

**STATE OF MINNESOTA
PUBLIC UTILITIES COMMISSION**

David Boyd
J. Dennis O'Brien
Tom Pugh
Phyllis Reha
Betsy Wergin

Chair
Commissioner
Commissioner
Commissioner
Commissioner

In the Matter of the Application of
Grant County Wind, LLC
for a Site Permit for a 20 Megawatt
Large Wind Energy Conversion
System and Associated Facilities in Grant
County

ISSUE DATE:

DOCKET NO. IP-6722/WS-09-341

**FINDINGS OF FACT, CONCLUSIONS
OF LAW AND ORDER, ISSUING A
SITE PERMIT TO GRANT COUNTY
WIND, LLC, FOR THE GRANT
COUNTY WIND FARM PROJECT**

The above-entitled matter came before the Minnesota Public Utilities Commission (Commission) pursuant to an application submitted by Grant County Wind, LLC, (GCW) on its own behalf and as agent for each of its ten generating members, for a site permit to construct, operate, maintain and manage a 20 Megawatt (MW) nameplate capacity Large Wind Energy Conversion System (LWECS) and associated facilities in Grant County.

All of the proposed wind turbines and associated facilities will be located in Grant County. Associated facilities will include pad mounted step-up transformers for each wind turbine, access roads, an electrical collection and feeder system, project substation, and one permanent meteorological tower. The energy from the proposed 20 MW project will be delivered from the project substation to the electrical grid at the existing Roseville substation.

STATEMENT OF ISSUE

Should Grant County Wind, LLC (GCW) be granted a site permit under Minnesota Statutes section 216F.04 to construct a 20 MW Large Wind Energy Conversion System in Grant County?

Based upon the record created in this proceeding, the Public Utilities Commission makes the following:

FINDINGS OF FACT

Background and Procedure

1. On April 29, 2009, Grant County Wind, LLC, filed a site permit application with the Public Utilities Commission for the 20 MW Grant County Wind Farm Project and associated facilities. Exhibit 1.
2. Office of Energy Security (OES) Energy Facility Permitting (EFP) staff reviewed and determined that the April 29, 2009, application complied with the application requirements of Minnesota Rules, part 7854.0500. In its comments and recommendations to the Commission, dated June 11, 2009, OES EFP staff recommended that the Commission accept the application. Exhibit 2.
3. On July 9, 2009, a Commission Order accepted the application for the Grant County Wind Farm project. Exhibit 3.
4. On July 16, 2009, OES EFP staff issued a “Notice of Application Acceptance” to receive comments on the permit application. Exhibit 4.
5. On July 21, 2009, GCW distributed copies of the “Site Permit Application for the Grant County Wind Farm Project and Notice of Application Acceptance, to government agencies and residences. Exhibit 6
6. Published notice of site permit application acceptance, and opportunity to comment on the permit application appeared in the *Grant County Herald*, on July 22, 2009. (Exhibit 5). The published notice provided: a) description of the proposed project; b) deadline for public comments on the application; c) description of the Commission site permit review process; and d) identification of the public advisor. The notice published meets the requirements of Minnesota Rules, Part 7854. 0900 subp 2.
7. Public comments on the completeness of the site permit application were accepted until August 7, 2009. Two comment letters were received and they are summarized in the OES Comments and Recommendations presented to the Commission at its August 20, 2009, meeting in conjunction with the request for issuance of a “Draft Site Permit” for the Grant County Wind Farm Project. Exhibit 7.
8. On August 25, 2009, a Commission Order issued a “Draft Site Permit” for the Grant County Wind Farm Project. Exhibit 8.
9. On August 24, 2009, OES EFP staff published in the *EQB Monitor* notice of the, application acceptance, public information meeting, and opportunity to comment on the permit application and the draft site permit, Volume 33, No. 17, August 24, 2009. (Exhibit 10, pages 12-15). The published notice contained all of the information required by Minnesota Rules part 7856.0900 subp. 1. Notice also appeared on the Commission web site on August 27, 2009.

