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February 9, 2018

VIA ELECTRONIC FILING

Mr. Daniel P. Wolf
Executive Secretary
Minnesota Public Utilities Commission
350 Metro Square Building
121 Seventh Place East
St. Paul, MN 55101

RE: Lake Benton Power Partners LLC
Docket No. IP6908/WS-13-294

Dear Mr. Wolf:

ALLETE Clean Energy is requesting pursuant to Minn. Rules 7854.1300, subp. 2 that the Minnesota Public Utilities Commission ("Commission") approve an amendment to the existing Large Wind Energy Conversion System ("LWECS") site permit originally issued on October 31, 1995 and amended on June 19, 1997 by the Minnesota Environmental Quality Board ("MEQB"), and amended most recently on November 1, 2017 by the Commission for the Lake Benton Power Partners 107.25 MW wind farm project (hereinafter "Lake Benton"). See Commission Docket No. IP6908/WS-13-294 / EQB Permit No. LWECS-1-1997 and the attached LWECS permit amendment application. The site permit amendment on November 1, 2017 extended the term of the permit by ten years, to November 1, 2039, and updated the permit conditions to comply with the current rules. At the time of approval, it was requested that ALLETE Clean Energy return with a follow-up petition detailing the work to be completed under our site refurbishment project, which is the subject of this site permit amendment petition.

The Lake Benton project was originally developed by Northern States Power ("NSP") and LBPP as one of the initial large wind projects along the Buffalo Ridge in southwestern Minnesota. On January 28, 2014, ALLETE Clean Energy, Inc., through an indirect subsidiary, acquired a company that owns Lake Benton Power Partners L.L.C. ("LBPP"). Since then, LBPP has continued to operate the project and to sell the output to Xcel Energy under a Commission approved power purchase agreement and providing the required compliance filings in the above-referenced Docket.

In 2005, the siting authority for wind facilities, including the Lake Benton project, was transferred by the Legislature from the MEQB to the Commission. 2005 Minn. Laws Ch. 97, Sec. 17. Therefore, LBPP, is seeking approval from the Commission to amend the current LWECS site permit to include the existing site conditions and setbacks as originally approved by the MEQB, to facilitate the refurbishment project planned for the site.

ALLETE Clean Energy has developed a refurbishment strategy that involves a significant investment in the existing turbines at the Lake Benton project. The investment will consist of

replacing or refurbishing the major components of the wind turbines. The work on items such as blades, gearboxes, generators, and switchgear will ensure safe, reliable operations through the end of the site permit term of November 1, 2039. ALLETE Clean Energy has detailed the work to be completed, along with the updated site conditions and environmental reviews completed for this project, and requests the Commission invoke the procedures set forth under Minn. Rules 7854.1300 to amend the existing site permit.

If you have additional questions please contact me at 218-355-3338, or wsawyer@alletecleanenergy.com, or David Moeller from ALLETE at 218-723-3963, or dmoeller@allete.com.

Yours truly,

William J. Sawyer

Manager – Clean Energy Solutions

Encl.

STATE OF MINNESOTA	)	AFFIDAVIT OF SERVICE VIA
	) ss	ELECTRONIC FILING
COUNTY OF ST. LOUIS	)	

Jodi Nash of the City of Duluth, County of St. Louis, State of Minnesota, says that on the 9th day of February, 2018, she served Lake Benton Power Partners' LWECS Amendment Application in Docket No. IP6908/WS-13-294 on the Minnesota Public Utilities Commission and the Energy Resources Division of the Minnesota Department of Commerce via electronic filing.

_____

Jodi Nash

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Generic Notice	Commerce Attorneys	commerce.attorneys@ag.state.mn.us	Office of the Attorney General-DOC	445 Minnesota Street Suite 1800 St. Paul, MN 55101	Electronic Service	Yes	OFF_SL_13-294_OFF_SL_13-294_WS-13-294 Lake Benton Power Partners
Ian	Dobson	residential.utilities@ag.state.mn.us	Office of the Attorney General-RUD	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012130	Electronic Service	Yes	OFF_SL_13-294_OFF_SL_13-294_WS-13-294 Lake Benton Power Partners
Sharon	Ferguson	sharon.ferguson@state.mn.us	Department of Commerce	85 7th Place E Ste 280 Saint Paul, MN 551012198	Electronic Service	Yes	OFF_SL_13-294_OFF_SL_13-294_WS-13-294 Lake Benton Power Partners
David	Leveille	dLeveille@alletecleanenergy.com	Allete Clean Energy	30 West Superior St Ste 200 Duluth, MN 55802-2093	Electronic Service	No	OFF_SL_13-294_OFF_SL_13-294_WS-13-294 Lake Benton Power Partners
Daniel P	Wolf	dan.wolf@state.mn.us	Public Utilities Commission	121 7th Place East Suite 350 St. Paul, MN 551012147	Electronic Service	Yes	OFF_SL_13-294_OFF_SL_13-294_WS-13-294 Lake Benton Power Partners

