

Wind Resource Summary for Olga #1 Site

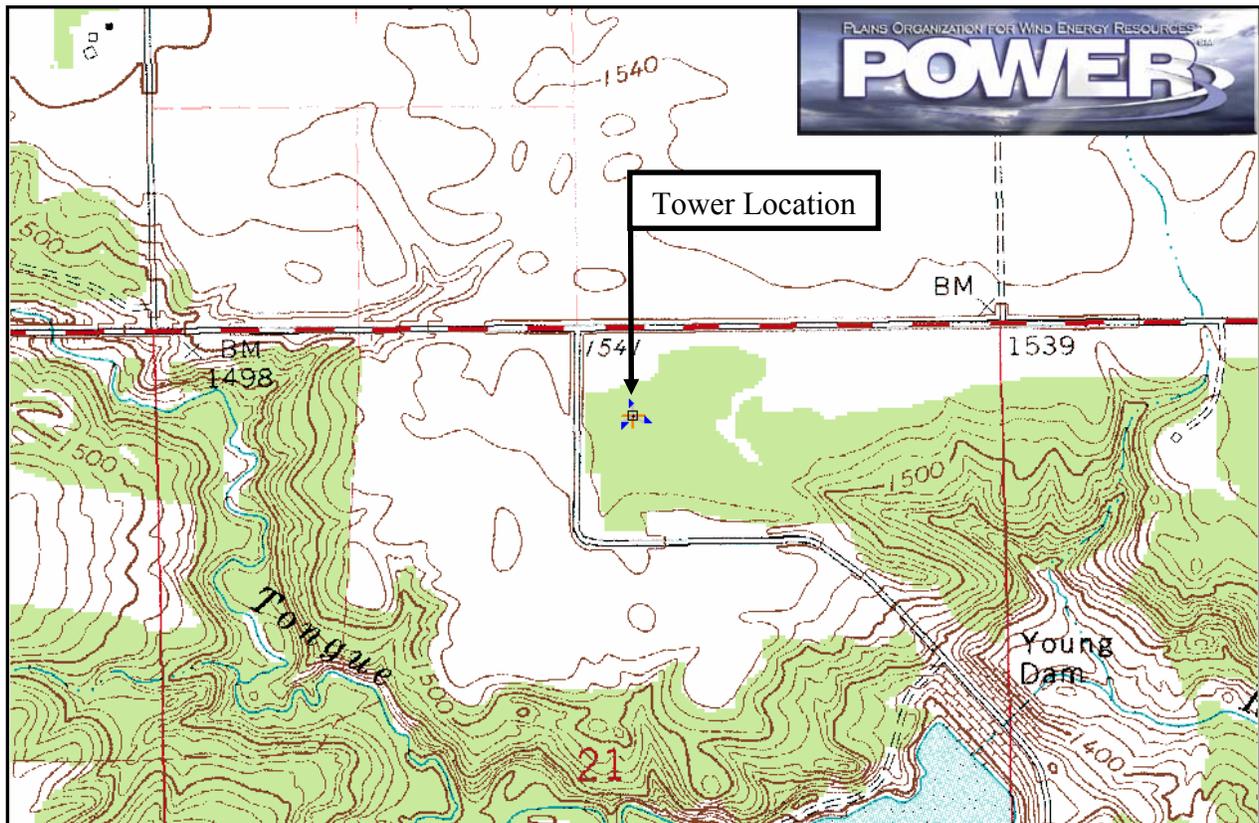
North Dakota Utility Study

Monitoring Period:^a 10/1/1994 – 5/8/1996

Site Description:

Latitude: N 48° 45' 34"	Township: 161 N
Longitude: W 98° 1' 30"	Range: 57 W
Elevation: 1540 feet	Section: 21
Tower Type: NRG Tilt-Up	Tower Height: 33 feet

The monitoring site was installed 2.7 miles south-southeast of the town of Olga, North Dakota. The site was located a half mile north of Young Dam and Tongue River in a relatively flat field. The tower was instrumented at one height, 33 feet (10 m). The vegetation around the site was a mixture of crops and trees. Trees and brush located primarily around the dam and river.



Summary Wind Data:	33 ft AGL^b
Mean Wind Speed	11.8 mph
Maximum, 60-min Mean Wind Speed	44.1 mph – 11/18/1994 5:00 a.m.
Estimated Wind Power Class^c	Class 3 (175 W/m ²)

^a Data recover rate for both wind speed and direction was 69%.