10. Published notice of site permit application acceptance, and opportunity to comment on the permit application and draft site permit appeared in the *Grant County Herald*, on August 26, 2009. Exhibit 12. The published notice provided: a) location and date of the public information meeting; b) description of the proposed project; c) deadline for public comments on the application and draft site permit; d) description of the Commission site permit review process; and e) identification of the public advisor. The notice published meets the requirements of Minnesota Rules, Part 7854.0900 subp 2.
11. On August 27, 2009, GCW sent a copy of the Notice of the Public Information Meeting and opportunity to comment on the Draft Site Permit and site permit application to residences and governmental agencies. Exhibit 11.
12. The OES EFP staff held a public information meeting on the evening of September 8, 2009, in Hoffman to provide an overview of the Commission permitting process and to receive comments on the site permit application and draft site permit. Approximately 40 people attended the meeting. Representatives from the GCW and its contractors were also present. OES EFP staff provided an overview of the LWECs site permitting process, the draft site permit and responded to questions. OES EFP staff and GCW responded to project specific questions and general questions about wind energy. The only Project specific question was about the installation of appropriately sized culverts for drainage. The deadline for submitting comments on the site permit application, draft site permit was September 23, 2009.
13. One written comment letter was received from the Minnesota Department of Natural Resources, dated September 23, 2009, requesting a copy of the biological survey prior to the start of construction. Exhibit 13.

Permittee

14. Grant County Wind, LLC, on its own behalf and as agent for each of its 10 generating members has submitted a site permit application for the proposed 20 megawatt (MW) project in Grant County. The Project is currently owned by 10 separate limited liability companies (Member Companies): Rafter P Wind, LLC, Western Minnesota Wind 1, LLC, Western Minnesota Wind 2, LLC, Western Minnesota Wind 3, LLC, Western Minnesota Wind 4, LLC, Western Minnesota Wind 5, LLC, Roseville Wind 1, LLC, Roseville Wind 2, LLC, Roseville Wind 3, LLC and Roseville Wind 4, LLC. As currently structured, each of the Member Companies intends to own one turbine and related roads and electrical facilities. GCW will own the common feeder system between turbines and the substation and interconnection facilities serving all turbines, and is party to the interconnection agreement with Otter Tail Power Company as interconnection service provider. Each Member Company is owned by two or more local individuals, consistent with CBED eligibility requirements. For purposes of this Application, the Permittee will be Grant County Wind, LLC.

Project Description

15. The Grant County Wind Farm Project is comprised of 10 Suzlon 2 MW wind turbine generators mounted on freestanding tubular towers and associated facilities.
16. The towers will be 80 meters (262 feet) in height. The turbine rotor diameter is 88 meters (289 feet) across. The overall height of the tower, nacelle and blade will be approximately 125 meters (410 feet) when one blade is in the vertical position.
17. The project will also include an underground automated supervisory control and data acquisition system (SCADA) for communication purposes. One permanent free standing 80 meter meteorological tower will be used as part of the communication system. Other components of the project include a concrete and steel foundation for each tower, pad-mounted step-up transformers, all weather class 5 roads of gravel or similar material, and an underground energy collection system and a project substation.
18. The Suzlon S88 2 MW wind turbine is a three bladed, upwind, active yaw, and active aerodynamic control regulated wind turbine with power/torque control capabilities. Each turbine is equipped with a wind direction sensor. The wind direction sensor communicates with the computer system, which evaluates the measured wind parameters, and within a specified time interval, activates the yaw drives to align the nacelle to the wind direction.
19. Each turbine is interconnected through an underground electrical collection system at 34.5 kV. The feeder lines from the project collection system feed the power to the independent breaker positions at the proposed project substation. The project substation steps up the voltage from the 34.5 kV collection systems to the transmission system level. All of the proposed feeder lines would connect to the proposed project substation within the site permit boundaries.
20. The blades will be either white or grey in color. The blades will be equipped with lightning protection. The entire turbine is also grounded and shielded to protect against lightning.
21. Each tower will be secured by a concrete foundation that will vary in size depending on the soil conditions. A control panel that houses communication and electronic circuitry is placed in each tower. In addition, a step-up, pad-mounted transformer is necessary for each turbine to collect the power from the turbine and transfer it to a 34.5 kV collection system via underground cables.
22. All turbines and the one permanent one permanent meteorological tower will be interconnected with fiber optic communication cable that will be installed underground. The communication cables will run back to a central host computer which will be located either at the project substation or at a facility where a supervisory control and data acquisition (SCADA) system will be located. Signals from the current and potential transformers at each of the delivery points will also be fed to the central SCADA host computer. The SCADA system will be able to give status indications of the individual

wind turbines and the substation and allow for remote control of the wind turbines locally or from a remote computer. This computerized supervisory control and data acquisition network will provide detailed operating and performance information for each wind turbine. The Permittee will maintain a computer program and database for tracking each wind turbine's maintenance history and energy production.