Large Wind Energy Conversion System
Site Permit Amendment Application
PUC Docket: IP6908/WS-13-294
EQB Permit: LWECS-1-1997

Lake Benton Power Partners LLC

Prepared for
Lake Benton Power Partners, LLC
a subsidiary of
ALLETE Clean Energy, Inc.

February 2018

Large Wind Energy Conversion System

Site Permit Amendment Application
PUC Docket: IP6908/WS-13-294
EQB Permit: LWECS-1-1997

Lake Benton Power Partners, LLC

Prepared for
Lake Benton Power Partners, LLC
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ALLETE Clean Energy, Inc.

February 2018

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Large Wind Energy Conversion System
Site Permit Amendment Application
Lake Benton Power Partners, LLC

February 2018

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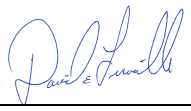
Acronyms and Abbreviations

Acronym	Description
ABPP	Avian and Bat Protection Plan
ADT	Average Daily Traffic
AGL	above ground level
BBCS	Bird and Bat Conservation Strategy
CSAH	County State Aid Highways
dBA	decibels, A-weighted scale
DNH	Determination of No Hazard
DNR	Department of Natural Resources
EERA	Energy Environmental Review and Analysis
EQB	Environmental Quality Board
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
ft	feet
FEMA	Federal Emergency Management Agency
IA	Interconnection Agreement
kV	kilovolt
LBPP	Lake Benton Power Partners, LLC
LWECS	Large Wind Energy Conversion System
m	meters
MBS	Minnesota Biological Survey
MISO	Midcontinent Independent System Operator
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MPH	miles per hour
MW	megawatt
NPPMP	Native Prairie Protection and Management Plan
NCF	Net Capacity Factor
NHIS	Natural Heritage Information System
NLEB	Northern long-eared bat
NPDES	National Pollutant Discharge Elimination System
NWI	National Wetlands Inventory
PUC	Public Utilities Commission
RD	rotor diameter
RPM	revolutions per minute
ROW	right-of-way
SDS	State Disposal System
SWCD	Soil and Water Conservation District
USACE	U.S. Army Corps of Engineers

USFWS	U.S. Fish and Wildlife Service
Xcel	Xcel Energy

Important Terms Used in this Application

Term	Description
Facility	Lake Benton Power Partners, LLP's existing 107.25 megawatt (MW) wind energy generation facility located in Lincoln County, Minnesota.
Project	Proposed accelerated maintenance to the existing Facility, consisting of retrofitting the existing wind turbines by replacing worn components with new components and increasing the rotor diameter by installing slightly longer blades (those currently available as replacement blades).
Retrofit	Lake Benton Power Partners, LLP's terminology for the turbine upgrades that are the subject of this application. The retrofit process includes replacing select turbine components and installing slightly longer turbine blades, thereby increasing the rotor diameter by two meters. The turbine locations will not change and the towers will remain the same height. In this way, the term "retrofit" is consistent with the PUC's unofficial term for this kind of activity, a "partial repowering."
Site Boundary	The boundary that was documented in the 2017 Site Permit and that is not subject to change as part of the proposed Project.

