STATE OF MINNESOTA
PUBLIC UTILITIES COMMISSION

David Boyd	Chair
J. Dennis O'Brien	Commissioner
Tom Pugh	Commissioner
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Betsy Wergin	Commissioner

In the Matter of the Application of Lakeswind Wind Power Partners, LLC, for a Site Permit for a 60-Megawatt Large Wind Energy Conversion System and Associated Facilities in Becker, Clay and Otter Tail counties

ISSUE DATE:

DOCKET NO.
IP6603/WS-08-1449

FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER, ISSUING A SITE PERMIT TO LAKESWIND WIND POWER PARTNERS, LLC, FOR THE LAKESWIND WIND POWER PLANT

The above-entitled matter came before the Minnesota Public Utilities Commission (Commission), pursuant to an application submitted by Project Resources Corporation (PRC) on behalf of Lakeswind Wind Power Partners, LLC, for a site permit to construct, operate, maintain and manage a 60-Megawatt (MW) nameplate capacity Large Wind Energy Conversion System (LWECS) and associated facilities in Becker, Clay and Otter Tail counties. PRC applied for the permit on behalf of Lakeswind Wind Power Partners, LLC.

All of the proposed wind turbines and associated facilities will be located in Becker, Clay and Otter Tail counties. Other associated facilities will include pad mounted step-up transformers for each wind turbine, access roads, an electrical collection and feeder system, project substation, and up to two permanent meteorological towers. The energy from the proposed 60 MW project will be delivered from the project substation to the Tamarac Substation owned by Great River Energy and located in the northeast corner of section 28 in Scrambler Township in Ottertail County.

STATEMENT OF ISSUE

Should Lakeswind Wind Power Partners, LLC, be granted a site permit under Minnesota Statutes section 216F.04 to construct a 60 MW Large Wind Energy Conversion System in Becker, Clay and Otter Tail counties?

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

FINDINGS OF FACT

Background and Procedure

1. On January 21, 2009, PRC on behalf of Lakeswind Wind Power Partners, LLC, filed a complete application with the Public Utilities Commission for up to 60 megawatts of nameplate wind power generating capacity identified as the Lakeswind Wind Power Plant in Becker, Clay and Otter Tail counties. (Exhibit 1).

2. OES EFP staff reviewed and determined that the January 21, 2009, application complied with the application requirements of Minnesota Rules, part 7836.0500. In its comments and recommendations to the PUC, dated February 4, 2009, OES EFP staff recommended that the PUC accept the application and issue a draft site permit (Exhibit 2).

3. On February 17, 2009, a PUC Order accepted the application for the Lakeswind Wind Power Plant and associated facilities. On February 17, 2009, the PUC also issued a draft site permit for review and comment (Exhibit 3).

4. OES EFP staff prepared a notice of "Application Acceptance and Public Information Meeting and Draft Site Permit Availability" to receive comments on the permit application and the draft site permit (PUC Docket # IP6603/WS-08-1449) (Exhibit 4).

5. On March 16, 2009, PRC's site permit application, draft site permit and notice of application acceptance and public information was distributed to the appropriate federal and state agencies, the Minnesota Historical Society, the auditor of Becker, Clay and Otter Tail counties, County Commissioners and township clerks. Each landowner potentially affected by the proposed project also received a copy of the application, notice of application acceptance and public information meeting, and a copy of the draft site permit (Exhibit 8).

6. The OES published notice of the site permit application, the OES public information meeting and opportunity to comment on the permit application and the draft site permit in Clay County in *THE FORUM*, and *The Hawley Herald, Inc*, on March 23, 2009 and in Becker County in the *Becker County Record*, on March 18, 2009 (Exhibit 5). 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 PUC site permit review process; and e) identification of the public advisor. The notice published meets the requirements of Minnesota Rules part 7836. 0900 subp2.

