STATE OF MINNESOTA
PUBLIC UTILITIES COMMISSION

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In the Matter of the Site Permit Application for a 42 Megawatt Large Wind Energy Conversion System in Stearns County, Minnesota

ISSUE DATE:

DOCKET NO.
IP-6853/WS-10-1240

FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER ISSUING A SITE PERMIT TO BLACK OAK WIND, LLC FOR THE BLACK OAK WIND FARM

The above-entitled matter came before the Minnesota Public Utilities Commission (Commission) pursuant to an application submitted by Black Oak Wind, LLC (Black Oak or Applicant) for a site permit to construct, own, operate, maintain and manage a 42 Megawatt (MW) nameplate capacity Large Wind Energy Conversion System (LWECS) and associated facilities in Stearns County.

A public meeting was held on April 7, 2011, in Sauk Centre, Minnesota. The meeting was presided over by the Department of Commerce (DOC) Energy Facility Permitting (EFP) staff. The meeting continued until all persons who desired to speak had done so. The public comment period closed on April 22, 2011. Comments on the Black Oak Wind Farm (Project) were also received during the public hearing record for the combined Black Oak/Getty Certificate of Need docket (IP-6553 and 6866/CN-11-471). Administrative Law Judge Bruce H. Johnson presided over a public hearing on the Black Oak and Getty projects held in Sauk Centre, Minnesota, on June 26, 2012. The Comment period closed on July 10, 2012 and Administrative Law Judge Johnson issued a Summary of Public Testimony on August 8, 2012.

STATEMENT OF ISSUE

Should Black Oak be granted a site permit under Minnesota Statutes section 216F.04 to construct a 42 MW Large Wind Energy Conversion System in Stearns County?

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

FINDINGS OF FACT

Background and Procedure

1. On December 6, 2010, Black Oak Wind, LLC (Black Oak), filed a site permit application with the Public Utilities Commission for the 42 MW Black Oak Wind Farm.[1]

2. Black Oak is a wholly owned subsidiary of Geronimo Wind Energy, LLC (GWE). The project will be owned and operated by Black Oak upon construction. GWE is a Minnesota-based wind energy developer and has developed other wind projects in Minnesota, including the Prairie Rose Wind Farm currently under construction in Rock

[1] Black Oak, *Site Permit Application*, December 6, 2010, eDocket ID: 201012-57165-01 – 10 (Exhibit 1)

and Pipestone counties, and the 95 MW Paynesville Wind Farm that is currently in development in Stearns County.[2]

3. Department of Commerce Energy Facility Permitting (EFP) staff reviewed the December 6, 2010, application for compliance with the application requirements of Minnesota Rules, part 7854.0500. In its comments and recommendations to the Commission, EFP staff recommended that the Commission accept the application, and that Black Oak update the application to reflect recently adopted Stearns County Ordinance and correct labeling on some maps.[3]

4. On January 14, 2011, a Commission Order accepted the application for the Black Oak Wind Farm.[4]

5. On January 14, 2011, Black Oak filed amended maps and text to the Site Permit Application as recommended in the December 23, 2010, EFP staff comments.[5]

6. Published notice of site permit application acceptance, and opportunity to comment on the site permit application appeared in the *Sauk Centre Herald*, on January 25, 2011.[6] 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 7854.0600, subpart 2.

7. On January 14, 2011, Black Oak distributed copies of the Site Permit Application for the Black Oak Wind Farm and Notice of Application Acceptance, to government agencies and landowners pursuant to the requirements of Minnesota Rules, Part 7854.0600, subpart 3.[7] On January 19, 2011, EFP Staff mailed a notice of application acceptance to landowners and local government officials pursuant to the requirements of Minnesota Rules, Part 7854.0600, subpart 2.[8]

8. Four comment letters were received prior to the close of the official public comment period on February 11, 2011, and three comments were received after the close of the

[2] Exhibit 1, at p. 1,
[3] EFP Staff Comments, December 23, 20120, eDocket ID: 201012-57812-01 (Exhibit 2)
[4] Commission Order Accepting Black Oak Wind, LLC's LWECS Site Permit Application, January 14, 2011, eDocket ID: 20111-58530-01 (Exhibit 3)
[5] Black Oak Wind Farm Site Permit Application for a Large Wind Energy Conversion System: Amended January 2011, January 14, 2011, eDocket ID: 20111-58574-02, 20111-58574-03, 20111-58574-04, 20111-58574-05 (Exhibit 4)
[6] Notice of PUC's acceptance of the LWECS Site Permit Application for Black Oak Wind Farm, *Sauk Centre Herald*, January 25, 2011, eDockets ID: 20126-75611-01 (Exhibit 5)
[7] Affidavit of Service: Notice of the PUC's acceptance of the LWECS, eDockets ID: 20111-58574-01, 20111-58620-01 (Exhibit 6)
[8] Notice of Application Acceptance in the Matter of the Site Permit Application for a 40 Megawatt Large Wind Energy Conversion System in Stearns County, January 19, 2011, eDocket ID: 20111-58673-01 (Exhibit 7)

comment period.[9] All seven comments are summarized in EFP's March 1, 2011, Comments and Recommendations to the Commission.[10]

9. On March 11, 2011, the Commission Order issued a "Draft Site Permit" for the Black Oak Wind Farm.[11]

10. On March 18, 2011, the Department's EFP staff issued a notice of draft site permit issuance and public information meeting. 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's site permit review process; and e) identification of the public advisor. The notice meets the requirements of Minnesota Rules, Part 7854.0900 subp 1. This notice was posted on the EFP website and sent to interested persons and governmental agencies on March 21, 2011, as required by Minnesota Rules, Part 7854.0900, subp. 2.[12] Additional notice of the availability of the Draft Site Permit was sent to local units of government on June 21, 2012.[13]

11. Published notice of draft site permit issuance and public information meeting appeared in the *Sauk Centre Herald* on March 22, 2011,[14] and in the *EQB Monitor* on March 21, 2011,[15] as required by Minnesota Rules, Part 7854.0900, subp. 2. The published notice contained all of the information required by Minnesota Rules part 7854.0900 subp. 1.

12. A Public Information Meeting on the Project was held in Sauk Centre on April 7, 2011. The purpose of the meeting was to provide an overview of the Commission permitting process and to receive comments on the draft site permit. Approximately forty (40) people attended the hearing. EFP staff and representatives from GWE were present. EFP staff provided an overview of the LWECS site permitting process, the draft site permit and responded to questions. EFP staff and GWE representatives responded to project specific questions and general questions about wind energy. Project specific questions and comments were related to project benefits for local residents, impacts to local roads, the wind resource in the project area and energy production from the project, wildlife impacts, the number and duration of construction jobs, noise, shadow flicker, stray

[9] Public & Agency Comments on Black Oak LWECS Site Permit Application, eDockets ID: 20112-59220-01, 20112-59451-01, 20112-59546-01, and 20112-59963-01 (Exhibit 8)
[10] EFP Comments and Recommendations on Issuance of Draft site Permit, March 1, 2011, eDocket ID: 20113-60002-01 (Exhibit 9)
[11] Commission Order Issuing Draft Site Permit for Public Review and Comment, March 11, 2011, eDocket ID: 20113-60298-01 (Exhibit 10)
[12] Notice of Draft Site Permit Availability and Public Information Meeting, March 21, 2011, eDocket ID: 20113-60489-01, and 20126-75901-02 (Exhibit 11)
[13] Id.
[14] Affidavit of Publication: Notice of Draft Site Permit Availability and Public Meeting, appearing in *Sauk Centre Herald* , March 22, 2011, eDockets ID: 20113-60680-01 (Exhibit 12)
[15] Notice of Draft Site Permit Availability and Public Meeting, appearing in *EQB Monitor*, March 21, 2011, eDockets ID: 20126-75538-01 (Exhibit 13)

voltage, effects on internet service, impacts to property values, and terms of leases with landowners.[16]