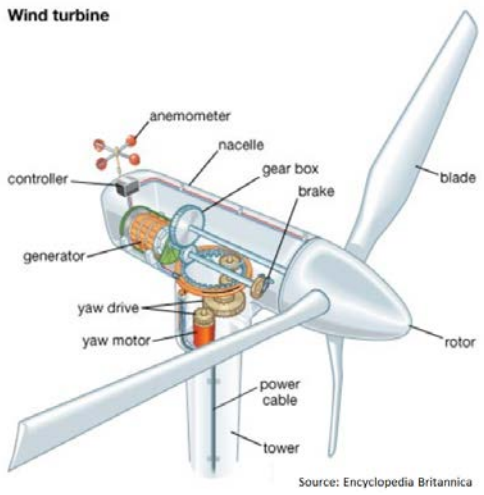
Applicant:	Lake Benton Power Partners, LLC
Address:	30 West Superior Street Duluth, Minnesota 55802
Phone:	(218) 355-3232
Authorized Representative:	Dave Leveille, Vice President, Operations & Customer Excellence ALLETE Clean Energy, Inc.
Signature:	
Preparers of Application:	Bill Sawyer, Manager – Clean Energy Solutions ALLETE Clean Energy, Inc. Rachael Shetka and Daniel Flo Barr Engineering Co.

1.0 Introduction

Lake Benton Power Partners, LLC (LBPP), a subsidiary of ALLETE Clean Energy, Inc., currently operates an existing wind energy generation facility with a nameplate capacity of 107.25-megawatts (MW) located in Lincoln County, Minnesota (refer to Figure 1; "Facility"). The Minnesota Environmental Quality Board (EQB) issued LBPP a Large Wind Energy Conversion System (LWECS) Site Permit (Public Utilities Commission [PUC] Docket: IP6908/WS-13-294, EQB Permit: LWECS-1-1997) on October 31, 1995, and made subsequent amendments on June 19, 1997 and November 1, 2017. As a result of the most recent permit amendment, the permit expires on November 1, 2039. The current (amended) permit is referred to throughout this application as the "Site Permit." Where necessary, the original 1995 version of the permit is referred to as the "Original Site Permit."

The Facility originally included 143 Zond turbines (Z 750 model) with a 48 meter (m) [157.5 foot (ft)] rotor diameter (RD) and 53 m [174 ft] hub height, and commenced commercial operation in 1998. LBBP permanently decommissioned four of the turbines; therefore, the Facility currently consists of 139 turbines. The Site Permit boundaries on the figures reflect the boundary in the amended Site Permit issued November 1, 2017.

LBPP is planning an accelerated maintenance program to modernize the Facility's turbines to ensure safe, reliable operations through the end of the permit term of November 1, 2039, and to more efficiently utilize the site's wind resources. These upgrades are consistent with Minnesota Statutes Chapter 216F.03: "the legislature declares it to be the policy of the state to site LWECS in an orderly manner compatible with environmental preservation, sustainable development, and the efficient use of resources". Retrofitting these turbines also avoids decommissioning the entire facility and construction of a new facility. The proposed upgrades consist of retrofitting the existing wind turbines by replacing equipment with new components (referred to herein as "the Project"). The turbine retrofits will include replacing equipment within the nacelle and turbine base (gearboxes, generators, and switchgear) as well as replacing the rotor assembly. Refer to the graphic below that provides an illustration of the turbine components. The proposed upgrades do not include installation of solar power generation or battery storage at the site.



To accomplish this accelerated maintenance and to complete the retrofits in accordance with the Site Permit, LBPP requests that the PUC amend the existing LWECS site permit and approve exceptions where necessary and as described in this application. Specifically, LBPP requests the following changes to the existing permit (refer to Attachment A):

- Grant permission to increase the RD from 48 to 50 m [157.5 to 164 ft];
- Adjust the permitted wind access buffer setbacks to current PUC guidelines; and
- Approve an exception for those turbines that do not meet the current PUC guidelines.

1.1 Statutory Authority

Minnesota Statutes Chapter 216F and Minnesota Rules Chapter 7854 govern the site permits for LWECS facilities, defined as "a combination of wind energy conversion systems with a combined nameplate capacity of 5,000 kilowatts or more."

Accordingly, LBPP prepared this application for a site permit amendment in accordance with the following, where applicable:

- The DOC "Application Guidance for Site Permitting of Large Wind Energy Conversion Systems in Minnesota" (1); and
- PUC Docket: IP6908/WS-13-294, Site Permit: LWECS-1-1997.

Only those sections of the recently amended Site Permit dated November 1, 2017 that would change as a result of this request are addressed in detail in this application.

1.2 State Policy

Retrofitting existing turbines to include increasing the turbines' rotor diameter will allow LBPP to more efficiently utilize the site's wind resources in accordance with Minnesota Statutes Chapter 216F.03 that specifies that "legislature declares it to be the policy of the state to site LWECS in an orderly manner compatible with environmental preservation, sustainable development, and the efficient use of resources." Furthermore, retrofitting these turbines avoids decommissioning an entire facility and construction of a new facility.

