.5	3.9	4.0	4.2	4.3	4.6	4.8	5.2	5.6	5.6	5.5	4.8	4.9	5.0	5.0	4.8	4.8
Aug-03	4.4	4.2	3.9	3.7	3.4	3.2	3.0	2.7	2.6	2.9	3.2	3.5	3.7	4.0	4.3	4.6	4.7	5.0	5.0	4.8	4.5	4.1	3.9	4.0	4.0
Annual	5.0	4.8	4.7	4.6	4.4	4.3	4.4	4.4	4.6	4.9	5.1	5.3	5.5	5.6	5.8	5.9	5.8	5.6	5.3	5.1	5.0	5.0	5.0	5.0	5.0

25M	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	
Sep-02	6.5	6.1	5.7	5.3	5.0	4.9	4.6	4.1	4.4	4.8	4.9	4.8	5.3	5.3	5.6	6.2	6.7	6.7	6.2	6.4	6.4	6.3	6.4	6.4	6.4
Oct-02	5.5	5.5	5.3	5.3	4.9	4.8	5.2	5.1	4.9	4.9	4.9	5.4	5.8	6.4	6.7	6.8	7.2	6.9	6.3	6.2	6.0	5.9	5.4	5.5	5.5
Nov-02	7.1	6.7	6.8	6.9	6.7	6.6	6.5	6.3	6.1	6.4	6.8	6.9	7.0	6.9	6.7	6.3	6.3	6.6	6.8	6.8	6.8	6.8	7.3	7.4	7.4
Dec-02	7.9	7.6	7.4	7.3	7.4	7.3	7.2	7.4	7.3	7.5	7.3	7.2	7.0	7.1	6.6	7.3	6.7	7.1	7.5	7.8	7.5	7.5	7.5	7.9	7.9
Jan-03	6.0	6.3	6.9	6.8	6.8	6.7	6.8	6.8	6.6	6.4	6.8	7.1	7.0	6.9	7.1	7.2	6.9	6.7	6.7	6.7	6.5	6.4	6.5	6.2	6.2
Feb-03	7.0	7.1	6.9	6.8	6.6	6.7	6.5	6.2	6.3	6.5	7.3	7.9	7.8	8.1	8.1	8.2	7.9	7.2	6.6	6.6	6.6	6.6	6.5	6.6	6.6
Mar-03	7.4	7.4	7.2	7.5	7.4	7.3	7.1	7.1	7.4	8.1	8.0	8.0	8.1	8.0	8.0	8.0	7.7	7.1	6.6	6.8	7.2	7.3	7.0	7.5	7.5
Apr-03	8.7	8.3	7.8	7.5	7.0	6.8	7.0	6.9	7.6	8.1	8.3	8.5	9.1	9.3	9.4	9.4	9.6	9.4	8.5	7.9	7.8	7.5	7.7	8.3	8.3
May-03	6.6	6.1	5.4	5.0	5.2	5.1	5.3	5.5	5.6	5.8	6.2	6.9	7.3	7.8	8.3	8.5	8.2	8.1	8.0	7.4	7.4	7.1	7.3	7.0	7.0
Jun-03	5.7	5.7	5.4	5.4	5.2	5.0	5.2	5.0	5.1	5.1	5.4	5.5	6.0	6.1	6.6	7.4	8.1	7.9	7.2	7.1	6.4	6.7	6.7	6.2	6.2
Jul-03	6.0	5.5	5.4	5.0	4.5	4.1	4.0	4.0	4.2	4.6	4.7	4.9	5.0	5.4	5.5	6.2	6.8	7.1	7.3	6.6	6.7	6.7	6.7	6.5	6.5
Aug-03	5.8	5.5	5.3	5.1	4.7	4.5	4.2	3.7	3.5	3.5	3.8	4.0	4.3	4.6	4.8	5.3	5.4	5.9	6.0	5.9	5.7	5.6	5.3	5.4	5.4
Annual	6.7	6.5	6.3	6.1	6.0	5.8	5.8	5.7	5.7	6.0	6.2	6.4	6.6	6.8	7.0	7.2	7.3	7.2	7.0	6.8	6.7	6.7	6.7	6.7	6.7