7. On March 23, 2009, the OES EFP staff published in the *EQB Monitor* notice of the March 31, 2009, public information meeting, and opportunity to comment on the permit application and the draft site permit, Volume 33, No. 6, March 23, 2009, pages 12-15

(Exhibit 7). The published notice contained all of the information required by Minnesota Rules part 7836.0900 subp. 1. Notice also appeared on the PUC web site on March 11, 2009, and on eDockets on March 23, 2009.

8. Due to inclement weather and flooding in the Fargo area, the scheduled March 31, 2009, Information Meeting was cancelled and re-scheduled for April 29, 2009.

9. On April 20, 2009, PRC filed an amendment to their site permit application to enlarge the project boundary (Exhibit7).

10. On April 7, 2009, a revised Notice of the Public Information Meeting, Application Acceptance and Draft Site permit Availability was re-issued and posted on the PUC web site on April 13, 2009, and published in the *EQB Monitor*, Volume 33, No. 8 on April 20, 2009 (Exhibit 11). The revised notice provided a map with the amended site permit boundary (Exhibit 9).

11. The revised notice was also published in Clay County in *The Hawley Herald, Inc*. on April 13, 2009, and in *THE FORUM* on April 20, 2009, and in Becker County in the *Becker County Record* on April 22, 2009 (Exhibit 10). These published notices included the amended site permit map.

12. The OES EFP staff held a public information meeting on April 29, 2009, in Barnesville, to receive comments on the site permit application, and draft site permit. Approximately 140 people attended the meeting. Representatives from PRC were also present. OES EFP staff provided an overview of permitting process and responded to questions about the wind permitting process. OES EFP staff and PRC responded to project specific questions and general questions about wind energy. Questions were asked about access roads, project timing, easement agreements and conditions, location of distribution and feeder lines, and project decommissioning, setbacks from homes, impacts on natural resources, United States Fish and Wildlife recommendations, noise related issues, and production taxes. No significant issues or concerns were raised about the permitting process, the proposed project, or conditions in the draft site permit at the public meeting. The public comment period on the project closed on May 20, 2009.

Written Comments and Letters Received by May 20, 2009

13. Approximately 27 written comments, some with attachments, were received by the close of the comment period on May 20, 2009. Comments were received from individuals, two state agencies and the applicant. See Exhibit 13 and 14.

    13a. Per Anderson, Moorhead, Minnesota, sent a letter dated May 4, 2009, accompanied by several attachments, to the Commission requesting a contested case hearing and a project moratorium. In addition, Mr. Anderson requested a hearing "where citizens ask questions and receive information from representatives of Project Resources Corporation (PRC), the Minnesota Department of Natural Resources (MnDNR) and the U.S Fish and Wildlife Service (USFS) regarding the site permit

application presented to the PUC…" Mr. Anderson asked that PRC provide "a revised turbine siting plan with an opportunity to submit written comment to the PUC." Mr. Anderson also requested further investigation of health issues associated with wind turbines. See Exhibit 13**.**

13b. Valerie LeClair, on May 20, 2009, expressed concerns about the Lakeswind Wind Power Plant because of the potential for decreased property values, noise, effectiveness, impact on wildlife and quality of life issues. See Exhibit 14.

13c. Dwight Mickelson, on May 20, 2009, commented that the "Lakes Wind Project is entirely inappropriate for this part of Clay. If you were looking for one of the most environmentally diverse and picturesque parts of Clay County…this is it." Mr. Mickelson also commented that growing families, retired people, and hobby farmers, especially in the region of Parke Township to the north of the Lakeswind Project will not receive compensation and that the open flats of Clay County would be more appropriate. See Exhibit 14.

13d. Kari Miles (March 28 and 30, 2009), commented about the potential impact of health effects on farmers and that farmers weren't told of the potential impacts, liability issues, noise, flashing lights, ice throws, property values and quality of life issues. Ms. Miles also commented that putting them in an industrial site is more appropriate. See Exhibit 14.