13. EFP staff received 11 written comments on the draft site permit before the close of the comment period on April 22, 2011. In addition to the comments received during the comment period, one was received within one week of the close of the comment period, comments continue to be filed in the docket.[17] As discussed in Finding 17, comments on the Black Oak siting docket were also received during the public hearing record for the combined Black Oak/Getty Certificate of Need docket (IP-6853 and 6866/CN-11-471). In addition to statements of support or opposition to the Project, written comments were related to wildlife impacts, site restoration, and agency review periods for biological documents. Issues related to both oral and written comments received during the comment period and during the Public Hearing are addressed in the Findings and the Site Permit. Wind resources are addressed in Findings 33 – 36; wind rights and agreements are discussed in Findings 37 – 41 and in the Site Permit at section 10.1; impacts to property values are addressed in Findings 52 – 53; noise impacts are discussed at sections 4.3, 5.1, and 6.6 of the permit and at Findings 54 – 57. Shadow flicker from the Project is addressed in section 6.2 of the permit and in Findings 58 – 62; aesthetic impacts are discussed in Findings 63 – 65; stray voltage is addressed in Finding 73; impacts to farmland are discussed in sections 7.2 – 7.6 of the permit, and in Findings 93 – 95; wildlife impacts are discussed in Findings 101 – 112 and in the Site Permit at sections 6.1, 6.7, 13.2, 13.3, and 13.4; groundwater impacts are addressed in Finding 120; impacts to surface water and wetlands are addressed in the Site Permit at sections 4.6, 6.1, 7.11, and 10.5.1 and at Findings 121 – 123; decommissioning is addressed in the Site Permit at sections 9.1 – 9.3, and in Findings 128 – 132. The Site Permit, at Section 10.2 requires a power purchase agreement or other enforceable mechanism; Black Oak anticipates a contract for sale of the power in late 2012, as noted in Finding 30.

14. There were no requests for a contested case hearing submitted during the comment period.

15. On January 17, 2012, Black Oak submitted comments to the Commission providing a draft Avian and Bat Protection Plan (ABPP), providing a revised layout, and informing the Commission of certain project changes resulting from coordination with the adjacent LWECS proposed by Getty Wind, LLC (Getty).[18]

Certificate of Need

16. In the order dated March 11, 2011, the Commission stated that, based on the information in the record to date, the Commission has determined that a certificate of need is not required for the Project.[19] Subsequent to the Commission's order accepting the

[16] Oral Comments: Draft Site Permit and Pubic Information Meeting on Black Oak Wind Farm held April 7, 2011, in Sauk Centre. eDockets ID: 20126-75582-01 (Exhibit 14)
[17] Public Comments on Draft Site Permit, eDockets ID: 20121-70618-01 (Exhibit 15)
[18] Black Oak Filing Updating Turbine Layout Based on Avian Report, January 17, 2012, eDocket ID: 20121-70385-01, (Exhibit 16)
[19] Exhibit 10

application, Black Oak, together with Getty, jointly submitted a petition for a Certificate of Need for the Black Oak Wind Farm and the Getty Wind Project, on October 11, 2011.[20]

17. On December 15, 2011, the Commission issued an order authorizing an informal review process for its consideration of the need for the project. A public hearing on the Black Oak and Getty projects was held in Sauk Centre on June 26, 2012;[21] the hearing was noticed to include opportunity for public comments on both the Black Oak and Getty site permits.[22] The Office of Administrative Hearings received eight written comments before the close of the comment period on July 10, 2012.[23] Administrative Law Judge Bruce H. Johnson issued a Summary of Public Testimony on August 8, 2012.[24]

18. A site permit may not be issued until the Commission determines the need for the facility.

Project Description

19. Black Oak is considering three turbine models ranging between 1.5 and 3.0 MW for the Project. Depending upon the turbine model selected, the Black Oak Wind Farm would be comprised of up to 22 REpower MM100 1.8 MW turbines for an installed capacity of 39.6 MW, up to 28 Goldwind 87/1500 1.5 MW turbines for an installed capacity of 42 MW, and up to 13 Vestas V112 3.0 MW turbines for an installed capacity of 39 MW.[25] The Project's preliminary turbine locations and associated facilities are shown on maps filed on June 22, 2012.[26]

20. Hub height for the Repower MM100 1.8 MW turbines would be 80 or 100 meters (262 or 328 feet) with a rotor diameter of 100 meters (328 feet), resulting in an overall height of the tower, nacelle and blade of approximately 427 - 492 feet when one blade is in the vertical position. The hub height for the Goldwind 87/1500 1.5 MW would be 80 or 100 meters (262 or 328 feet) with a rotor diameter of 87 meters (285feet), resulting in an overall height of approximately 423 to 472 feet when one blade is in a vertical position. The hub height for the Vestas V112 3.1 MW turbine would be 84 or 94 meters (276 or 308 feet) with a rotor diameter of 112 meters (368 feet), resulting in an overall height of approximately 459 to 492 feet when one blade is in a vertical position.[27]

21. Turbine towers would be constructed of tubular steel and consist of three to four sections manufactured from certified steel plates. Each tower will be secured by a concrete foundation of 50 to 65 feet in diameter and 4 to 6 feet deep, depending on turbine size

[20] Joint Application for Certificate of Need for the Black Oak and Getty Wind Projects, October 11, 2011, eDocket ID: 201110-67221-03
[21] Transcript of Public Hearing held June 26, 2012, July 11, 1012, eDocket ID: 20127-76685-03 (Exhibit 26)
[22] Revised Notice of Public Hearing, May 25, 2012, eDocket ID: 20125-75012-02 (Exhibit 20)
[23] OAH and Court Reporter, Written Public Comments, August 14, 2012 and July 12, 2012, eDocket ID: 20128-77851-01, 20127-76745-02, 20127-76745-05 , 20127-76745-02 (Exhibit 28)
[24] OAH, Summary of Public Testimony, August 8, 2012, eDocket ID: 20128-77667-01 (Exhibit 26)
[25] Exhibit 16
[26] Black Oak, Hearing Testimony of Patrick Smith with Schedules, June 22, 2012, at Figures 2 – 4, eDocket ID: 20126-75957-03 (Exhibit 21)
[27] Exhibit 16, at p. 4

and engineering, soil conditions, turbine tower load specification and cost considerations. Black Oak anticipates that approximately 290 to 740 cubic yards of soil, depending upon turbine size and soil conditions, would need to be excavated.[28]

22. The project will also include an underground automated supervisory control and data acquisition system (SCADA) for real-time monitoring and control of turbine operations. Up to two (2) permanent free standing 80 meter meteorological towers will be used as part of the communication system.[29] Other components of the project include a concrete and steel foundation for each tower, transformers (either within the turbine or pad-mounted), all weather class 5 roads of gravel or similar material, an operation and maintenance (O&M) building, a Sonic Detection and Ranging (SODAR) unit or a Light Detection and Ranging (LIDAR) unit, an underground energy collection system, underground and possibly overhead electric feeder lines, a project substation, and a 69 kV transmission line connecting the project substation to Xcel Energy's Black Oak Switching Station.[30] Black Oak intends to pursue permitting for the 69 kV transmission line and the O&M facility through Stearns County.