1.3 Facility Ownership

Consistent with Site Permit, LBPP will continue to own and operate the Facility.

1.4 Community Benefits

Retrofitting the Facility will extend the long-term revenue streams for participating landowners, for Lincoln County, and for Drammen, Diamond Lake, and Lake Benton townships. The retrofit of the Facility will provide long-term employment by continuing to employ between 12 and 15 full-time employees to operate and maintain the Facility's turbines.

In addition, LBPP pays approximately $270,000 annually in production taxes to the state of Minnesota, which resulted in an estimated $5 million in production taxes paid to Lincoln County over the operating history of the Facility through 2016.

1.5 Existing Environment

Table 1 summarizes the existing environment in the vicinity of the Facility. Figure 1 through Figure 12 illustrate the current conditions for the Facility regarding:

- Figure 1 - Site Location
- Figure 2 - Project Area and Facilities
- Figure 3 - Public Land Ownership and Recreation
- Figure 4 - Turbine Layout and Constraints
- Figure 5 - Land Cover
- Figure 6 - Zoning Map
- Figure 7 - Topographic Map
- Figure 8 - FEMA Floodplain Map
- Figure 9 - Wetlands Inventory
- Figure 10 - Surface Waters Map
- Figure 11 - Unique Natural Features Map
- Figure 12 - Land Ownership Map

Table 1 Summary of Existing Environment Conditions

Item	Existing Conditions
Land Use	The majority of the land within the Facility boundary is used for agricultural purposes (cropland, primarily corn and soybeans) with some herbaceous and hay/pasture land cover (Figure 5).
Residences	There are approximately 22 existing residences within the Facility boundaries (Figure 4).
Demographics	The population of Lincoln County is 9,800. The per capita income in Drammen and Lake Benton townships is approximately 20% lower than the county's average per capita income, while Diamond Lake Township's per capita income is nearly double the county's average. (1)
Utilities	There are two windfarms operating adjacent to the Facility that were constructed subsequent to LLBP (Northern Alternative Energy to the north and northwest, and MinnDakota Wind to the west and southwest). There is one utility line within the Project area (Figure 2). There is a distribution line running north/south along 160th Avenue and east/west along County Highway 12. The Project has 34.5kV feeder lines that connect to Xcel's 115 kV transmission line along the southern edge of the Project area.

Item	Existing Conditions
Roads	The roads within the Project area are county roads and county state aid highways (CSAH). U.S. Trunk Highway 14 traverses east/west through the City of Lake Benton and immediately south of the Facility. U.S. Trunk Highway 75 traverses north/south through the City of Lake Benton and immediately east of the Facility. (2)
Traffic	The functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day, or Average Daily Traffic (ADT). The highest existing ADT in or near the Facility was below 250 vehicles per day.(3)

Note(s):

(1) U.S. Census Bureau, 2010 Census data

(2) http://www.dot.state.mn.us/maps/gdma/data/maps/county/lincoln.pdf

(3) 2016 Traffic Volume General Highway Map, Lincoln County, MN (Minnesota Department of Transportation (MnDOT)

2.0 Project Description

The existing Facility is located within Lincoln County, Minnesota (refer to Figure 1). LBPP is not proposing modifications to the Facility boundaries originally included in the Site Permit (refer to Figure 2). The proposed Project includes temporary disturbance to replace or refurbish equipment at each turbine as follows:

- Component replacement within the nacelle and turbine base (gearboxes, generators, and switchgear).
- Replacement of existing rotor assemblies, including turbine blades.

At the time of original Facility construction, the turbines were installed with 48 m [157.5 ft] diameter rotors and black colored blades. During the course of routine maintenance, LBPP has replaced many turbine blades, and at present approximately 50 percent of the blades are now white in color, but most still of the 48 m rotor size. Today, 48 m rotors are not commercially available and the replacement rotors for the Zond turbines are the 50 m [164 ft] size. Table 2 and Figure 13 include a comparison of the original 48 m RD turbines to the proposed 50 m RD turbines.