13e. Paul and Kay Ornberg submitted two sets of comments (March 30 and May 19, 2009), and raised several general questions about the project, wind rights, placement of overhead electric lines associated with the project, placement of additional communication towers, lease restrictions, and payment of taxes. Mr. Ornberg also expressed concerns about not knowing the location of the turbines, access roads, size of the turbines, visual and shadow flicker impacts, costs, liability issues, fire, how the review process works and health related issues. See Exhibit 14.

13f. Several individuals submitted comments in support of the Lakeswind Project prior to May 20, 2009. Persons indicating support for the project include: Cliff and Linda Bang, John Bergseid (two comments), Wendell and Marine Blatchford, Larry and Diane Blomster, Linda and Ron Ekre, Lisa Gibb, Barb Grunewald, David and Doris Hanson, Marvin Hanson, Lindley Jacobson, Armand and Nonie Swenson, Rod Schultz, Eldon and Margie Raknerud, Raymond Lottie, Jay Roste, and Roger Minch. See Exhibit 13 and 14.

13g. The Minnesota Department of Natural Resources (MnDNR), on May 15, 2009, commented with concerns about possible impacts to publicly-owned and privately-owned areas within the project boundary containing high quality plant and animal communities. The MnDNR recommended a site visit with the applicant to develop final turbine siting for the project and methodologies for biological surveys and management plans. See Exhibits 14. PRC continues to correspond with the MnDNR and United States Fish and Wildlife Service (USFWS). See Exhibit 15 and 16.

The Permittee

14. PRC, on behalf of Lakeswind Wind Power Partners, LLC, has been in the process of developing the Lakeswind Wind Power Plant site since 2007. The Lakeswind Wind Power Partners, LLC, Site Permit Application is for a 60 Megawatt LWECS project. The energy produced by the Project will be delivered to the Tamarac Substation located in the northeast corner of the northwest ¼ of the northeast ¼ of Section 28 in Scrambler Township in Otter Tail County. The applicant is in discussions with Minnesota electric utilities for sale of the power. See site permit III.J.4.

Project Description

15. As proposed, the 60-megawatt Lakeswind Wind Power Plant will consist of up to 40 General Electric 1.5-megawatt wind turbine generators or similar turbine mounted on freestanding tubular towers. If wind turbines with a larger nameplate rating are used, which could range from 1.65 to 3.0 MWs, fewer turbines will be needed because the project output will be no more than 60 MW. The proposed turbine model and specifications may change because of turbine availability issues and because the project is now proposed to be built in 2010, rather than 2009.

16. The towers will be 80-meters (262 feet) in height. The blades on the GE wind turbine are 38.5-meters (126 feet) long. Turbine rotor diameter will be 77 meters (253 feet) across. The overall height of the tower, nacelle and blade will be approximately 118.5 meters (389 feet) when one blade is in the vertical position. The project will also include an underground automated supervisory control and data acquisition system (SCADA) for communication purposes. Up to two permanent meteorological towers 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 and overhead electric energy collection system and a project substation. A separate transmission line of an undetermined voltage, ranging from 41.6 kV to 115 kV will be built that connects the project substation to the Tamarac Substation; it is not covered in this docket.

17. The GE Wind 1.5 MW wind turbine is a three bladed, upwind, active yaw, and active aerodynamic control regulated wind turbine with power/torque control capabilities. The rotor utilizes blade pitch regulation and variable speed operation to achieve optimum power output at all wind speeds. The variable speed operation minimizes power and torque spike delivered from the rotor to the drive train resulting in improved long-term reliability. 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.

18. 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.

The applicant is proposing to place the feeder lines on public road rights-of-way where possible. Depending on conditions the feeder lines may be either overhead or underground. All of the proposed feeder lines would connect to the proposed project substation within the site permit boundaries.

19. The blades are made of fiberglass with a smooth layer of gel coat that provides ultraviolet protection. 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.

20. 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.

21. All turbines and up to 2 permanent meteorological towers 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 the operations and maintenance 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.