23. All turbine models under consideration are three bladed, upwind, active yaw, and active aerodynamic control regulated wind turbines. All turbine models are also equipped with emergency power supplies to allow the turbine to be shut down safely if power from the grid is lost. Each turbine is equipped with a wind direction sensor to allow the turbine to rotate to optimize turbine output based on real-time wind conditions.[31] Turbine towers will be tubular steel painted a non-glare white. The blades will be equipped with lightning protection.[32]

24. Each turbine is interconnected through an underground electrical collection system at 34.5 kV. All of the proposed feeder lines from the Project, approximately six miles, would connect to the project substation.[33] Depending upon whether the Getty and Black Oak projects are constructed together or separately, separate substations may be constructed for each project, or the projects may jointly construct one substation. Black Oak has tentatively identified a substation site in section 12 of Ashley Township. Alternatively, if the Black Oak and Getty projects are constructed simultaneously, Black Oak may tie into the Getty Substation, tentatively located in section 7 of Black Oak Township near the intersection of County Roads 187 and 190 (415th Avenue and 370th Street).[34] Final substation siting remains dependent on archaeological and biological field surveys as well as soil testing. A 69 kV transmission line will connect the Project with the electrical grid at Xcel Energy's Black Oak Switching Station, located approximately three and one-half miles east of the Getty project's eastern boundary.[35]

[28] Exhibit 4, at p. 66
[29] Black Oak Wind, LLC and Getty Wind, LLC Post-Hearing Comments , July 10, 2012, eDocket ID: 20127-76674-07 (Exhibit 24), at response 10
[30] Exhibit 4, at p. 2
[31] Id., at pp. 11-12
[32] Id., at p. 6
[33] Id.
[34] Exhibit 24, at response 7
[35] Exhibit 4, at p. 9

The interconnection will be in accordance with Midwest System Operator Standards and consistent with the Large Generator Interconnection Agreement.

25. Depending upon final site design Black Oak anticipates that the project would permanently occupy approximately 13.5 to 20 acres when constructed.[36] EFP staff estimates that approximately 60 to 100 additional acres will be temporarily disturbed for contractor staging and assembly areas, turbine foundations, access roads, electric collection lines, substation, and an operations and maintenance facility.

26. Black Oak anticipates construction of approximately four to six miles of access roads.[37] During the construction phase, roads will be approximately 40 feet wide to allow for the large construction equipment; after construction roads will be reduced to approximately 16 feet wide and covered with gravel to allow permanent year-round access to turbine sites. Access roads will be low-profile to allow farm equipment to cross easily.[38]

27. Black Oak has filed an interconnection request with the Midwest Independent Transmission System Operator (MISO) and anticipates it will be able to execute a General Interconnection Agreement (GIA) for the Project in February 2013.[39]

28. Black Oak anticipates the capital costs for the project to be $82 million and ongoing operating and administrative costs, including property taxes and royalties to landowners, to be approximately $2.5 million per year.[40]

29. Black Oak anticipates that construction of the Project will begin in mid-2013, with commercial operation expected by the end of 2013.[41]

30. Black Oak anticipates that a contract for sale of power from the Project will be reached in late 2012.[42]

Site Location, Characteristics, and Topography

31. The Project will be located in an agricultural area south and southwest of the city of Sauk Centre. Black Oak Wind has identified a site of approximately 7,100 acres located in sections 25-27 and 34-36 of Ashley Township (T126N, R35W) and sections 1-3, 11-14, and 23 of Raymond Township (T125N, R35W) in Stearns County.[43] Elevation within the site boundary varies from 1,299 to 1,380 feet above mean sea level.[44]

32. The Padua Wildlife Management Area (WMA) is located approximately 500 feet southeast of the Project Area. Five additional WMAs are located within five miles of the

[36] Id,, at p. 65
[37] Id., at p. 64
[38] Exhibit 4, at pp. 64-65
[39] Exhibit 21, at p. 13
[40] Exhibit 4, at p. 68
[41] Exhibit 21, at p.12
[42] Id., at p. 13
[43] Exhibit 4, at p. 2
[44] Id., at p. 15

Project Area. The Behnen and Trisko Waterfowl Production Areas (WPAs) are adjacent to the site; 15 additional WPAs are located within five miles of the Project Area.[45] Black Oak has not identified any conservation easements within the site.[46]

Wind Resource Considerations

33. Based on data obtained from three temporary meteorological stations within the site, Black Oak calculated long-term monthly average wind speeds of between 6.8 and 8.1 meters/second (15.2 to 18.1 miles per hour), with a mean wind speed of 7.7 meters/second (17.2 miles per hour).[47] The strongest wind speeds occur during the months of October through January, while July and August typically have the lowest average wind speeds. Wind speeds are generally greater in the evening and nighttime hours and lower in the morning at midday.[48]

34. The prevailing wind directions are from the northwest and the south.[49] Black Oak intends to develop a final layout that maximizes the Project's energy production while minimizing impacts from the Project. The final site layout will be dictated by the topography of the site, the turbine model selected, and required setbacks from homes, environmental constraints, and areas where Black Oak does not have site control.[50]

35. 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. As addressed in section 4.10 of the site permit, greater or lesser spacing between the turbines or turbine strings may be used in areas where the terrain dictates the spacing. Sufficient spacing between the turbines is utilized to minimize wake losses when the winds are blowing parallel to the turbines.

36. Assuming net capacity factor of between 35 and 40 percent, projected average annual output from the Project, based on a nameplate generating capacity of 42 MW, will be approximately 129,000 to 147,000 MWh per year.[51]

Wind Rights and Easement/Lease Agreements

37. In order to build a wind facility, a developer must secure site leases and easement 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. Land and wind rights will need to encompass the proposed LWECS, including all associated facilities, including but

[45] Id., at pp. 27 - 29
[46] Exhibit 24, at response 11
[47] Exhibit 4, at pp. 60 - 61
[48] Exhibit 4, at p. 61
[49] Id., at Figure 9-3.
[50] Id., at p. 3
[51] Exhibit 24, at response 13

not limited to wind and buffer easements, wind turbines, access roads, meteorological towers, and the electrical collection system.

38. Black Oak exerts some form of site control, in the form of signed wind leases, easements or options, over approximately 6,565 acres, or approximately 92 percent of the land within the site.[52] Section 10.1 of the site permit requires Black Oak to demonstrate that it has obtained the wind rights necessary to construct and operate the Project at least 14 days before the pre-construction meeting.

39. In its January 2008 *Order Establishing General Wind Permit Standards*, the Commission affirmed a Wind Access Buffer Setback of three rotor diameters on the secondary wind axis and five rotor diameters on the predominant axis to protect wind rights of adjacent property owners.[53] As noted in Finding 50, Stearns County has adopted by ordinance a setback of a setback of five rotor diameters from all parcels of land for which the Permittee has a wind easement for this Project, unless the Stearns County Board finds the wake interference is less than five rotor diameters.

40. The proposed project layouts shown in the June 22, 2012, filing show at least one turbine in each layout located within the Wind Access Buffer Setback between the Project and the adjacent Getty project.[54]

41. Black Oak and Getty contend that in cases where turbines are located within the Wind Access Buffer Setback, wind lease and easement agreements are shared between the two projects via an agreement as part of Black Oak and Getty's joint development partnership. Black Oak and Getty further contend that because the wind leases and easements are shared, there should be no need for the Commission to vary the 3 x 5 RD wind access buffer.[55]

Site Considerations

42. Minnesota Statutes chapter 216F and Minnesota Rules chapter 7854 apply to the siting of LWECS. The rules require an applicant to provide a substantial amount of information to allow the Commission 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.[56] Pursuant to Minnesota Statutes section 216F.02, certain sections in Minnesota Statutes chapter 216E (Minnesota Power Plant Siting Act) apply to siting LWECS, including section 216E.03, subdivision 7 (considerations in designating site and routes). The analysis of the environmental impacts required by Minnesota Rule 7854.0500, subpart 7 satisfies the environmental review requirements; no environmental assessment worksheet or environmental impact statement is required for a proposed LWECS project.[57] Therefore,

[52] Id., at response 14
[53] Commission Order Establishing General Wind Permit Standards, January 15, 2008. eDocket ID: 4897855
[54] Exhibit 21, at Schedules 1-6
[55] Exhibit 24, at response 4
[56] Minn. Stat. § 216F.03 and Minn. R. 7854.0500
[57] Minn. Rule 7854.0500, subp. 7

environmental review is based on the application and the record. The following analysis addresses the relevant criteria that are to be applied to a LWECS project.

