

Wind Resource Summary for Luverne Site

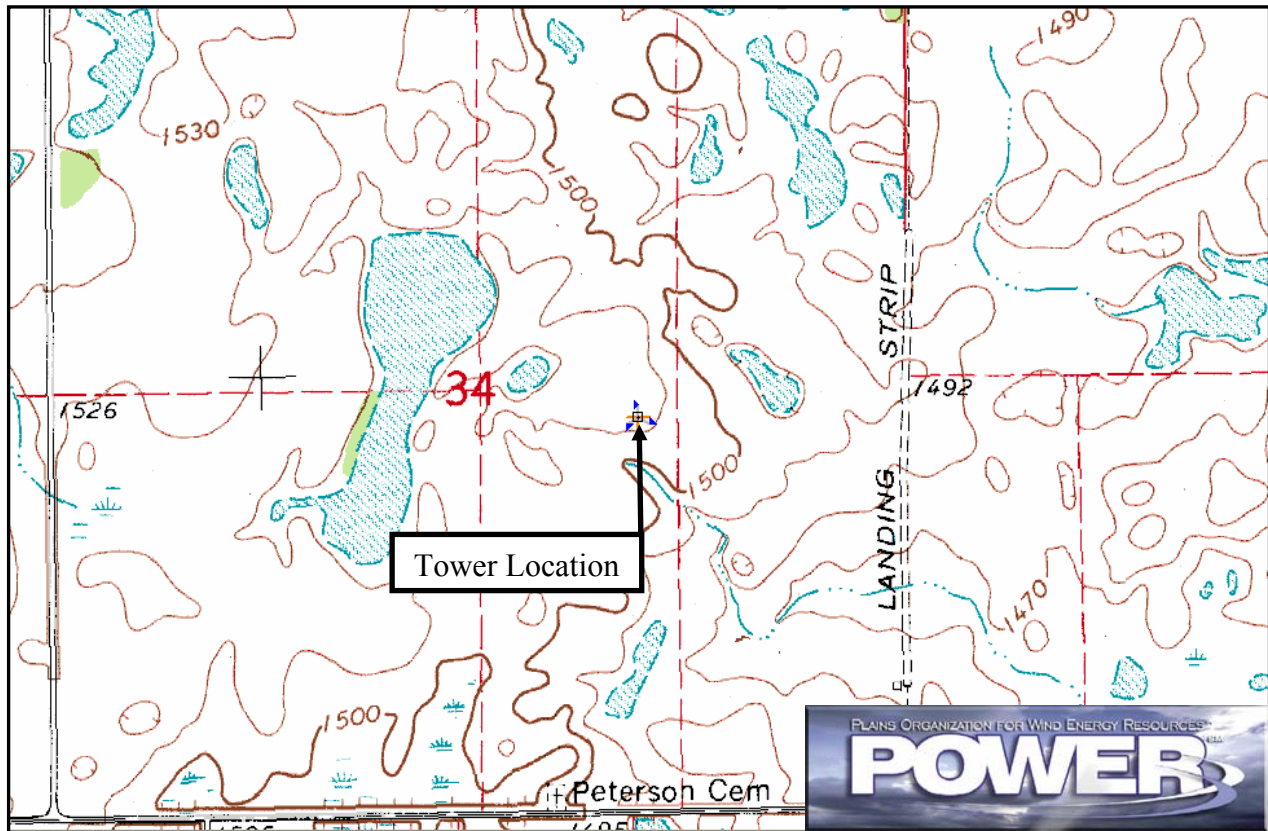
Griggs/Steele Wind Development Group, LLC

Falls^a 2000, 2001, 2002 & 2003

Site Description:

| | |
|--------------------------|------------------------|
| Latitude: N 47° 19' 57" | Township: 145 N |
| Longitude: W 97° 54' 27" | Range: 57 W |
| Elevation: 1510 feet | Section: 34 |
| | |
| Tower Type: NRG Tilt-up | Tower Height: 131 feet |

The monitoring site is 5.7 miles north-northeast of the town of Luverne, North Dakota. The tower is instrumented at three levels: 33 ft (10 m), 98 ft (30 m), and 131 ft (40 m). The site is 3.2 miles east of the Sheyenne River on the Pembina Escarpment. The land around the site is primarily cultivated fields with many small ponds and lakes in the area.



| Summary Wind Data: | 33 ft AGL ^b | 98 ft AGL | 131 ft AGL |
|---|--|-----------|------------|
| Mean Wind Speed | 12.4 mph | 15.5 mph | 17.2 mph |
| Maximum, 60-min Mean Wind Speed | 43.8 mph at 131 ft AGL – 11/29/2002 12:00 p.m. | | |
| Estimated Wind Power Class ^c | Class 4 (408 W/m ² at 131 ft AGL) | | |

^a Fall is defined as the months of September, October and November. Fall 2000 begins with September 2000.