22. 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

23. The 60 MW Lakeswind Wind Power Plant site as amended on April 20, 2009, will be located in southwest Becker County, southeastern Clay County, and northwest Otter Tail County (Exhibit 9). The Project site includes portions of four townships. In Becker County, the site includes Sections 19, 29, 30, 31 and 32 of Cormorant Township. In Clay County, the site boundary includes Sections 19, 20, 24, 25, 26, 29, 30 and 32 through 36 of Parke Township and Sections 1 through 5 and 8 through 30 in Tansem Township. In Otter Tail County, the site includes portions of Sections 5, 6 and 19 through 21 in Scrambler Township. The Project boundary encompasses approximately 22,500 acres. As of the date of its application and site permit amendment, the Applicant had obtained lease and easement agreements with most of the landowners within the site.

24. Land use in the project area is mixed and comprised of agriculture/farming, forestry and mining, communication and micro-wave towers and a variety of natural resource features (Blanket Flower Prairie State Scientific and Natural Area, waterfowl production areas, wildlife management area, woodlots, native prairie, lakes and wetlands).

25. Considerable portions of land within the project site is actively farmed for crops and used for pasture. Crops include wheat, barley, oats, sugar beets, sunflowers, soybeans, hay and pasture crops and corn for feeding livestock. According to the MnDNR Division of Lands and Mineral Aggregate Maps, the eastern part of the Clay County site is inferred to contain potentially significant aggregate deposits based on geologic units.

26. Construction of the turbines sites and access roads will involve temporarily disturbing at the most approximately three acres of land per turbine or approximately 120 acres total for the project 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 is approximately 17 acres and for towers and transformers and areas around them about two acres.

27. Wind turbine and road access will be sited to take into account the contours of the land and prime farmland locations to minimize impact. An erosion and sediment control plan and Storm Water Pollution Prevention Plan (SWPPP) will be prepared for the Project and the disturbed areas will be seeded after construction to stabilize the area. The Project will also be subject to the requirements of the NPDES Construction Permit.

28. According to PRC's application the highest elevations in Clay County are on the glacial hills near Rollag, about 1,515 feet above sea level. The eastern third of the county is a complex upland area consisting of short, uneven slopes and many depressions and natural draws. Slopes in this area commonly range from nearly level to steep.

Wind Resource Considerations

29. The wind resource in the counties of Becker, Clay and Otter Tail averages between 7 and 9 meters per second (15.7 to 17.9 miles per hour) in the project area. This is also documented by the Wind Resource Analysis Program (WRAP) Report (2002) prepared by the Minnesota Department of Commerce. The WRAP Report presents wind analysis data from monitoring stations across the state of Minnesota. Regionally, the prevailing wind directions are generally southeast and northwest. Of the annual energy budget, a high percentage results from southerly winds, which are most frequent in the warmer weather months. The north and northwest winds typically occur in winter.

30. For this project the wind turbines will be sited in small clusters along hilltops and ridgelines within the site boundaries. The wind turbines are 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 PRC'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 west-southwest to north-northeast, 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. Individual, isolated turbine sites may be necessary to minimize Project impacts. Sufficient spacing between the turbines is utilized to minimize wake losses when the winds are blowing parallel to the turbines.

31. The gross annual energy output per turbine is estimated to be approximately 5,244 MWh (megawatt hours) per year. Assuming an efficiency of approximately 85.1 percent when the wind is blowing, the net annual energy output per turbine is expected to be 4,463 MWh. If 40 turbines are used, the project will produce approximately 178,000 MWh per year. The base energy calculation presented assumes a normal or average wind year. The maximum variation in energy is within +/- 15 percent. Based on the data, one would expect the annual variation in energy at the project site to be within 10 percent of the mean during most years.

Land Rights and Easement Agreements

32. 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.

33. PRC 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.

Site Criteria

34. Minnesota Rules chapter 7836 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 7836.0500 through 7836.0600. The following analysis addresses the relevant criteria that are to be applied to a LWECS project.