Human Settlement

43. The Project is located within a moderately populated rural area, fewer than 10 people per square mile, in Stearns County. There are 23 homes within the Project boundary.[58] The nearest city, Sauk Centre, is located approximately two miles northeast of the Project. As established in section 4.2 of the site permit, Black Oak will maintain a setback distance of at least 1,000 feet from all residences unless a waiver has been signed by the property owner. In all cases the setback shall be sufficient to comply with the noise standards established by the Minnesota Pollution Control Agency. As established in section 4.1 of the site permit, Black Oak will also maintain a setback of five rotor diameters (1280 – 1680 feet) on the prevailing wind axis from non-participating landowner's property lines and three rotor diameters (760 – 985 feet) on the non-prevailing wind axis.

44. The Project is not expected to affect any existing water wells, as turbine locations will be set back from residences.[59]

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

Zoning and Land Use

46. The Project is located within the Agricultural District A-160 zoning classification established in the *Stearns County Land Use and Zoning Ordinance 439*. The A-160 zoning classification limits residential development by establishing a one dwelling per 160 acres.[60] Approximately 84 percent of the Project Area is comprised of cultivated row crops and 14 percent of the Project Area is comprised of grasslands.[61]

47. Minnesota Statutes section 216F.08 authorizes counties to assume responsibility for processing permit applications for LWECS with a combined nameplate capacity of less than 25,000 kilowatts. Pursuant to Minnesota Statutes section 216F.08, Stearns County notified the Commission in writing on December 10, 2009, that the Stearns County Board of Commissioners assumed permitting responsibility for projects under 25 megawatts. The Stearns County Board amended its ordinance governing Wind Energy Conversion Systems on December 21, 2010.[62]

48. Certain standards adopted by ordinance by Stearns County are more stringent than the Commission's General Permit Standards as set forth the in Docket No. E, G-999/M-07-1102. Minnesota Statutes section 216F.081 states that the Commission shall consider and

[58] Exhibit 4, at p. 11
[59] Exhibit 4, at p. 39
[60] Id., at p. 18
[61] Id., at p. 43
[62] Stearns County, Stearns County Land Use and Zoning Ordinance #439, Printed May 15, 2012, http://www.co.stearns.mn.us/Portals/0/docs/Document%20Library/ordinances/ord439.pdf , at Section 6.60

apply those more stringent standards unless the Commission finds good cause not to apply the standards.

49. The Draft Site Permit identified these more stringent setbacks as a special condition in section 13.1, Application of County Standards, to allow for public to comment on whether these more stringent standards were appropriate for the site permit. In summary, Stearns County had adopted more stringent standards related to setbacks from: (1) property lines; (2) Occupied structures, Stearns County differentiates between occupied structures of participating and non-participating property owners; and (3) a setback of 5 rotor diameters from all parcels of land for which the Permittee has a wind easement for this Project, unless the Stearns County Board finds the wake interference is less than 5 rotor diameters. The Stearns County ordinance also precludes turbines from being placed within a Shoreland Overlay District and requires certain assumptions in modeling for shadow flicker.

50. No comments were received opposing the more stringent setbacks or identifying any good cause not to apply them. All special conditions identified in the Draft Site Permit are carried forward and take precedence.

51. Under section 7.11.4 of the *Stearns County Land Use and Zoning Ordinance 439*, the project substation is a permitted use in all Stearns County zoning districts subject to the setback provisions applicable in the applicable zoning classification. The site permit, at section 13.5, requires the project substation to be sited in compliance with setback standards established for the A-160 zoning classification under section 9.1.11 of the *Stearns County Land Use and Zoning Ordinance 439.*[63]

Property Values

52. Property values are influenced by a complex interaction between factors specific to each individual piece of real estate as well as local and national market conditions; consequently the effect of one particular project on the value of one particular property is difficult to determine.

53. In a 2009 Lawrence Berkeley National Laboratory conducted a nationwide study on the potential impacts of wind projects on property values.[64] Results from that study indicated that property values near wind projects are not negatively impacted and that home buyers and sellers consider a property's scenic vista when determining a sale/purchase price. In their consideration of a moratorium on wind development, the Stearns County Commission looked at the potential impact to property values from wind projects. The Stearns County Assessor's Office prepared "A Study of Wind Energy Conversion Systems in Minnesota." As part of the study, the Assessor's office surveyed counties with LWECS to assess impacts on property values as a result of wind farms. Six counties

[63] Stearns County, *Stearns County Land Use and Zoning Ordinance 439*, May 15, 2012, http://www.co.stearns.mn.us/Portals/0/docs/Document%20Library/ordinances/ord439.pdf
[64] Hoen et al, *The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic* Analysis, Ernest Orlando Lawrence Berkely National Laboratory, December 2009, http://eetd.lbl.gov/ea/ems/reports/lbnl-2829e.pdf

in southern Minnesota (Dodge, Jackson, Lincoln, Martin, Mower, and Murray counties) with large wind energy conversion systems responded to the survey. Although the study did not find any changes in property valuation to properties hosting a wind tower, the study also concluded that there was insufficient data to allow for a reasonable analysis of the development of wind facilities on property values.[65] The study also cited a study from the Renewable Energy Policy Project of 25,000 properties within five miles of a wind project in ten communities in the United States, and concluded that property values were not negatively impacted. The study also cited a study conducted by the Royal Institute of Chartered Surveyors, which found that almost 30 percent of respondents reported a decrease in property values for properties located near wind facilities. In their decision not to adopt a moratorium on LWECS, the Stearns County Commission found that "the impact of wind farms will have a negligible effect on property values.[66]

Noise

54. The operation of the wind turbines would produce noise. Turbines produce mechanical noise (noise due to the gearbox and generator in the nacelle) and aerodynamic noise (noise due to wind passing over the turbine blades).[67]

55. Noise impacts to nearby residents will be factored into the turbine micro-siting process. Black Oak must demonstrate the Project can meet the noise standard pursuant to Minnesota Rules chapter 7030 (site permit, sections 4.3 and 6.6). Noise levels have been predicted by a noise modeling program and will be verified per section 5.1 to be compliant with the Minnesota Pollution Control Agency (PCA) 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. The nighttime L50 limit of 50 dBA is the most applicable stringent state limit.

56. Black Oak estimates its most recent layouts would produce a maximum cumulative calculated noise level of 43.6 to 45 dBA at the nearest noise sensitive receptor, with an average project-related noise level of 32.3 to 36.1 dBA; the highest maximum noise levels were for the 1.8 MW turbine layout, the highest average noise levels were for the 1.5 MW turbine layout. Maximum calculated noise levels for all turbine models are at least 5 dB below the nighttime L50 noise limit of 50 dBA.[68]

[65] Exhibit 15, at pp. 6 – 10
[66] Stearns County Commission, *Stearns County Resolution 10-46: Resolution Adopting Findings of Fact for the Proposed Stearns /county Interim Ordinance Number 444 Imposing a Moratorium on Large Wind Energy Conversion Systems (LWECS) for Projects Five (5) Megawatts and Greater*, June 15, 2010, posted to Paynesville Wind Docket, eDockets ID: 20106-52067-01 .
[67] Minnesota Department of Health. *Public Health Impacts of Wind Turbines.* May 22, 2009, http://www.health.state.mn.us/divs/eh/hazardous/topics/windturbines.pdf
[68] Exhibit 21, at p. 6 and schedules 7 - 9

57. Black Oak will conduct a post-construction noise study as required in section 6.6 of the Permit. The noise study will determine the noise levels at different frequencies and at various distances from the turbines at various wind directions and speeds. The purpose of the post-construction noise study report is to quantify sound generated by the operational LWECS at receptors, compare results to Minnesota Noise Standards, confirm the validity of the pre-construction noise modeling and assess the modeling as a predictor of probable compliance with Minnesota noise standards.

Shadow Flicker

58. Shadow flicker can be described as alternating changes of light intensity at a given receptor. Shadow flicker does not occur when the sun is obscured by clouds or fog, when the turbine rotor is oriented parallel to the receptor, or when the turbine is not operating. Shadow intensity, or how "light" or "dark" a shadow appears at a specific receptor, will vary with the distance from the turbine. Closer to a turbine, the blades will block out a larger portion of the sun's rays and shadows will be wider and darker. Receptors located farther away from a turbine will experience much thinner and less distinct shadows since the blades will not block out as much sunlight. Shadow flicker usually occurs in the morning and evening hours when the sun is low in the horizon and the shadows are elongated. Shadow flicker will be greatly reduced or eliminated within a residence when buildings, trees, blinds, or curtains are located between the turbine and receptor.