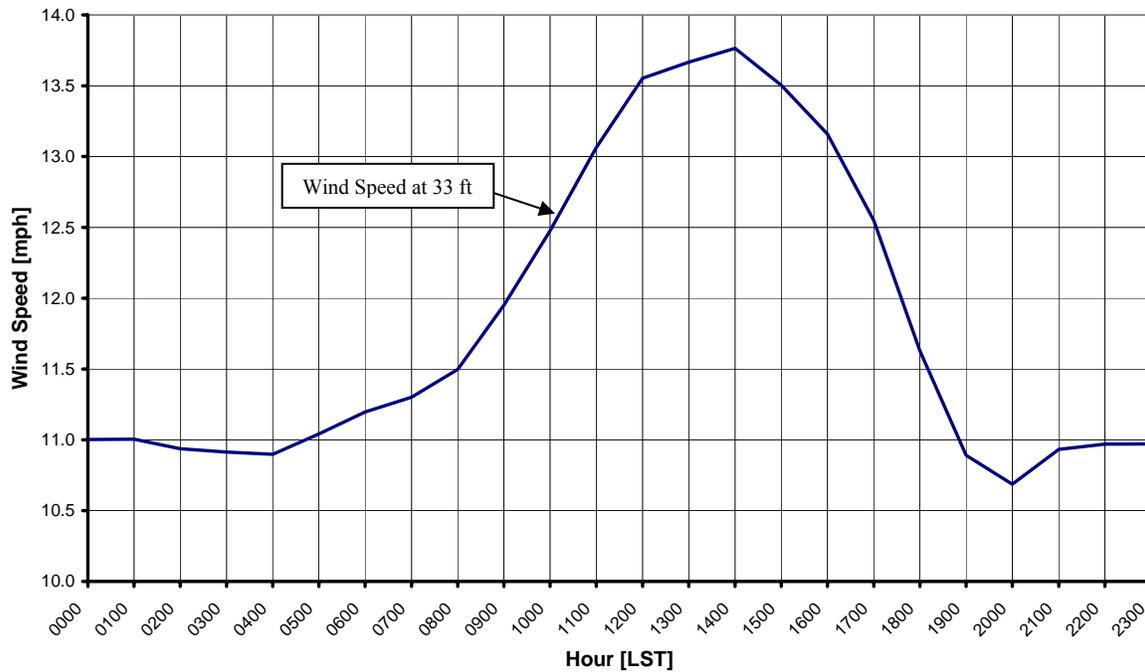
^b Above ground level.

^c Air temperature was not factored into calculation.

Average Hourly Wind Speeds

LST ^d	33 ft AGL	
	mph	m/s
0000	11.0	4.92
0100	11.0	4.92
0200	10.9	4.89
0300	10.9	4.88
0400	10.9	4.87
0500	11.0	4.94
0600	11.2	5.01
0700	11.3	5.05
0800	11.5	5.14
0900	12.0	5.34
1000	12.5	5.58
1100	13.1	5.84
1200	13.6	6.06
1300	13.7	6.11
1400	13.8	6.15
1500	13.5	6.04
1600	13.2	5.88
1700	12.5	5.61
1800	11.6	5.20
1900	10.9	4.87
2000	10.7	4.78
2100	10.9	4.89
2200	11.0	4.90
2300	11.0	4.90

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^d Local standard time.



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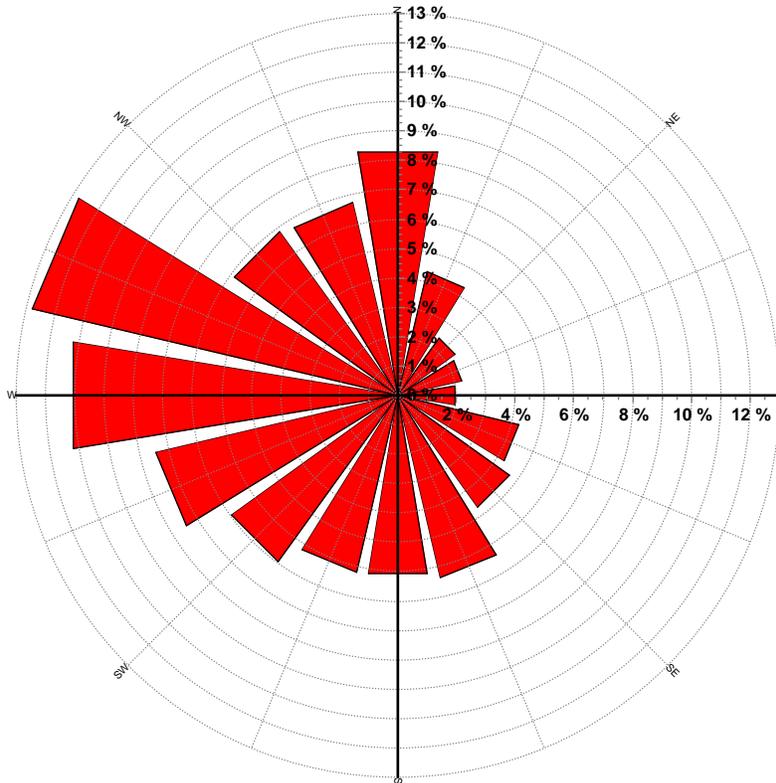
Creation Date: 9/22/2004