40M A	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	
Sep-02	7.1	6.8	6.4	5.9	5.5	5.4	5.1	4.6	4.7	5.0	5.1	5.1	5.6	5.6	5.9	6.6	7.1	7.2	6.9	7.2	7.2	7.0	7.0	7.1	7.1
Oct-02	6.1	6.1	5.9	5.9	5.5	5.4	5.8	5.6	5.3	5.1	5.1	5.7	6.1	6.7	7.1	7.2	7.7	7.5	7.0	6.9	6.7	6.6	6.0	6.2	6.2
Nov-02	8.0	7.5	7.6	7.8	7.6	7.4	7.4	7.1	6.6	6.9	7.2	7.4	7.5	7.4	7.3	7.2	7.0	7.1	7.4	7.7	7.6	7.6	8.1	8.2	8.2
Dec-02	8.7	8.6	8.3	8.2	8.3	8.1	8.0	8.0	7.9	8.0	7.7	7.5	7.4	7.5	8.1	7.8	7.3	7.9	8.3	8.6	8.2	8.2	8.4	8.8	8.8
Jan-03	6.7	7.0	7.5	7.5	7.5	7.4	7.6	7.5	7.2	6.8	7.1	7.5	7.4	7.4	7.6	7.7	7.5	7.5	7.6	7.5	7.3	7.2	7.2	6.9	6.9
Feb-03	7.8	8.0	7.7	7.5	7.3	7.3	7.2	6.9	6.8	7.0	7.8	8.4	8.4	8.7	8.7	8.5	8.5	7.9	7.3	7.4	7.4	7.4	7.3	7.4	7.4
Mar-03	8.4	8.3	8.1	8.5	8.4	8.5	8.1	7.9	7.9	8.7	8.6	8.5	8.6	8.6	8.5	8.6	8.4	7.8	7.5	7.9	8.3	8.3	7.9	8.5	8.5
Apr-03	9.8	9.4	8.8	8.4	7.8	7.6	7.9	7.5	8.2	8.6	8.9	9.1	9.6	10.0	10.1	10.0	10.3	10.1	9.4	8.8	8.7	8.4	8.7	9.3	9.3
May-03	7.5	6.8	6.0	5.6	5.8	5.8	5.8	5.8	5.9	6.2	6.6	7.3	7.8	8.4	8.9	9.1	8.9	8.8	8.8	8.3	8.2	7.9	8.1	7.8	7.8
Jun-03	6.5	6.5	6.2	6.1	5.9	5.7	5.7	5.4	5.4	5.4	5.7	5.9	6.5	6.6	7.2	8.2	8.8	8.7	8.0	8.0	7.4	7.6	7.5	7.0	7.0
Jul-03	7.0	6.3	6.1	5.7	5.2	4.6	4.5	4.3	4.4	4.9	5.1	5.3	5.5	5.9	6.1	6.9	7.6	8.0	8.3	7.8	7.9	7.9	7.8	7.4	7.4
Aug-03	6.7	6.3	6.1	5.8	5.4	5.1	4.7	4.2	3.9	3.7	4.0	4.3	4.6	4.9	5.3	5.8	6.0	6.6	6.7	6.6	6.6	6.5	6.1	6.3	6.3
Annual	7.5	7.3	7.1	6.9	6.7	6.5	6.5	6.2	6.2	6.3	6.6	6.8	7.1	7.3	7.6	7.8	7.9	7.9	7.8	7.7	7.6	7.5	7.5	7.6	7.6

Note: 10 meter and 25 meter data based on validated data set with no corrections.
40 meter data based on validated and corrected data set.