59. Shadow flicker computer models simulate the path of the sun over the year and assess at regular time intervals the possible shadow flicker across a project area. The outputs of the model are useful in the design phase of a wind farm.

60. Shadow flicker consultants generally agree that flicker is not noticeable beyond about 10 rotor diameters from a wind turbine.[69] Minnesota has not adopted a standard of acceptable hours for shadow flicker. In December 2010 the Wisconsin PSC adopted administrative rules specifying general permit standards a political subdivision (a city, village, town or county) may impose on the installation or use of a wind energy system. Political subdivisions that choose to regulate wind energy systems may not promulgate regulations more restrictive than those identified in the PSC's rules. The rules became effective in March 2012.[70] Under the Wisconsin Rules, a political subdivision may prohibit a wind energy system from producing shadow flicker more than 30 hours per year at the homes of non-participating residences or occupied community buildings, and may require a wind energy system owner to mitigate shadow flicker that occurs 20 or more hours per year.[71] Several jurisdictions in other countries have established guidelines for acceptable levels of shadow flicker based on certain assumptions.

61. Black Oak provided a preliminary shadow flicker analysis for both expected case and worst case scenarios. Under the expected case, which uses real and weather data to simulate ground conditions, the average home near the Project could be expected to be

[69] Environmental Health Division, Minnesota Department of Health, *Public Health Impacts of Wind Turbines*, May 22, 2009, at 14, http://www.health.state.mn.us/divs/eh/hazardous/topics/windturbines.pdf
[70] Wisconsin Public Service Commission, Wind Siting Rules, http://psc.wi.gov/renewables/windSitingRules.htm
[71] Wisconsin Administrative Code, Chapter 128, http://docs.legis.wisconsin.gov/code/admin_code/psc/128.pdf

exposed to approximately 1.3 to 2.7 hours of shadow flicker per year, with some homes experiencing up to 17.1 and 36.5 hours, depending upon the turbines used. Under a worst case scenario, which assumes that the sun is always shining, the turbines are always in motion and oriented towards the homes, a typical home could expect exposures of between 5.3 and 10.6 hours per year. Depending upon layout, modeling shows some homes experiencing up to 50.3 to 92.4 hours per year under a worst case scenario.[72] The analysis does not differentiate between participating and non-participating landowners.

62. As directed by section 6.2 of the site permit, the Pemittee shall provide data on shadow flicker impacts on each residence of non-participating landowners and participating landowners prior to construction. Information shall account for topography and the physical characteristics of the selected wind turbine. Black Oak Wind will use the results of the modeling in developing a final layout to minimize impacts to residents.

Visual Values

63. The placement of up to 28 turbines for the Project, as well as up to 26 turbines on the adjacent Getty project, will alter the appearance of the area. The existing landscape in the Project vicinity is characterized by agricultural fields, scattered farmsteads and associated windbreaks, and gently rolling topography. The turbines, with heights of up to 492 feet from ground to tip of fully-extended blade, will be prominent features on the landscape. There will be intermittent, expansive views of the turbines to local residents, passing motorists on local roads, and from the nearby WMAs and WPAs. Motorists and drivers may travel within 250 feet of some turbines.

64. 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 (site permit at section 7.18). 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 project site will retain its overall rural character. The turbines and associated facilities necessary to harvest the wind for energy are not inconsistent with existing agricultural practices.

65. Many factors influence how a wind energy facility is perceived. Factors may include levels of visual sensitivity of individuals, viewing conditions, visual settings, and individual ideas and experiences. Distance from a turbine(s) and activities within and near the project area, landscape features such as hills and tree cover, as well an individual's personal feelings about wind energy technology can all contribute to how a wind energy facility is perceived. 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. Visually, the Project will be similar to other LWECS projects located in rural areas in Minnesota.

[72] Exhibit 21, at p.7

Health and Safety

66. There are no public airports within the Project boundary. There are four airports within 20 miles of the Project boundary. The Sauk Centre Municipal Airport is the nearest airport, located approximately four miles northeast of the Project boundary and primarily serves local navigation and has an average of 112 flights per week on its two runways.[73]

67. Black Oak has not yet been issued a "no hazard" determination from the Federal Aviation Administration (FAA). Section 4.12 of the site permit requires the Permittee to avoid placing wind turbines or associated facilities in a location that could create an obstruction to navigable airspace of public or licensed private airports. The Permittee must comply with the requirements of the Minnesota Department of Transportation, Department of Aviation and FAA (site permit, sections 10.5.1 and 4.12).

68. A preliminary review of the project area using the screening tool developed by the US Department of Defense to assess potential impacts to Long-Rang and Weather Radar shows the project to be outside of the anticipated impact zones for NEXRAD weather radar and Air Defense and Homeland Security Radars.[74]

69. Air traffic may be present near the Project for crop dusting of agricultural fields. Crop dusting is typically carried out during the day by highly maneuverable airplanes or helicopters. The installation of wind turbines in active croplands and installation of overhead collector lines, if needed, will create a potential for collisions with crop dusting aircraft. Any new overhead collector lines are expected to be similar to existing distribution lines and located along the edges of fields and roadways, minimizing the potential for collisions with aircraft. The turbines themselves would be visible from a distance and lighted according to FAA guidelines (section 7.18 of the site permit). The permanent meteorological towers will be free standing and have lighting consistent with the turbines.

70. Possible health concerns associated with wind turbines and transmission of electricity generally include those from electric and magnetic fields (EMF). The term EMF refers to electric and magnetic fields that are present around electrical devices. Electric fields arise from the voltage or electrical charges and magnetic fields arising from the flow of electricity or current that travels along transmission lines, power collection (feeder) lines, substation transformers, house wiring and electrical appliances. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors. When operating, the proposed Project will generate electromagnetic fields.

71. EMF from underground electrical collection lines dissipates very close to the line because they are installed below ground within insulated shielding. The voltage for the feeder lines for this project would be 34.5 kV. EMF associated with the transformers at the base

[73] AirNav.com, http://www.airnav.com/airport/D39
[74] US Federal Aviation Administration, *DOD Preliminary Screening Tool*, https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp

of each turbine completely dissipates within 500 feet from the transformer.[75] Turbines will be set back at least 1,000 feet from residences unless a waiver is signed by the landowner.

72. The Commission has consistently found that there is insufficient evidence to demonstrate a causal relationship between EMF exposure and adverse human health effects.

73. Stray voltage, also referred to as neutral-to-earth voltage, is sometimes raised as an issue with transmission lines in relation to effect on livestock. The Project is not expected to create stray voltage because the Project does not connect directly to residences or farms in the area and does not change on-farm electrical service.[76]

74. 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. The setback requirements in section 4 of the site permit provide further assurance that the turbines will be placed an adequate distance from residences, roads and other areas of human activity.

75. Black Oak will prepare an emergency response plan (fire protection and medical emergency plan) in consultation with the emergency responders having jurisdiction over the Project area (site permit, section 7.16). As with any large construction project, some risk of worker or public injury exists during construction. Black Oak and its construction representatives and workers will prepare and implement work plans and specifications in accordance with applicable worker safety requirements during construction of the Project. Black Oak will also control public access to the Project during construction and operation. Black Oak will provide security during construction and operation of the project, including fencing, warning signs, and locks on equipment and facilities. Black Oak will also provide landowners, interested persons and public officials and emergency responders with safety information about the project and its facilities (site permit, sections 7.15 and 7.16).

76. 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 emergency response plan (site permit, sections 7.17 and 7.16).