Human Settlement, Public Health and Safety

35. The site is in an area of low population density, with little residential, commercial development on the site. There are approximately 110 homes within or adjacent to amended site permit boundary. PRC estimates that the average distance from turbines to

the nearest homes will be between 1,600 to 1,800 feet for project participants and non-participants will be further away. Rollag, a small community, is located approximately one-half north of the site permit boundary. Active gravel pits constitute the major industrial use in the project area and are located on the eastern portion of the proposed site. The foot-print of the gravel operations are expected to expand over the next 30 years. 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.

36. There will be no displacement of existing residences or structures in siting the wind turbines and associated facilities.

37. PRC has indicated that they will not locate wind turbines within one-half mile of property owned by Per and Sandra Anderson, Dwight Mickelson, Valerie LeClaire, Paul Ornberg and Kari Miles. See permit condition III.M.2.

38. The project will comply with the Federal Aviation Administration requirements with respect to lighting. See site permit condition III.E.4.

39. 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.

40. 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 or in the immediate proximity during the winter months.

41. 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.

42. Lakeswind Wind Power Partners, LLC, will maintain liability insurance coverage on the project. See PRC response letter (June 2, 2009) in Exhibit 14.

Noise

43. Wind turbines do generate noise. GE Wind and noise consultants suggest a maximum noise threshold of 45 dBA at occupied homes. According to Project Resources sound pressure levels will be well below the Pollution Control Agency noise standard of 50

dBA measured at the closest residence. See Minn. Rules part 7030.0040. See permit condition III.E.3.

Visual Values

44. The placement of up to 40 turbines will affect the appearance of the area. The wind turbines will be mounted on tubular towers that are between 265 to 328 feet tall. The rotor blades will have a diameter of between 254 to 338 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 highways 32 and 34, and local roads. Motorists and drivers on local township and county roads may travel within 300 feet of some turbines.

45. 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 PUC require the use of tubular towers; therefore, the turbine towers will be uniform in appearance. See permit condition III.E.1. The turbine towers will be similar in appearance, but larger than, those used in Moorhead on the north east side of town. 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 consistent with existing land use and agricultural practices.

46. 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 40 tubular steel structures approximately 265 feet high or taller, standing on formerly undisturbed ridgelines or high-ground, with 126 foot or longer blades, for an overall height of 389 feet or more 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 add to visual impact of the area. Because wind generation development is likely to continue in Becker, Clay and Otter Tail counties, 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.

47. Several other measures will also be taken to minimize visual intrusion such as: use of low profile access roads, project access roads will avoid cuts and fill, the areas affected by construction will be restored after construction is completed, turbines will not be illuminated unless required by FAA regulations, and the turbine rotor size will require sufficient turbine spacing to minimize wake loss. The visual scale will be similar to the other projects in Minnesota.

Recreational Resources

48. Recreational opportunities in Becker, Clay and Otter Tail counties include hunting, fishing, and snowmobiling, camping, and hiking. There are four wildlife management areas (WMAs) in the vicinity of the Project site. Hunting is permitted in designated Minnesota Department of Natural Resources WMAs, unless otherwise posted. WMAs are also managed to provide wildlife habitat and improve wildlife production. These MnDNR lands were acquired and developed primarily with hunting license fees. WMAs are closed to all-terrain vehicles and horses because of detrimental effects on wildlife habitat.

49. Barnesville WMA is located adjacent to the west of the Project site, Hay Creek WMA is located near the northwest corner of the Project site in Skree Township and the Scrambler WMA is located near the northeast corner of the Project site.

50. The turbines will be noticeable to persons using the WMAs. Turbines will be at least five rotor diameters (RD) on the prevailing wind axis and at least 3 RD on the non-prevailing wind from WMAs or local parks. See permit condition III.C.4. Turbine operations are not expected to directly affect the natural areas in any material way and no adverse impact on wildlife management areas or practices is expected.

51. The Blanket Flower Prairie Scientific and Natural Area is within the site permit boundary and is located in portions of section 11 and 14 in Tansem Township on the east side of the site. Turbines will be at least five rotor diameters from this MnDNR owned land on the prevailing wind axis and three diameters on the non-prevailing wind axis. See site permit III.C.4.