23. Housed inside the fiberglass nacelle that sits on the top of the tower are the generator, brake system, yaw drive system and other miscellaneous components.

Site Location and Characteristics

24. The 20 MW Grant County Wind Farm Wind Project will be located in southeastern Grant County, approximately five miles west of Hoffman. The Project site includes portions of sections 13, 14 and 24 in Roseville Township. The township is zoned agricultural. The topography within the site is relatively flat. Elevation varies from 1,200 to 1,220 feet above mean sea level. The dominant land use is agricultural, comprised of corn and soybeans. The Project boundary encompasses approximately 800 acres.
25. Construction of the turbines sites and access roads will involve temporarily disturbing at the most approximately five acres of land per turbine or approximately 50 acres for contractor staging areas, foundation construction, underground power lines, and tower and turbine assembly. Permanent roads are expected to be about 16 feet wide. The permanent displacement for turbine access roads and for towers and transformers and areas around them is about 10 to 20 acres for the Grant County Wind Farm Project.
26. Wind turbine and road access will be sited to take into account the contours of the land and prime farmland locations to minimize impact. The Project will be subject to the requirements of the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Construction Stormwater Permit. An erosion and sediment control plan and Storm Water Pollution Prevention Plan (SWPPP) will also be prepared for the Project and the disturbed areas will be seeded after construction to stabilize the area.

Wind Resource Considerations

27. The Project area has an average estimated wind speed of 7.71 meters per second (17.25 miles per hour) at the 80 meter (262 foot) hub height). Wind speeds are generally greater in the night and early morning hours and decline at midday. Regionally, the prevailing wind directions are generally south-southeast and northwest. There exist differences in diurnal production from season to season where the summer has a large change in production from night to day. Conversely the wind and spring months exhibit more consistent wind speeds throughout the day. Of the annual energy budget, a higher percentage results from southerly winds, which are most frequent in the warmer weather months. The north and northwest winds typically occur in winter.

28. For this project, turbines will be sited so as to have good exposure to winds from all directions with emphasis on exposure to the prevailing southerly and northwesterly wind directions. The turbine spacing, according to GCW's application, maximizes use of the available wind and minimizes wake and array losses within the topographical context of the site. The turbines are typically oriented east to west, which is roughly perpendicular to the prevailing southerly and northwest winds. Turbine placement, aside from other resource features where setbacks or wind access buffers are required, will be designed to provide sufficient spacing between the turbines to minimize internal wake losses. Given the prevalence for southerly and northerly winds, the spacing is widest in the north-south direction. Greater or lesser spacing between the turbines or turbine strings may be used in areas where the terrain dictates the spacing. This is addressed in the permit at III.E.5. Sufficient spacing between the turbines is utilized to minimize wake losses when the winds are blowing parallel to the turbines.
29. Assuming net capacity factor of 36 percent, projected average annual output will be about 61,651 MWh per year. The net annual energy output per turbine is estimated to be approximately 5,991 to 6,375 MWh (megawatt hours) per year. The base energy calculation presented assumes a normal or average wind year.

Land Rights and Easement Agreements

30. In order to build a wind plant, a developer needs to secure site leases and easement option agreements to ensure access to the site for construction and operation of a proposed project. These lease or easement agreements also prohibit landowners from any activities that might interfere with the execution of the proposed project.
31. GCW has obtained lease and easement option agreements and/or rights to such agreements with landowners for land within the project site boundary necessary for installation of the components of the wind farm. These rights and easements will be used to site the turbines and all associated facilities and provide the necessary wind access buffers and setbacks.
32. GCW has options, leases or easement on the land and wind rights necessary within the site to build the Project. However, additional wind rights and buffers may need to be obtained to comply with draft site permit setback requirements. Land and wind rights will need to encompass the proposed wind farm and all associated facilities, including but not limited to wind and buffer easements, wind turbines, access roads, meteorological towers, electrical collection system and electric lines located on or along public road rights-of-way.