Public Services and Infrastructure

77. The Project is expected to have minimal effects on existing public infrastructure. Except for a short period of time during construction and occasionally during operation and

[75] Exhibit 4, at p. 30
[76] Department of Commerce, *Environmental Report: Black Oak/Getty Wind Project*, May 2012, eDocket ID: 20125-74522-01

maintenance activities, the Project will not generate an increase in traffic volumes or daily human activity. The construction contractor will repair any road damage that may occur during the construction of the Project (site permit, section 7.8).

78. The Project will require the use of public roads to deliver construction supplies and materials to the work site, resulting in wear and tear on roads. The Project is located approximately three miles south of Interstate 94, and is crossed by a number of county and township roads. Other than short-term impacts during construction, no significant permanent changes in road traffic patterns or volume are expected. Black Oak will provide the Commission, township, and county officials identification of all roads to be used for the Project at least 14 days prior to pre-construction meeting, including the timing of the delivery of towers and turbines and arrival of the crane to erect project equipment (site permit, 7.8.1). Prior to using the roads, Black Oak will make satisfactory arrangements with the appropriate road authorities concerning use, maintenance, and repair of roads to be used during the construction of the Project (site permit, 7.8.1).

79. Black Oak will construct approximately four to six miles of access roads connecting the turbines with public roads. Access roads will be low-profile to allow farm equipment to cross easily. The typical access road will be approximately 40 feet wide during the construction phase of the Project to accommodate large cranes required for installation. Following construction, the roads would be reduced to approximately16 feet in width and covered in Class 5 gravel (or similar material) to provide year-round access. Areas that were temporarily disturbed during construction will be re-graded to natural contours, filled, and dressed as needed.[77] The specific turbine locations will determine the amount of roadway that will be constructed for this Project. Temporary disturbances during construction of the Project include crane pads at each turbine site, temporary travel roads for the cranes, temporary laydown areas around each turbine, trenching in the underground electrical collection system, and storage/stockpile area.

80. Access roads shall be constructed in accordance with all necessary township, county or state road requirements and permits (site permit section 7.8.2). 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. Black Oak may do this work or contract it out.

81. If access roads are installed across streams or drainage ways Black Oak, in consultation with the Minnesota Department of Natural Resources (DNR), 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 DNR (site permit at 4.6 and 7.8.2).

82. Black Oak will bury all SCADA communications cables within or adjacent to land necessary for turbine access roads (site permit section 4.14).

[77] Exhibit 4, at pp. 64 - 65

83. The proposed project will have approximately six miles of cables for the collector lines on private property within the wind farm.[78] Collector lines carrying electrical power from turbines to electrical interconnection points will be buried underground and placed within or adjacent to turbine access roads unless otherwise negotiated with affected landowners (site permit, section 4.15). Feeder lines carrying power from internal project interconnection points to the Project substation may be overhead or underground as negotiated with individual landowners (site permit section 4.15). The Applicant anticipates that feeder lines will also be buried; if conditions exist that would prevent the feeder lines from being buried, feeder lines will be installed overhead.[79]

84. Prior to construction, Black Oak will contact Gopher State One Call to locate underground facilities so they can be avoided. Further, section 7.15 of the site permit requires the Permittee to submit the location of underground cables, collector, and feeder lines to Gopher State Once Call.

85. In areas where Project facilities cross or may otherwise affect existing telephone lines or equipment Black Oak will enter into agreement with telecom service providers to avoid interference with existing telecom facilities.[80] Black Oak will fulfill, comply with, and satisfy all Institute of Electrical and Electronics engineers, Inc. (IEEE) standards applicable to the Project with respect to avoiding interference with communication systems (site permit, section 4.15).

86. Under section 6.4 of the site permit Black Oak may not operate the Project so as to cause microwave, television, radio, telecommunications, or navigation interference in violation of Federal Communication Commission regulations or other law. In concordance with section 6.4 of the site permit, Black Oak will prepare an assessment of communication resources in the Project vicinity to provide data that can be used in the future to determine whether elements of the Project are the cause of disruption or interferences with television, or radio reception, microwave patterns, or telecommunications signals. The permit requires Black Oak to take timely measures to correct any interference that may occur as a result of the Project. Black Oak has identified one microwave beam path crossing the southern part of the Project.[81]

87. There are no pipelines or railroads located within the project boundary.[82]

88. Great River Energy (GRE) owns a 400 kV Direct Circuit transmission line that crosses the Project.[83] There are no established setbacks from high voltage transmission lines, but Black Oak Wind anticipates maintaining a setback of 150 meters (492 feet) from the 400 kV DC line, consistent with that of the adjacent Getty project.[84] A portion of Xcel Energy's Fargo – St. Cloud 345 kV transmission line will cross through the northern portion of the Project.

[78] Id., at 9
[79] Id.
[80] Id., at p. 23
[81] Exhibit 4, at p. 23
[82] Id., at p. 24
[83] Id.
[84] Exhibit 21, schedules 2, 4, and 6

Recreational Resources

89. Wildlife Management Areas (WMAs) are established to protect lands and waters that have a high potential for wildlife production, public hunting, trapping, fishing and other compatible recreational uses. These DNR lands are acquired and developed primarily with hunting license fees. There are no WMAs within the Project boundary, however the Padua WMA is located just south of the Project and the Tower, Miller, Victor Winter, Sauk River, and Spirit Marsh WMAs are located within approximately five miles of the Project.[85] Waterfowl Production areas (WPAs) are acquired as public land or protected through perpetual easement as part of the US Fish and Wildlife Services (USFWS) National Wildlife Refuge System to provide habitat for a variety of birds and wildlife. WPAs also provide outdoor recreational opportunities such as hunting, hiking, and wildlife watching. The Behnen and Trisko WPAs are adjacent to the Project and 15 other WPAs are located within five miles of the Project.[86]

90. Scientific and Natural Areas (SNAs) are designated to protect rare and endangered species habitat, unique plant communities, and significant geologic features that possess exceptional scientific or educational values; the Sedan Brook Prairie SNA is located approximately five miles south of the Project boundary. There are no National Wildlife Refuges, state, or national parks within five miles of the Project boundary.[87]

Community Benefits

91. Black Oak estimates that the Project will generate approximately $150,000 to $170,000 in Wind Energy Production Tax to local units of government. Landowners with turbine(s) and/or wind easements on their property will also receive payments from the Permittee.[88]

92. Local contractors and suppliers will be used for portions of the construction.[89] In their joint application for a Certificate of Need, Black Oak and Getty estimated a construction workforce of approximately 90 to 135 for the combined projects over approximately six months.[90]

Effects on Land-Based Economies

93. The Project is located in an agricultural area, approximately 84 percent of the site is covered in cultivated row crops.[91] Most of the soil within the Project area is considered prime farmland and most of the impacts from the Project will occur on cultivated agricultural lands. Black Oak estimates that approximately 13.5 to 20 acres of land will

[85] Exhibit 4, at p. 27
[86] Id., at p. 28
[87] Id.
[88] Exhibit 4, at p. 37
[89] Id.
[90] Black Oak and Getty, *Joint Application for Certificate of Need for the Black Oak and Getty Wind Projects,* October 11, 2011, eDocket ID: 201110-67221-03, at p. 61
[91] Exhibit 4, at p. 42

be permanently removed from agricultural production as a result of the Project.[92] EFP staff estimates that approximately 80 to 115 acres of agricultural land will be temporarily impacted by construction activities (e.g. grading, soil compaction, access roads, turnaround areas, temporary construction staging areas). Overall, impact to agricultural lands as a result of the Project is anticipated to be short term, and is not expected to alter crop production. Once in operation, it may occasionally be necessary for Black Oak to complete repairs, or clear vegetation around a turbine or facility, which could result in additional temporary impact to agricultural operations. These interruptions are expected to be infrequent and short term.

94. Under section 7.2 of the site permit Black Oak is required, unless otherwise negotiated with landowners, to implement measures to protect and segregate topsoil from subsoil in cultivated land.

95. The site permit, at section 7.5, requires Black Oak to promptly repair or replace any fences or gates removed or damaged during all phases of the Project's life unless otherwise negotiated with affected landowners. Section 7.6 of the site permit requires Black Oak to promptly repair or replace any drainage tiles broken or damaged during any phase of the Project's life.