52. Waterfowl Production Areas (WPAs) provide habitat for a vast variety of waterfowl shorebirds, grassland birds, plant, insects and wildlife. WPAs owned by the U.S. Fish and Wildlife Service also provide opportunities for public access and wildlife-dependent recreation such as hunting, wild life watching and photography. These WPAs are either acquired as public land, or protected through perpetual easement, as part of the U.S. Fish and Wildlife Service's National Wildlife Refuge System. There are four WPAs located within the Project site boundary. Turbines will be required to comply with a five by three rotor diameter setback from WPAs. See site permit III.C.4.

Infrastructure

53. The proposed wind farm is expected to have a minimal effect on the existing infrastructure. The proposed project will use underground cables for the collector lines on private property within the wind farm. Feeder lines associated with the project may be overhead or underground. Any aboveground feeder lines, if used, may be wood-pole, typical of wind project feeder lines used elsewhere in Minnesota. Placement of collector and feeder lines is addressed in the site permit at III.E.7. and 8. If a higher voltage line is required (41.6 to 115 kV) to deliver the energy from the wind farm project substation to the Tamarac Substation, several other electrical design options will be evaluated and a separate permit (local or state) may be required for those facilities.

54. 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. Construction of the project requires the addition of several miles of access roads that will be located on private property. The access roads will be routed along the wind turbine strings, 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 or and maintenance activities will be used to maintain road integrity. The Permittee may do this work or contract it out.

55. If access roads must be 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.

56. 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 the project construction to document and mitigate any television reception impacts that might occur. This is addressed in the site permit at III.D.3.

57. 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

58. The project will provide local tax revenues (approximately 150 – 200 thousand dollars annually) from a production tax on the wind turbines. No significant adverse impact on public services is expected. 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. Landowners with turbine(s) on their property will also receive payments from the Permittee for energy generated by the turbine(s).

59. To the extent that local workers and local contractors are capable, qualified, and available, Lakeswind Wind Power Partners, LLC, 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 several site technicians and a wind plant supervisor.

Effects on Land-Based Economies

60. The wind turbines and access roads will be located so that the most productive farmland will be left as intact as possible. However, the project will displace approximately 20 acres of agricultural land. 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 and Aggregate Industries is a project participant.

Archaeological and Historical Resources

61. A review of the Minnesota State Historic Preservation Office (SHPO) computer database indicates that two recorded archaeological sites are within the project site. Eight historical structures were listed within the Project site.

62. A Phase I Archaeology survey is recommended for all the proposed turbine locations, access roads, junction boxes and areas of construction impact for the transmission line to document any previously unrecorded archaeological sites within the project site. The site permit at III. D.2. requires the Permittee to conduct an archaeological reconnaissance survey. A Phase I archaeology survey consists of the following tasks: consultation, documentation, and identification.

63. 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 also requires the Permittee to stop work and notify the Minnesota Historical Society and PUC if any unrecorded cultural resources are found during construction.

Air and Water Emissions

64. No harmful air or water emissions are expected from the construction and operation of the LWECS.

Animals and Wildlife

65. 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:

65a. 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)

65b. 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)

65c. 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)

66. Mitigation measures are also 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); 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); c) trees and shrubs that are important to the wildlife present in the area will not be disturbed (III.B.11 and III.C.60. In its permit application (Exhibit 1, Section F.18.c. p.41) PRC indicated that it will: implement "best management practices in order to minimize indirect impacts such as the introduction or spread of invasive plant species and during construction to control erosion at the Project site; avoid disturbance of wetlands, streams, native prairie remnants and calcareous fens and nesting bald eagles. 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).

67. PRC recognizes the potential value of ongoing studies after construction of the project to improve scientific knowledge and understanding of avian and wildlife interactions with wind turbines. OES EFP staff, MnDNR and PRC will coordinate activities with respect to any studies that are implemented.