Data recovery rates at 33, 98, and 131 feet were 97%, 96%, and 74%, respectively.

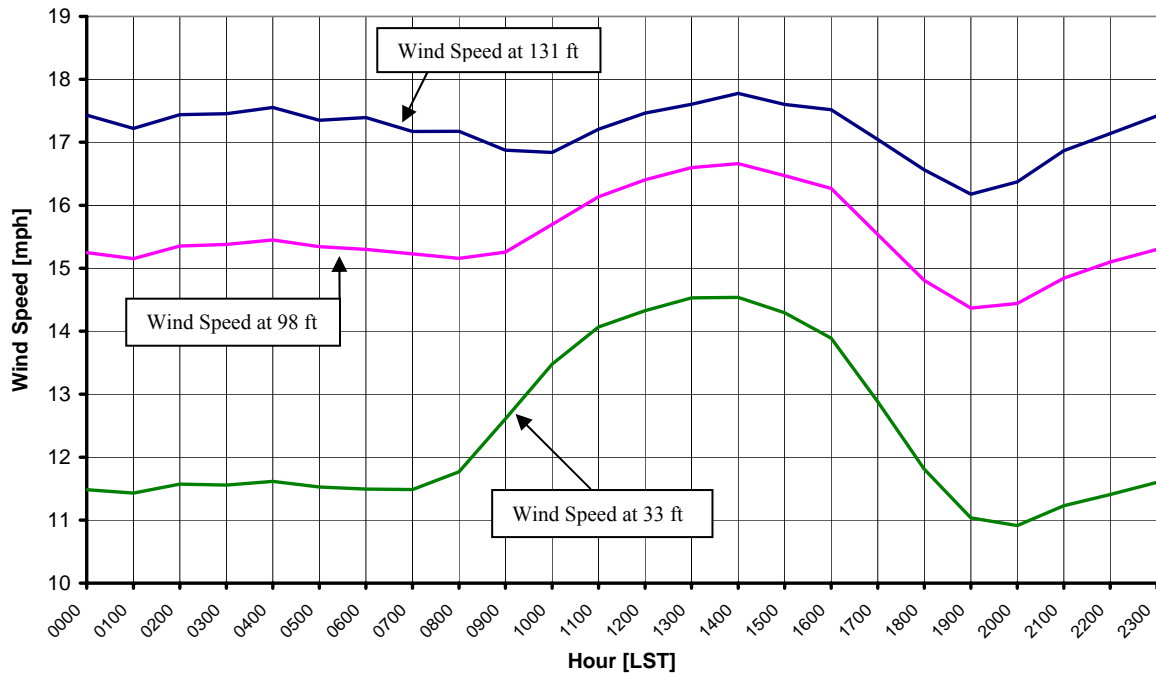
^b Above ground level.

^c Air temperature was not factored into calculations.