Site Criteria

33. Minnesota Rules chapter 7854 applies to the siting of Large Wind Energy Conversion Systems. The rules require an applicant to provide a substantial amount of information to allow the PUC to determine the potential environmental and human impacts of the proposed project and whether the project is compatible with environmental preservation,

sustainable development, and the efficient use of resources. Minn. Rules Parts 7854.0500 through 7854.0600. The following analysis addresses the relevant criteria that are to be applied to a LWECS project.

Human Settlement, Public Health and Safety

34. The site is in an area of relatively low population density, characteristic of rural areas throughout west central Minnesota. GCW's turbine locations will be at least 900 feet from the closest residence within the site. GCW will also maintain a set back of five rotor diameters (1,445 feet) on the prevailing wind axis from non-participating landowner's property lines and three rotor diameters (867 feet) on the non-prevailing wind axis. GCW's proposed project design will comply with the Minnesota Pollution Control Agency (PCA) noise standards. As a result, the impact of the proposed LWECS on human settlement, public health and safety will be minimal. The site permit, at part III.C has conditions for setbacks from residences and roads. The proposed wind turbine layout will meet or exceed those requirements. The proposed project is not expected to affect any water wells (used, unused or unsealed) or any rural water system that services the area.
35. There will be no displacement of existing residences or structures in siting the wind turbines and associated facilities.
36. The Permittee will provide security during construction and operation of the project, including fencing, warning signs, and locks on equipment and facilities. The Permittee will also provide landowners and interested persons with safety information about the project and its facilities. See site permit condition III.B.15.
37. In winter months ice may accumulate on the wind turbine blades when the turbines are stopped or operating very slowly. Furthermore, the anemometer may ice up at the same time, causing the turbine to shut down during any icing event. As weather conditions change, any ice will normally drop off the blades in relatively small pieces before the turbines resume operation. This is due to flexing of the blades and the blades' smooth surface. Although turbine icing is an infrequent event, it remains important that the turbines are not sited in areas where regular human activity is expected below the turbines during the winter months.
38. Each turbine will be clearly labeled to identify each unit and a map of the site with the labeling system will be provided to local authorities as part of the fire protection plan. See permit condition III.B.17.

Noise

39. Background noise levels in the Project Area are typical of those in a rural setting, where existing nighttime noise levels are commonly in the low to mid-30 dBA. The dBA scale represents A-weighted decibels based on the range of human hearing. Higher levels exist near roads and other areas of human activity. Wind conditions in the Project Area tend to increase ambient noise levels compared to other rural areas. Noise levels were calculated

using the Suzlon S88 wind turbine for the site. The computer modeling program assumes all turbines in the Project are operating simultaneously and winds speed of 8 m/s (17.9 mph) are occurring, which represents the wind speed when maximum noise levels of 107.5 dBA are expected at hub height.

40. Noise levels predicted by computer models were compared to the Minnesota Pollution Control Agency Daytime and Nighttime L10 and L50 Limits as stated in Minn. Rule 7030.0040. These standards describe the limiting levels of sound established on the basis of present knowledge for the preservation of public health and welfare. These standards are consistent with speech, sleep, annoyance, and hearing conversation requirements for receivers within areas grouped according to land activities by the Noise Area Classification (NAC) system established in Minn. Rule. 7030.0050. The NAC-1 was chosen for receivers in the Project Area since this classification includes farm houses as household units. Daytime and nighttime limits for this classification are (1) L50 limit of 60 dBA and L10 limit of 65 dBA in daytime, and (2) L50 limit of 50 dBA and L10 limit of 55 dBA at nighttime. The nighttime L50 limit of 50 dBA is the most stringent limit.
41. Wind turbines, when in motion, do generate sound or noise. The level of sound (noise) varies with the speed of the turbine and the distance of the listener or receptor from the turbine. On relatively wind days, the turbines create more noise; however, the ambient or natural wind noise levels tend to override the turbine noise as distance from the turbine increases.
42. Noise impacts to nearby residents and other potentially affected parties will be factored into the turbine micro-siting process. The noise contour map in the application demonstrates that the turbine layout will ensure compliance with PCA noise standards. See permit condition III.E.3.