ARGONNE MESA WIND MONITORING PROJECT
Site Data Validation Report

Note #	Sensor/Channel	From	To	Code	Description
1	ANEM 10 M	12/3/2002 6:00	12/4/2002 16:00	ICE	Data deleted and not replaced.
2	ANEM 10 M	2/7/2003 4:00	2/7/2003 14:00	ICE	Data deleted and not replaced.
3	ANEM 10 M	2/7/2003 21:00	2/8/2003 4:00	ICE	Data deleted and not replaced.
4	ANEM 10 M	2/15/2003 20:00	2/16/2003 9:00	ICE	Data deleted and not replaced.
5	ANEM 10 M	2/20/2003 8:00	2/20/2003 15:00	ICE	Data deleted and not replaced.
6	ANEM 25M	12/3/2002 7:00	12/4/2002 16:00	ICE	Data deleted and not replaced.
7	ANEM 25M	2/7/2003 5:00	2/7/2003 9:00	ICE	Data deleted and not replaced.
8	ANEM 25M	2/7/2003 21:00	2/8/2003 4:00	ICE	Data deleted and not replaced.
9	ANEM 25M	2/20/2003 8:00	2/20/2003 16:00	ICE	Data deleted and not replaced.
10	ANEM 40A	12/3/2002 19:00	12/4/2002 16:00	ICE	Data deleted and replaced based on correlation to 40m B anemometer and diurnal avgs.
11	ANEM 40A	2/7/2003 1:00	2/8/2003 10:00	ICE	Data deleted and replaced based on correlation to 40m B and 25m anemometers and diurnal avgs.
12	ANEM 40A	2/20/2003 6:00	2/21/2003 1:00	ICE	Data deleted and replaced based on correlation to 40m B and 25m anemometers and diurnal avgs.
13	ANEM 40B	12/3/2002 22:00	12/4/2002 16:00	ICE	Data deleted and not replaced.
14	ANEM 40B	2/7/2003 4:00	2/7/2003 13:00	ICE	Data deleted and not replaced.
15	ANEM 40B	2/7/2003 20:00	2/8/2003 5:00	ICE	Data deleted and not replaced.
16	ANEM 40B	2/20/2003 2:00	2/20/2003 15:00	ICE	Data deleted and not replaced.
17	ANEM 40B	2/20/2003 20:00	2/21/2003 4:00	ICE	Data deleted and not replaced.
18	VANE 25M	11/4/2002 3:00	11/4/2002 10:00	ICE	Data deleted and not replaced.
19	VANE 25M	11/15/2002 18:00	11/16/2002 2:00	ICE	Data deleted and not replaced.
20	VANE 25M	12/3/2002 5:00	12/4/2002 10:00	ICE	Data deleted and not replaced.
21	VANE 25M	12/5/2002 0:00	12/5/2002 13:00	ICE	Data deleted and not replaced.
22	VANE 25M	12/17/2002 11:00	12/17/2002 12:00	ICE	Data deleted and not replaced.
23	VANE 25M	2/7/2003 2:00	2/8/2003 9:00	ICE	Data deleted and not replaced.
24	VANE 25M	2/15/2003 19:00	2/16/2003 9:00	ICE	Data deleted and not replaced.
25	VANE 25M	2/20/2003 5:00	2/20/2003 16:00	ICE	Data deleted and not replaced.
26	VANE 25M	2/20/2003 19:00	2/21/2003 5:00	ICE	Data deleted and not replaced.
27	VANE 40M	12/3/2002 5:00	12/4/2002 10:00	ICE	Data deleted and not replaced.
28	VANE 40M	12/4/2002 23:00	12/5/2002 13:00	ICE	Data deleted and not replaced.
29	VANE 40M	2/7/2003 2:00	2/8/2003 8:00	ICE	Data deleted and not replaced.
30	VANE 40M	2/15/2003 19:00	2/16/2003 9:00	ICE	Data deleted and not replaced.
31	VANE 40M	2/20/2003 4:00	2/20/2003 15:00	ICE	Data deleted and not replaced.
32	VANE 40M	2/20/2003 19:00	2/21/2003 5:00	ICE	Data deleted and not replaced.

Explanation of Codes:

UKN Unknown
 ICE Icing or wet snow
 LTG Static Voltage Discharge
 TWR Wind shading from tower
 DBD Wind vane dead band
 OPR Operator error
 MAL Equipment Malfunction
 MTC Maintenance
 MSN Missing Data