Average Hourly Wind Speeds

| LST ^d | 131 ft AGL | | 98 ft AGL | | 33 ft AGL | |
|------------------|------------|------|-----------|------|-----------|------|
| | mph | m/s | mph | m/s | mph | m/s |
| 0000 | 17.4 | 7.79 | 15.2 | 6.82 | 11.5 | 5.13 |
| 0100 | 17.2 | 7.70 | 15.2 | 6.77 | 11.4 | 5.11 |
| 0200 | 17.4 | 7.80 | 15.4 | 6.86 | 11.6 | 5.17 |
| 0300 | 17.5 | 7.80 | 15.4 | 6.88 | 11.6 | 5.17 |
| 0400 | 17.6 | 7.85 | 15.4 | 6.91 | 11.6 | 5.19 |
| 0500 | 17.4 | 7.76 | 15.3 | 6.86 | 11.5 | 5.15 |
| 0600 | 17.4 | 7.78 | 15.3 | 6.84 | 11.5 | 5.14 |
| 0700 | 17.2 | 7.68 | 15.2 | 6.81 | 11.5 | 5.13 |
| 0800 | 17.2 | 7.68 | 15.2 | 6.78 | 11.8 | 5.26 |
| 0900 | 16.9 | 7.54 | 15.3 | 6.82 | 12.6 | 5.64 |
| 1000 | 16.8 | 7.53 | 15.7 | 7.02 | 13.5 | 6.02 |
| 1100 | 17.2 | 7.69 | 16.1 | 7.21 | 14.1 | 6.29 |
| 1200 | 17.5 | 7.81 | 16.4 | 7.33 | 14.3 | 6.41 |
| 1300 | 17.6 | 7.87 | 16.6 | 7.42 | 14.5 | 6.50 |
| 1400 | 17.8 | 7.95 | 16.7 | 7.45 | 14.5 | 6.50 |
| 1500 | 17.6 | 7.87 | 16.5 | 7.36 | 14.3 | 6.39 |
| 1600 | 17.5 | 7.83 | 16.3 | 7.27 | 13.9 | 6.21 |
| 1700 | 17.0 | 7.62 | 15.5 | 6.94 | 12.9 | 5.76 |
| 1800 | 16.6 | 7.40 | 14.8 | 6.62 | 11.8 | 5.28 |
| 1900 | 16.2 | 7.23 | 14.4 | 6.42 | 11.0 | 4.93 |
| 2000 | 16.4 | 7.32 | 14.4 | 6.46 | 10.9 | 4.88 |
| 2100 | 16.9 | 7.54 | 14.8 | 6.64 | 11.2 | 5.02 |
| 2200 | 17.1 | 7.66 | 15.1 | 6.75 | 11.4 | 5.10 |
| 2300 | 17.4 | 7.79 | 15.3 | 6.84 | 11.6 | 5.18 |

**Griggs/Steele Wind Development Group LLC – Luverne Site
Falls 2000, 2001, 2002 & 2003**



^d Local standard time.



Energy & Environmental Research Center
701-777-5000 or bstevens@underc.org

Creation Date: 4/15/2005

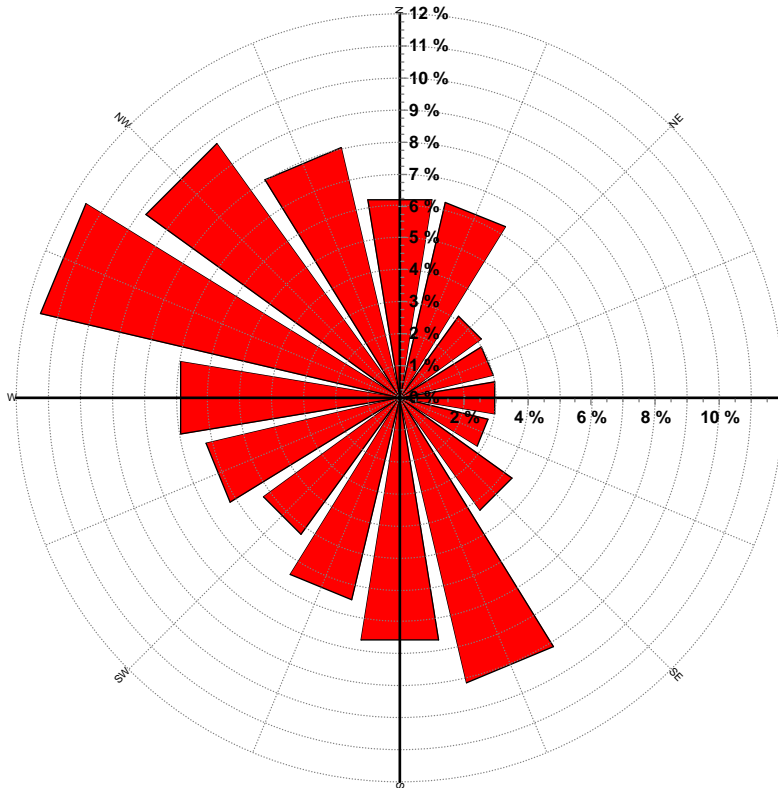
Wind Directional Frequency*

Winds from the... Frequency (%)

| | |
|-----|------|
| NNW | 8.0 |
| NW | 9.8 |
| WNW | 11.5 |
| W | 7.0 |
| WSW | 6.2 |
| SW | 5.3 |
| SSW | 6.5 |
| S | 7.6 |
| SSE | 9.2 |
| SE | 4.3 |
| ESE | 2.8 |
| E | 3.0 |
| ENE | 3.0 |
| NE | 3.2 |
| NNE | 6.3 |
| N | 6.3 |

* Wind direction vane inoperative during Falls 2001, 2002, and 2003.