Visual Values

43. The placement of 10 turbines for the Grant County Wind Farm Project, will affect the appearance of the area. The wind turbines will be mounted on tubular towers that are 262 feet tall. The rotor blades will have a diameter of 289 feet. The turbine towers and rotor blades will be prominent features on the landscape. There will be intermittent, expansive views of the turbines to passing motorists on State Highway 59 and local roads. Motorists and drivers on local township and county roads may travel within 300 feet of some turbines.
44. The visual impact of the wind turbines will be reduced by the use of a neutral paint color. The only lights will be those required by the Federal Aviation Administration. All site permits issued by the Commission require the use of tubular towers; therefore, the turbine towers will be uniform in appearance. Blades used in the proposed project will be white or grey. The wind turbines in this project, while prominent on the landscape, also blend in with the surrounding area. The project site will retain its rural character. The turbines and associated facilities necessary to harvest the wind for energy are not inconsistent with existing agricultural practices.

45. From one perspective, the proposed project might be perceived as a visual intrusion on the natural aesthetic value on the landscape, characterized by up to 10 tubular steel structures approximately 262 feet high, standing on formerly undisturbed high-ground, with 142 foot long blades, for an overall height of 410 feet approximately when one blade is in the vertical position. Wind plants have their own aesthetic quality, distinguishing them from other non-agricultural uses. Existing wind plants have altered the landscape elsewhere in Minnesota from agricultural to wind plant/agricultural. This project will modify the visual character of the area. Because wind generation development is likely to continue in Grant County, this visual presence will continue to increase as wind development occurs. To date, the presence of the wind turbines in other parts of Minnesota has been well accepted by the people who live and work in those areas.
46. Visually, the Grant County Wind Farm Project will be similar to other LWECS projects located on Buffalo Ridge and southeastern Minnesota.

Recreational Resources

47. Recreational opportunities in Grant County include hiking, biking, boating, fishing, camping, swimming, horseback riding, skiing, hunting, and nature viewing. Because the Project site encompasses only agricultural land, farmsteads and a few woodlots, turbine operations are not expected to affect any natural areas in any material way and no adverse impact on wildlife management practices are expected.

Public Services and Infrastructure

48. The primary transportation arteries through the project Area include State Highway 59 which runs north-south along the east side of the Project site and State Highway 27 which runs east to west and is north of the Project site. Other roads in the vicinity of the Project site are local township roads. The Project will impact roads on a short-term basis, and the Permittee is responsible for damages to roads.
49. Microwave beam path analysis work will avoid conflicts with the Fresnel zones. GCW will also place towers so as to avoid interfering with land mobile facilities.
50. The proposed project will have several thousand feet of underground cables for the collector lines on private property within the wind farm. The underground cables will be installed in a trench that is at least 48 inches in depth. Most of the underground electric circuits will parallel existing turbine maintenance roads or public road rights-of-way. However, some of these underground circuits may cross private rights-of-way. Placement of collector and feeder lines is addressed in the site permit at III.E.7 and 8. The proposed wind farm is expected to have a minimal effect on the existing infrastructure.
51. The project will require the use of public roads to deliver construction supplies and materials to the work site. Site permit condition III.B.8. addresses this topic. Wear and tear on roads will occur as a result of the transport of heavy equipment and other materials. The site permit at III.B.8, addresses road damages. Construction of the project

requires the addition of access roads that will be located on private property. The access roads will be routed along the wind turbines, fence lines, and field edges to minimize disturbance to agricultural activities. The typical access road will be 15 to 20 feet in width and covered in Class 5 gravel (or similar material). The access roads will be low profile roads to allow for the movement of agricultural equipment. The site permit at III.B. 8 (b) addresses this topic. During operation and maintenance of the wind plant, operation and maintenance crews, while inspecting and servicing the wind turbines, will use access roads. Periodic grading and maintenance activities will be used to maintain road integrity. The Permittee may do this work or contract it out.

52. If access roads are installed across streams or drainage ways, the Permittee in consultation with the Minnesota Department of Natural Resources will design, shape and locate the road so as not to alter the original water flow or drainage patterns. Any work required below the ordinary high water line, such as road crossings or culvert installation, will require a permit from the Minnesota Department of Natural Resources. See site permit at III.K.7.
53. The proposed wind farm will not affect water supplies, railroads, telecommunication facilities, and radio reception. The presence or operation of the wind plant could potentially impact the quality of television reception in the area. Previous work on television reception issues indicates that in some cases new antennas or relocation of existing antennas can restore television signal strength reception. The Permittee will address the concerns of residents in the area of the project site before and after project construction to document and mitigate any television reception impacts that might occur. This is addressed in the site permit at III.D.3.
54. Construction, operation, and maintenance of the proposed wind plant will comply with all of the required federal and state permit requirements. See site permit at III.K.7.