Wind Directional Frequency

Winds from the... Frequency (%)

NNW	6.7
NW	6.9
WNW	12.8
W	11.2
WSW	8.5
SW	7.0
SSW	6.2
S	6.1
SSE	6.4
SE	4.7
ESE	4.3
E	2.0
ENE	2.2
NE	2.4
NNE	4.3
N	8.4

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Wind Rose for 33-ft AGL
10/1/1994 - 5/8/1996



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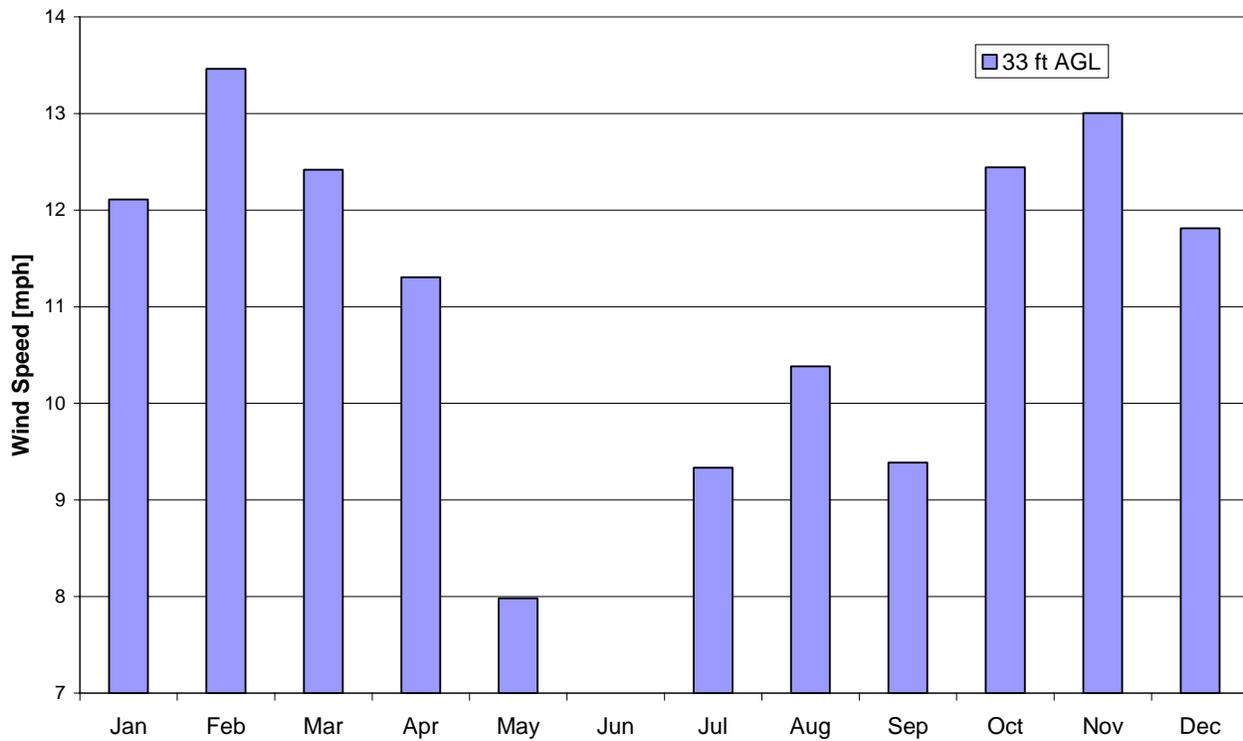
Monthly Wind Speed Averages

33 ft AGL

Month	mph	m/s
Jan	12.1	5.41
Feb	13.5	6.02
Mar	12.4	5.55
Apr	11.3	5.05
May	8.0	3.57
Jun*		
Jul	9.3	4.17
Aug	10.4	4.64
Sep	9.4	4.20
Oct	12.4	5.56
Nov	13.0	5.81
Dec	11.8	5.28

* No average due to poor data recovery.

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