Vegetation

68. No public waters, wetlands or forested land are expected to be 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

69. Construction of the wind turbines and access roads increases the potential for erosion during construction and converts prime farmland to industrial use. 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

70. No towers, access roads or utility lines will 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

71. Current information suggests windy areas in this part of the state are large enough to accommodate more wind facilities. In the future, turbines used in Becker, Clay and Otter Tail counties likely will consist of several types and sizes supplied by different vendors and installed at different times.

72. While large-scale projects have occurred elsewhere (California, Texas and Iowa), 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.

73. The PUC anticipates more site permit applications under Minnesota Statutes section 216F.04 (a). The PUC 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.

74. 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.

75. 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.

76. 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.

77. 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. Instead, it is expected that the site will use shorter strings or clusters of and possibly isolated turbines locations within the site. The objective is to capture the most net energy possible from the best available wind resource. Allowing for setback from roads and residences and avoiding sensitive areas, Project Resources Corporation 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 Lakeswind Project. PRC's wake investigation shows that the estimated wake losses for the proposed Lakeswind Wind Power Plant will be around 4 percent.

78. Other factors that lead to discounts were assumed to be identical for all arrays and include turbine availability (5%); blade soiling (1%), icing (2%), high wind hysteresis (0.01), cold weather shutdown (0.025 %), electrical efficiency (2%), parasitic (1%). Total losses are calculated at 14 to 15 percent.

Maintenance

79. Maintenance of the turbines will be on a scheduled, rotating basis with one or more units normally off for maintenance each day, if necessary. Maintenance on the interconnection points will be scheduled for low wind periods and coordinated with entity purchasing the power. The Lakeswind Wind Power Plant will be staffed with two to three technicians and a wind plant supervisor. An operations and maintenance facility will also be built, but not necessarily on the project site.

Decommissioning and Restoration

80. The estimated decommissioning cost for the Lakeswind Wind Power Plant is $250,000 in 2008 decommissioning dollars. Decommissioning activities will include (1) removal of all turbines and towers; (2) removal of all pad mounted transformers; (3) removal of all above-ground distribution facilities; (4) removal of foundations to a depth of three feet below grade; and (5) removal of surface road material and restoration of the roads and turbine sites to previous conditions to the extent feasible. The Permit requires the Permittee to submit a Decommissioning Plan to the PUC that describes how the Permittee will ensure that the resources are available to pay for decommissioning the project at the appropriate time. Decommissioning funds will be set aside as specific budget item. A set-aside guarantee will be executed on behalf of the project owner with an independent administrator for the funds. See Exhibit 1, page 21.

Site Permit Conditions

81. All of the above findings pertain to the Applicant's requested permit for a 60 megawatt wind project.

82. 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 that provide for clarifications of the draft site permit conditions have been made.

83. 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 Lakeswind Wind Power Partners, LLC, for the 60-megawatt Lakeswind Wind Power Plant.

3. The Lakeswind Wind Power Partners, LLC, application for a site permit was properly filed and noticed as required by Minnesota Statutes 216F.04 and Minnesota Rules 7836.0600 subp 2 and 7836.0900 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 7836.

5. A request for a contested case hearing was filed prior to the close of the comment period. The request for a contested case has been addressed by the Commission in a separate action from the site permit decision.

6. 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 60-megawatt LWECS Lakeswind Wind Power Plant, will not create significant human or environmental impacts and is compatible with environmental preservation, sustainable development, and the efficient use of resources.

7. The Minnesota Public Utilities Commission has the authority under Minnesota Statutes section 216F.04 to establish conditions in site permits relating to site layout and construction and operation and maintenance of an LWECS. The conditions contained in the site permit issued to Lakeswind Wind Power Partners, LLC, for the Lakeswind Wind Power Plant 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 Lakeswind Wind Power Partners, LLC, to construct and operate the 60-megawatt LWECS Lakeswind Wind Power Plant in Becker, Clay and Otter Tail counties 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 7836 for PUC Docket No. IP6603/WS-08-1449.

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

BY THR 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.