Community Benefits

55. The Grant County Wind Farm Project will pay an annual Wind Energy Production Tax to the Grant County and Roseville Township. Landowners with turbine(s) and/or wind easements on their property will also receive payments from the Permittee.
56. To the extent that local workers and local contractors are capable, qualified, and available, GCW will seek to hire them to construct the proposed project. The hiring of local people will expand employment opportunities in this area of the state and keep money in the local economy. Once constructed, the project will be staffed with site technicians.

Effects on Land-Based Economies

57. The wind turbines and access roads will be located so that the most productive farmland will be left as intact as possible. However, the total amount of agricultural land

permanently displaced will be no more than 20 acres. The site permit at III.B. 2., 3., 4., 5., 6., 7., 8(c), 9., and 10. addresses mitigation measures for agricultural lands. The proposed project does not adversely affect any sand or gravel operations.

Archaeological and Historical Resources

58. In a June 2006 letter to the applicant the Minnesota State Historic Preservation Office (SHPO) indicated there are no properties listed on or eligible for listing on the National Register of Historic Places that will be affected by the Project. A follow up letter from SHPO dated January 21, 2009, indicated that an archaeological survey was recommended. The site permit at III. D.2. requires the Permittee to conduct an archaeological reconnaissance survey (Phase I). An archaeology reconnaissance survey consists of the following tasks: consultation, documentation, and identification. It provides enough information to allow consideration of avoidance if a site is to be impacted by an undertaking and to gather enough information to allow for reasonable recommendations for more detailed work should it be necessary.
59. If any archaeological sites are found during the Phase I survey, their integrity and significance should be addressed in terms of the site's potential eligibility for placement on the National Register of Historic Places (NRHP). If such sites are found to be eligible for the NRHP, appropriate mitigative measures will need to be developed in consultation with the Minnesota State Historic Preservation Officer (SHPO), the State Archaeologist, and consulting American Indian communities. The site permit (III.D.2.) also requires the Permittee to stop work and notify the Minnesota Historical Society and Commission if any unrecorded cultural resources are found during construction.

Air and Water Emissions

60. No harmful air or water emissions are expected from the construction and operation of the LWECs.

Animals and Wildlife

61. With proper planning neither construction nor operation of the Project is expected to have a significant impact on wildlife. Based on studies of existing wind power projects in the United States and Europe, the only impact of concern to wildlife would primarily be to avian and bat populations. The final report on avian monitoring studies at Buffalo Ridge, Minnesota "Final Report-Avian Monitoring Studies at the Buffalo Ridge, Minnesota Resource Area: Results of a 4-Year Study" (September 2000) identified the following impacts:
 - 61a. Following construction of the wind turbines, there is a reduction in the use of the area within 100 meters of the turbines by seven of 22 species of grassland breeding birds. It was hypothesized that lower avian use may be associated with avoidance of turbine noise, maintenance activities, and less available habitat. The researchers stated "on a

large scale basis, reduced use by birds associated with wind power development appears to be relatively minor and would not likely have any population consequences on a regional level.” (p. 44)

- 61b. Avian mortality appears to be low on Buffalo Ridge, compared to other wind facilities in the United States, and is primarily related to nocturnal migrants. Resident bird mortality is very low and involves common species. The researchers stated that “based on the estimated number of birds that migrate through Buffalo Ridge each year, the number of wind plant related avian fatalities at Buffalo Ridge is likely inconsequential from a population standpoint.” (p. iv)
- 61c. Bat mortality was also studied at Buffalo Ridge, instigated by bat collision victims found during the avian monitoring studies. The bat study was conducted in 2001 and 2002. (“Bat Interactions with Wind Turbines at the Buffalo Ridge, Minnesota Wind Resource Area,” November 2003). The overall conclusion is that bat activity at turbines and the numbers of bat fatalities do not share a statistical relationship. Bat collisions were found to be very rare, given the amount of bat activity documented at the turbines. Most fatalities involved migrating or dispersing bats occur in the fall. Fatality estimates at Buffalo Ridge indicate that the population of bats susceptible to turbine collisions is large, and that the observed number of fatalities “is possibly not sufficient to cause significant, large-scale population declines.” (p. 6-1)
62. Mitigation measures are prescribed in the site permit and include but are not limited to: a) a pre-construction inventory of existing biological resources, native prairie, state listed and threatened species and wetlands in the project area (Site Permit III.D.1); and b) turbines and associated facilities will not be constructed in wildlife management areas, recreation and state scientific and natural areas or parks (Site Permit III.C.4) and a 5 by 3 rotor diameter setback is provided (Site Permit III.C1). The site permit has requirements to implement sound water and soil conservation practices during construction and operation of the project throughout the Project’s life in order to protect topsoil and adjacent resources and to minimize soil erosion (Site Permit III.B.9). This also applies to any work in proximity to watercourses (Site Permit III.C.5).
63. In its September 23, 2009 letter, the DNR requested an opportunity to review the biological survey prior to the start of construction. Exhibit 13. DNR will be provided with a copy of the biological survey prior to construction.