96. The proposed project will not adversely affect any forestry or mining operations.[93]

Archaeological and Historical Resources

97. Black Oak commissioned a review of records at the Minnesota State Historic Preservation Office (SHPO) for the majority of the Project area. Subsequent to commissioning the survey, Black Oak expanded the Project by six sections to the north; the expansion area is not included in the Phase Ia Literature Search Report provided in the Revised Site Permit Application.[94] Black Oak Wind states that it will review the records for the expanded area prior to construction.[95]

98. The archaeologists preparing the literature review recommend that further investigation of the Project site through a Phase I archaeological reconnaissance survey by a professional archaeologist permitted by the State of Minnesota.[96] Section 6.3 of the site permit requires the Permittee to conduct an archaeological reconnaissance survey (Phase I or Phase IA) and provide the results to the Commission, the State Historic Preservation Office (SHPO) and the State Archaeologist at least 14 days prior to the pre-construction meeting. An archaeological reconnaissance survey is used to determine if archaeological sites exist within the area potentially affected by the Project. Depending upon the results of the reconnaissance survey, more detailed work may be necessary.

[92] Id., at p. 43
[93] Id., at p. 35
[94] Exhibit 4 at p. 25
[95] Id.
[96] Id.

99. 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 SHPO, the State Archaeologist, and consulting American Indian communities. Section 6.3 of the site permit also requires the Permittee to stop work and notify the Commission, SHPO, and the State Archaeologist if any unrecorded cultural resources are found during construction.

Air and Water Emissions

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

Wildlife

101. Landcover within the Project boundary is comprised primarily of cultivated land (approximately 84 percent) and grassland (approximately 14 percent).[97] Direct disturbances to wildlife habitat are expected to be minimal, as Black Oak has committed to placing turbines, access roads, and other project components on cropped land.

102. Wildlife species found within the Project area include both resident and migratory species of Minnesota game and non-game wildlife associated with the cropland, upland grasslands and wetland and forested area that comprise the project area.[98]

103. Based on studies of existing wind power projects in the United States and Europe, impacts to avian and bat populations are typically the areas of greatest concern. Direct impacts may include strike fatality from turbine blades, power lines, and related infrastructure. Indirect impacts may include displacement of birds and bats and other wildlife from their habitats, site avoidance, and behavioral modification.[99]

104. Black Oak, together with Getty, commissioned surveys of wildlife habitat and use of the Black Oak and Getty sites, with particular emphasis on avian species. Black Oak used information from these surveys to avoid siting of the turbines in areas known to have high avian use.

105. Black Oak and Getty jointly developed and submitted a draft an Avian and Bat Protection Plan (ABPP) into the record on January 17, 2012.[100] The draft ABPP incorporates survey information of wildlife habitat and use of the Black Oak and Getty sites and describes design, construction, and operation standards to be used to minimize impacts to avian and bat species. The draft ABPP also describes training procedures to be used for construction and operations staff, a wildlife carcass and injury discovery process, reporting procedures, and proposed incident reporting forms. Black Oak and

[97] Id. at p. 33
[98] Id., at p. 44
[99] National Wind Coordinating Collaborative, *Wind Turbine Interactions With Birds, Bats, and Their Habitats: A Summary of Research Results and Priority Questions.* Spring, 2010. www.nationalwind.org
[100] Draft Avian and Bat Protection Plan, January 17, 2012, eDocket ID: 20121-70380-02 (Exhibit 17)

Getty received comments on the Draft ABPP from the USFWS, DNR, and Department of Commerce Staff. Black Oak and Getty submitted a revised ABPP on July 10, 2012.[101]

106. Publicly available post construction avian and bat mortality at wind farms across the U.S. show a range of avian fatalities reported of between 0.49 to 7.17 birds per MW, or 0.44 to 11.83 birds per turbine.[102] Because research on the aggregate impact of avian fatalities resulting from wind farms on species populations is ongoing, it is not possible to determine impacts the Project may have on species populations in the area.

107. Section 6.7 of the site permit requires Black Oak to comply with the provisions of the ABPP prepared for the Project, submit quarterly avian and bat reports, and report dead or injured birds or bats.

108. Throughout the project record DNR staff reviewed several iterations of the layout of the Project. DNR comments note the presence of public lands, public waters, wetlands, and sensitive species as well as the large tracts of disturbed agricultural lands within the Project, and the efforts taken by Black Oak to avoid demonstrated areas of high avian use. The most recent DNR comments characterize the Project, and the adjacent Getty project, as of moderate risk to birds and bats. DNR staff recommends that the Commission require post-construction monitoring for avian fatalities according to the moderate risk protocol.[103] The proposed site permit, at section 13.2, requires Black Oak to design and implement a post-construction avian and bat fatality survey consistent with the DNR Draft Avian and Bat Monitoring Protocol for a site considered to be of moderate risk to wildlife and to provide the survey design to the Commission at least 90 days prior to the planned commencement of commercial operation.

109. In its comments on the adjacent Getty Wind Project, the United States Fish and Wildlife Service recommended that bird diverters be installed on any above ground collector, feeder, distribution or transmission lines to minimize the potential for bird collisions with above ground electrical lines.[104] The attached proposed site permit contains a special condition, at section 13.3, requiring Black Oak Wind to install bird diverters on any overhead collector, feeder, or distribution line constructed as part of this project.

110. At this time published peer-reviewed research identifying mitigation strategies to minimize impacts to bats is limited. In particular, information on turbine locations to minimize bat impacts is unclear. There is a growing body of literature indicating that curtailment, limiting turbine operation either through a higher cut-in speed or turning turbines off at certain times of high bat activity, may significantly minimize bat impacts from wind projects.[105] The site permit, at section 13.3, requires Black Oak to submit a

[101] Revised Avian And Bat Protection Plan, July 11, 2012, eDocket ID: 20127-76674-01 (Exhibit 25)
[102] Exhibit 26, at p. 21
[103] DNR, *Comments on Turbine Layouts for Black Oak and Getty Wind Projects in Stearns County*, August 24, 2012, eDocket ID: 20128-78117-01 (Exhibit 30)
[104] USFWS December 29, 2012, Comment Letter on Getty Wind Project, found in Public Comments on Getty LWECS Site Permit Application, eDocket ID, 20121-70416-01 , at pp. 20 - 23
[105] Ellison, L.E. 2012. *Bats and Wind Energy-A Literature Synthesis and Annotated Bibliography*: U.S. Geological Survey Open-File Report 2012–1110. 57 p., http://pubs.usgs.gov/of/2012/1110/OF12-1110.pdf

report to the Commission no later than December 15, 2013, summarizing the findings from a site-specific bat study characterizing species present and level of bat activity within the Project boundary. EFP staff will continue to monitor for mitigation strategies to minimize impacts to bats.

Rare and Unique Natural Resources

111. Field surveys at the site did not identify any species listed under the federal Endangered Species Act. The field studies did identify seven bird species (trumpeter swan, horned grebe, Wilson's Phalarope, marbled godwit, Forster's Tern, American white pelican, and bald eagle) listed by the State of Minnesota as endangered, threatened or special concern.[106]

112. An active Bald Eagle nest was discovered early in the avian surveys and was monitored throughout the surveys and into the spring of 2012. The revise ABPP, dated July 2012, identifies disturbance of the active bald eagle nest as a primary concern for avian species during the construction phase of the Project and identifies training that will be implemented to avoid nest disturbance.[107] Black Oak Wind states that they continue to work closely with the USFWS to analyze bald eagle use date collected during the surveys. Under 50 CFR § 22.26, the USFWS may issue an eagle take permit if an otherwise lawful activity may result in disturbance, injury or harm (i.e. "take") to bald or golden eagles and the risk of a "take" cannot be effectively avoided or mitigated. As of July 10, 2012, the USFWS has not recommended that Black Oak or Getty seek an eagle take permit.