Griggs/Steele Wind Development Group LLC – Luverne Site
Wind Rose for 131 ft AGL
Fall 2000



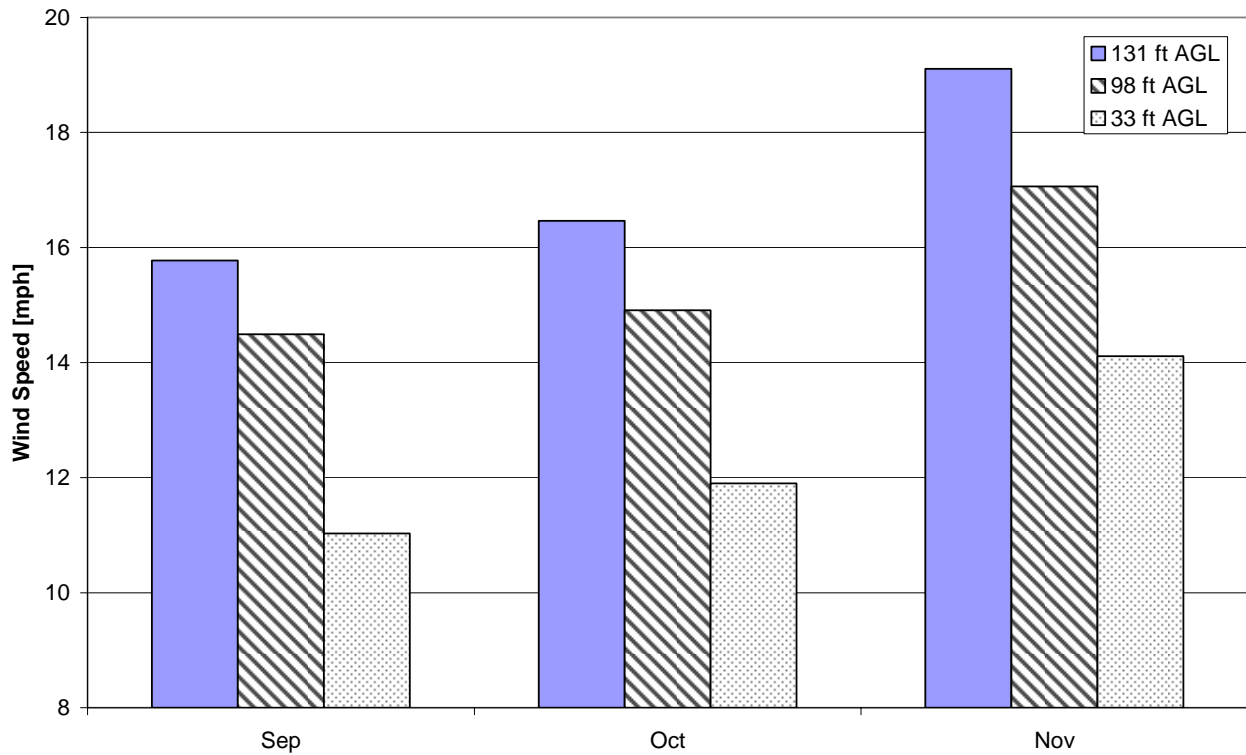
Energy & Environmental Research Center
701-777-5000 or bstevens@undeerc.org

Creation Date: 4/15/2005

Monthly Wind Speed Averages

| Month | 131 ft AGL | | 98 ft AGL | | 33 ft AGL | |
|-------|------------|------|-----------|------|-----------|------|
| | mph | m/s | mph | m/s | mph | m/s |
| Sep | 15.8 | 7.05 | 14.5 | 6.48 | 11.0 | 4.93 |
| Oct | 16.5 | 7.36 | 14.9 | 6.67 | 11.9 | 5.32 |
| Nov | 19.1 | 8.54 | 17.1 | 7.63 | 14.1 | 6.31 |

**Griggs/Steele Wind Development Group LLC – Luverne Site
Falls 2000, 2001, 2002 & 2003**



Energy & Environmental Research Center
701-777-5000 or bstevens@undeerc.org

Creation Date: 4/15/2005