Vegetation

64. No public waters, wetlands or forested land are expected to be adversely affected by the project. No groves of trees or shelterbelts will need to be removed to construct and operate the system. Native prairie will also be avoided. If native prairie cannot be avoided, the site permit, at III. C.6., provides for preparation of a prairie protection and management plan.

Soils

65. Construction of the wind turbines and access roads in farmland increases the potential for erosion during construction. The site permit at III. B. 9. requires a soil erosion and sediment control plan. The project will also require a storm water run-off permit from the Minnesota Pollution Control Agency.

Surface Water and Wetlands

66. Access roads or utility lines will not be located in surface water or wetlands, unless authorized by the appropriate permitting agency. See site permit at III.C.5.

Future Development and Expansion

67. Current information suggests windy areas in this part of the state are large enough to accommodate more wind facilities. In the future, wind turbines used in Grant and surrounding counties will consist of several types and sizes supplied by different vendors and installed at different times.
68. While large-scale projects have occurred elsewhere (Texas, Iowa and California), little systematic study of the cumulative impact has occurred. Research on the total impact of many different projects in one area has not occurred. OES EFP staff will continue to monitor for impacts and issues related to wind energy development.
69. The Commission anticipates more site permit applications under Minnesota Statutes section 216F.04 (a). The Commission is responsible for siting of LWECs “in an orderly manner compatible with environmental preservation, sustainable development, and the efficient use of resources.” Minnesota Statutes section 216F.03.
70. Minnesota Statutes section 216E.03, subd. 7 requires consideration of design options that might minimize adverse environmental impacts. By using larger turbines, fewer turbines are required, reducing siting needs for turbines and related facilities. Turbines must also be designed to minimize noise and aesthetic impacts. Buffers between strings of turbines are designed to protect the turbines’ production potential. The site permit also provides for buffers between adjacent wind generation projects to protect production potential. See site permit at III.C.1.
71. The location and spacing of the turbines are critical to the issues of orderly development and the efficient use of wind resources. Turbines are likely to be located in the best winds, and the spacing dictates, among other factors, how much land area the project occupies. There is strong public support for orderly development.
72. One efficiency issue is the loss of wind in the wake of turbines. When wind is converted to rotational energy by the blades of a wind turbine, energy is extracted from the wind. Consequently, the wind flow behind the turbine is not as fast and is more turbulent than the free-flowing wind. This condition persists for some distance behind the turbine as

normal wind flow is gradually restored. If a turbine is spaced too close downwind of another, it produces less energy and is less cost-effective. This is the wake loss effect. If the spacing is too far, wind resources are wasted and the projects' footprint on the land is unnecessarily large.

73. For this project, turbine spacing maximizes use of the available wind resources and minimizes wake and array losses within the topographical context of the site. Site topography, natural resource features and wind resources did not lead to a layout involving long strips of turbines running parallel to each other and perpendicular to the prevailing wind. The objective is to capture the most net energy possible from the best available wind resource. Allowing for setbacks from roads and residences and avoiding sensitive areas, GCW arrived at a nominal turbine spacing of 3 rotor diameters in the non-prevailing wind directions and five or more rotor diameters in the prevailing wind directions, northwest-southerly direction, with respect to the predominant energy production directions. Given the prevalence for southerly winds, the spacing between turbines will be greater in the prevailing winds in the northwest-southerly direction for the Grant County Wind Farm Project. GCW does not expect significant wake loss.
74. Other factors that lead to energy production discounts include turbine availability, blade soiling, icing, high wind hysteresis, cold weather shutdown, electrical efficiency and parasitic. Total losses typically range from 13 to 16 percent.