Vegetation

113. Approximately 14 percent of the area within the Project boundary is grassland. Grassland and wetland areas within the Project boundary may contain remnant native prairie areas. [108] Areas of native prairie within the area potentially disturbed during construction of the Project will be identified in the Biological Inventory Survey required under section 6.1 of the permit. If any native prairie is identified in the Biological Inventory Survey, section 4.7 of the permit requires Black Oak Wind to prepare a Prairie Protection and Management Plan identifying steps taken to avoid impacts to native prairie and mitigation for unavoidable impacts to native prairie.

114. Black Oak Wind will minimize impacts to CRP land avoid impacts to RIM lands.[109] Black Oak has not identified Conservation Reserve Program (CRP) or Reinvest in Minnesota (RIM) lands or easements within the Project boundary.[110]

[106] Exhibit 1, at Appendix I, pp. 12 - 17
[107] Exhibit 25, at pp.14-15
[108] Exhibit 4 at p. 42
[109] Id., at p. 34
[110] Exhibit 24, at response 7

115. Section 7.11 of the site permit requires Black Oak to incorporate a comprehensive re-vegetation plan in the Soil Erosion and Sediment Control Plan developed for the Project, in order to ensure adequate erosion control and restoration of the site.

116. No forested lands 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.[111]

Geology, Soils, and Groundwater Resources

117. Construction of the wind turbines and access roads in farmland increases the potential for erosion during construction. Section 7.11 of the site permit requires a Soil Erosion and Sediment Control Plan. Because the Project disturbs more than one acre, it will require a National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Construction Stormwater Permit from the PCA. Black Oak will prepare a Storm Water Pollution Prevention Plan (SWPPP) for the Project, identifying the management practices used to prevent erosion.[112]

118. Upon completion of construction Black Oak will re-grade temporarily disturbed areas to natural contours. Access roads re-graded, filled, and dressed.[113] Disturbed areas will be loosened and re-seeded to blend with existing vegetation.[114]

119. Section 7.3 of the site permit requires Black Oak to implement measures to minimize soil compaction during all phases of the Project's life.

120. Surface geology in the Project area consists of glacial deposits associated with the Des Moines Lobe. The surficial deposits range in depth from 150 to 200 feet across the Project area. The glacial aquifers providing groundwater in Project area are generally unconfined and considered low yield. The water table is shallow, approximately 0 to 20 feet below ground surface across the site. Water needs for the Project will be limited, similar to those required by a residence.[115] Because turbine locations will be set back from residences, impacts to wells are not anticipated.[116]

Surface Water and Wetlands

121. Wind turbines and associated facilities will not be located in public water wetlands, except that collector and feeder lines may cross if authorized by the appropriate permitting agency (site permit, section 4.6). A permit may be required if surface waters are impacted (site permit, section 10.5.1).

122. Use of appropriate erosion control measures will minimize impacts to surface waters and wetlands. Black Oak will identify erosion control measures to be implemented in each

[111] Exhibit 4, at p. 43
[112] Id., at p. 38
[113] Id., at p. 66
[114] Id., at p. 43
[115] Environmental Report: Black Oak/Getty Wind Project May 2012, eDocket ID: 20125-74522-01, at p. 19
[116] Exhibit 4, at p. 39

phase of the Project in the Soil Erosion and Sediment Control Plan prepared for the Project (site permit, section 7.11).

123. Black Oak will identify any potentially affected wetlands prior to construction (site permit, section 6.1)

Future Development and Expansion

124. Current information suggests windy areas in this part of the state are large enough to accommodate more wind facilities. The Paynesville Wind Farm was permtted by the Commission in 2011 but has not yet begun construction; other facilities are believed to be in various stages of planning or development in Stearns County.

125. While large-scale projects have occurred elsewhere (Texas, Iowa and California), little systematic study of the cumulative impact has occurred. EFP staff will continue to monitor for impacts and issues related to wind energy development.

126. The Commission is responsible for siting of LWECS "in an orderly manner compatible with environmental preservation, sustainable development, and the efficient use of resources."[117] Section 4.1 of the site permit provides for buffers between adjacent wind generation projects to protect production potential.

Maintenance

127. Black Oak will manage the ongoing operation of the Project. Maintenance of the turbines will be on a scheduled, rotating basis.[118] Equipment will be monitored by local staff, and remotely by Black Oak's operations and power scheduling desk.[119] An Operations and Maintenance facility is planned for the Project. Once a site is selected, Black Oak will seek permitting for the O&M facility through Stearns County.[120]

Decommissioning and Restoration

128. Black Oak anticipates that the life of the Project to be 30 years beyond the date of first commercial operation. Black Oak wishes to reserve the right to extend the life of the Project beyond the 30 year date and may apply for an extension of the LWECS site permit to continue operation of the Project.[121]

129. At the end of operation, Black Oak will be responsible for removing wind facilities and turbines. Black Oak will be responsible for costs to decommission the Project and

[117] Minn. Stat. § 215F.03.
[118] Exhibit 1, at pp. 65-66
[119] Exhibit 4, at pp. 67 - 68
[120] Exhibit 4, at p. 8
[121] Id., at p. 70

associated wind facilities.[122] Black Oak estimates the cost of decommissioning to be approximately $74,500 in current dollars.[123]

130. As provided in section 9.1 of the site permit, the Permittee must submit a Decommissioning Plan to the Commission prior to the pre-operation compliance meeting. The Decommissioning Plan will document the manner in which Black Oak will ensure that it carries out its obligations to provide for the resources necessary to fulfill its requirements to properly decommission the Project at the appropriate time. The site permit addresses site restoration at section 9.2.

131. As provided in the site permit, at section 9.2, Black Oak is required to dismantle and remove from the site all towers, turbines, transformers, overhead and underground cables and lines, foundations, buildings and ancillary equipment to a depth of four feet. Any agreement for removal of Project facilities to a lesser depth, or for no removal, must be recorded with the county in a manner that clearly shows the location of any remaining foundations. Under terms of section 9.2 of the site permit, Black Oak will restore and reclaim the site to its pre-project topography and topsoil quality within 18 months of the time the Project, or any component, ceases operation.

132. As provided in section 9.3 of the site permit, Black Oak shall advise the Commission of any turbines abandoned prior to termination of the operation of the Project. As further specified in section 9.3 of the site permit, any turbines abandoned prior to termination of operation of the Project are to be decommissioned pursuant to section 9.2 of the site permit unless an alternate decommissioning plan is developed and submitted to the Commission.

Site Permit Conditions

133. All of the above findings pertain to Black Oak's requested permit for a 42 megawatt LWECS.

134. 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.

135. The site permit contains conditions that apply to site preparation, construction, cleanup, restoration, operation, maintenance, abandonment, decommissioning and all other aspects of the Project.

[122] Id.
[123] Exhibit 24, at response 6

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 over the site permit applied for by Black Oak Wind, LLC, for the 42 megawatt Black Oak Wind Farm pursuant to Minnesota Statute 216F.04.

3. Black Oak Wind, LLC, has substantially complied with the procedural requirements of Minnesota Statutes chapter 216F and Minnesota Rules chapter 7854.

4. The Minnesota Public Utilities Commission has complied with all procedural requirements required of Minnesota Statutes chapter 216F and Minnesota Rules chapter 7854.

5. The Minnesota Public Utilities Commission has considered all the pertinent factors relative to its determination of whether a site permit should be approved.

6. The Black Oak Wind Farm is compatible with the policy of the state to site LWECS in an orderly manner compatible with environmental preservation, sustainable development, and the efficient use of resources under Minnesota Statutes section 216F.03.

7. The Minnesota Public Utilities Commission has the authority under Minnesota Statutes section 216F.04 to place conditions in a permit and may deny, modify, suspend, or revoke a permit. The conditions contained in the site permit issued to Black Oak Wind, LLC, for the Black Oak Wind Farm are reasonable and appropriate.

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 Black Oak Wind, LLC, to construct and operate the 42 megawatt Black Oak Wind Farm in Stearns 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. IP6853/WS-10-1240.

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)

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