Maintenance

75. Maintenance of the turbines will be on a scheduled, rotating basis. Maintenance on the interconnection point will be scheduled for low wind periods. The Grant County Wind Project will be staffed with wind technicians as necessary. At this time there are no plans for an operations and maintenance building. If an operation and maintenance facility will be necessary, it will be permitted by the local unit of government.

Decommissioning and Restoration

76. GCW expects that the life of the Project will be no less than 25 years and reserves the right to re-apply for a LWECS site permit and continue operation of the Project. LWECS site permit renewal may be under a new long-term power purchase agreement (PPA), merchant operation of the Project, or replacement and re-powering of the Project.
77. Decommissioning activities will include (1) removal of all wind turbine components and towers; (2) removal of all pad mounted transformers; (3) removal of all above-ground distribution facilities; (4) removal of foundations; and (5) removal of surface road material and restoration of the roads and turbine sites to previous conditions to the extent feasible. The Permit (III.G.1.) requires the Permittee to submit a Decommissioning Plan to the Commission prior to commercial operation. The Permit (III.G.2.) addresses site restoration and paragraph (III.G.3.) addresses turbines abandoned prior to termination of operation of the LWECS.

Site Permit Conditions

78. All of the above findings pertain to the Applicant's requested permit for a 20 megawatt wind project.
79. Most of the conditions contained in this site permit were established as part of the site permit proceedings of other wind turbine projects permitted by the Environmental Quality Board and the Public Utilities Commission. Comments received by the Commission have been considered in development of the site permit. Minor changes and additions that provide for clarifications of the draft site permit conditions have been made.
80. The site permit contains conditions that apply to site preparation, construction, cleanup, restoration, operation, maintenance, abandonment, decommissioning and all other aspects of the Project.

Based on the foregoing findings, the Minnesota Public Utilities Commission makes the following:

CONCLUSIONS OF LAW

1. Any of the foregoing findings which more properly should be designated as conclusions are hereby adopted as such.
2. The Minnesota Public Utilities Commission has jurisdiction under Minnesota Statute 216F.04 over the site permit applied for by Grant County Wind, LLC for the 20 megawatt Grant County Wind Farm Project.
3. The Grant County Wind, LLC, application for a site permit was properly filed and noticed as required by Minnesota Statutes 216F.04 and Minnesota Rules 7854.0600 subp 2 and 7854.0900 subp 2.
4. The Minnesota Public Utilities Commission has afforded all interested persons an opportunity to participate in the development of the site permit and has complied with all applicable procedural requirements of Minnesota Statutes Chapter 216F and Minnesota Rules Chapter 7854.
5. The Minnesota Public Utilities Commission is the agency directed to carry out the legislative mandate to site LWECs in an orderly manner compatible with environmental preservation, sustainable development and the efficient use of resources. The proposed 20 megawatt Grant County Wind Farm Project will not create significant human or environmental impacts and is compatible with environmental preservation, sustainable development, and the efficient use of resources.

6. The Minnesota Public Utilities Commission has the authority under Minnesota Statutes section 216F.04 to establish conditions in site permits relating to site layout, construction and operation and maintenance of an LWECS. The conditions contained in the site permit issued to Grant County Wind, LLC for the Grant County Wind Farm Project are appropriate and necessary and within the Minnesota Public Utilities Commission's authority.

Based on the foregoing Findings of Fact and Conclusions of Law, the Minnesota Public Utilities Commission issues the following:

ORDER

A LWECS Site Permit is hereby issued to Grant County Wind, LLC, to construct and operate the 20 megawatt Grant County Wind Farm Project in Grant County in accordance with the conditions contained in the site permit and in compliance with the requirements of Minnesota Statute 216F.04 and Minnesota Rules Chapter 7854 for PUC Docket No. IP6722/WS-09-341.

The site permit is attached hereto, with a map showing the approved site.

BY THE ORDER OF THE COMMISSION

Burl W. Haar
Executive Secretary

(S E A L)

This document can be made available in alternative formats (i.e., large print or audio tape) by calling 651.297.4596 (Voice). Persons with hearing or speech disabilities may call us through Minnesota Relay at 1.800.627.3529 or by dialing 711.