Table 2 Turbine Dimensions

Design Parameter	48 m Rotor Diameter	50 m Rotor Diameter	Change
Hub Height	53 m [174 ft]	53 m [174 ft]	No change
Total Tip Height	77 m [253 ft]	78 m [256 ft]	1 m [3.3ft]
Rotor Sweep Area	1,809.6 m2 [19,482.8 ft2]	1,963.5 m2 [21,124.1 ft2]	153.9 m2 [1641.3 ft2]
Revolutions Per Minute	34.44	32.3	2.14 decrease
Tip velocity	193 miles per hour (mph)	189 mph	4 mph decrease
Nameplate Capacity	107.25 MW	107.25 MW	No change

The turbines have original lightning protection technology, and the site experiences 3 to 5 lightning strikes per year. The replacement blades will have improved lightning protection.

There will be no changes to turbine locations or towers, meteorological towers, or underground electrical collection system outside of the substation. Figure 2 illustrates the existing Facility components.

The retrofit will not increase individual turbine generator capacity or nameplate capacity, and energy production is expected to be similar to original design, but with better efficiency than current operations. Therefore, the Facility's current Interconnection Agreement (IA) with Midcontinent Independent System Operator, Inc. (MISO) and Xcel Energy (Xcel) will not require an amendment.

Maintenance and retrofitting activities at each turbine will require approximately three days to complete and may occur at multiple turbines simultaneously to minimize Facility downtime. LBPP plans to complete the maintenance and retrofitting activities over a three year timeframe, commencing in 2018 and completing by December 31, 2020 to qualify for federal production tax credits. Therefore, each year, LBPP plans to complete the maintenance and retrofitting of about one third of the turbines (40 to 50) at the site. The exact number per year will vary depending on component availability, weather conditions, minimizing production impacts, and identification of other required routine maintenance outside of the scope of this application.

The general sequence to replace the rotor assembly is as follows (refer to Figure 14):

1. Trucks deliver the new blades and hub to the turbine pad using the gravel access road. Either a boom truck or telehandler unloads the turbine blades and hub, and assembles them into a complete rotor on the turbine pad. Trucks leave after unloading.
2. The crane sets up on the gravel access road with the new rotor on its right or left.
3. The crane lowers the old rotor onto the other side of the turbine pad.
4. The crane picks and sets the new rotor.
5. The crane leaves.
6. Either a boom truck or telehandler disassembles the old rotor and loads the blades and hub onto trucks which are staged on the access road.

The general sequence for gearbox maintenance is as follows:

1. The crane sets up on the gravel access road adjacent to the turbine.
2. A truck delivers the new gearbox or generator and stages on the road.
3. The crane lowers rotor and sets it on the right or left side of the crane in the same place it would be for a rotor change.
4. The crane lowers old gearbox and sets on the road temporarily or on the same trailer as the new gearbox.
5. The crane lifts new gearbox into place.
6. The crane lifts rotor back into place.
7. The gearbox truck leaves.
8. The crane leaves.

The sequence for a generator change would be similar to that for a gearbox, except that the rotor does not need to be removed to change the generator.

LBPP anticipates that the maintenance contractor will use temporary laydown area adjacent to each turbine as the retrofit zone to assemble the replacement rotor (refer to Figure 14). The actual area utilized within this zone will be the size of two rotors (area for placement of replacement rotor and area for setting down existing rotor), and will be approximately 4,000 m^2 [45,000 ft^2]. Minimal disturbance will occur within this area (minor damage to crops and/or vegetation, no grading work will occur). Additionally, a temporary laydown area will be utilized at the existing operation and maintenance area on site, encompassing approximately two acres to support maintenance equipment and materials (refer to Figure 15). The contractor will use existing access roads to support deliveries and maintenance at each

turbine. Therefore, no improvements to roads are necessary. Components removed from turbines will be handled, processed, treated, stored, and disposed of or recycled per regulations. LLBP plans to utilize wheeled cranes (refer to the typical illustration below, exact model may differ) capable of using existing turbine, township, and county roads for the maintenance activities (track cranes will not be necessary). This will reduce the amount of temporary impacts associated with the maintenance activities.

Source: Grove Crane Model GMK6350 specification guide

3.0 Setbacks and General Conditions

3.1 Setbacks

The setbacks that are applicable to new LWECS permits in Minnesota, as described in the PUC's General Wind Permit Standards, are presented in Table 3 and on Figure 4. Section IX of Lincoln County's Comprehensive Development Ordinance (Windpower Management) includes setback requirements for facilities with capacities less than 5 MW. Therefore, only the PUC LWECS setbacks apply to the Facility.

Table 3 LWECS Setbacks

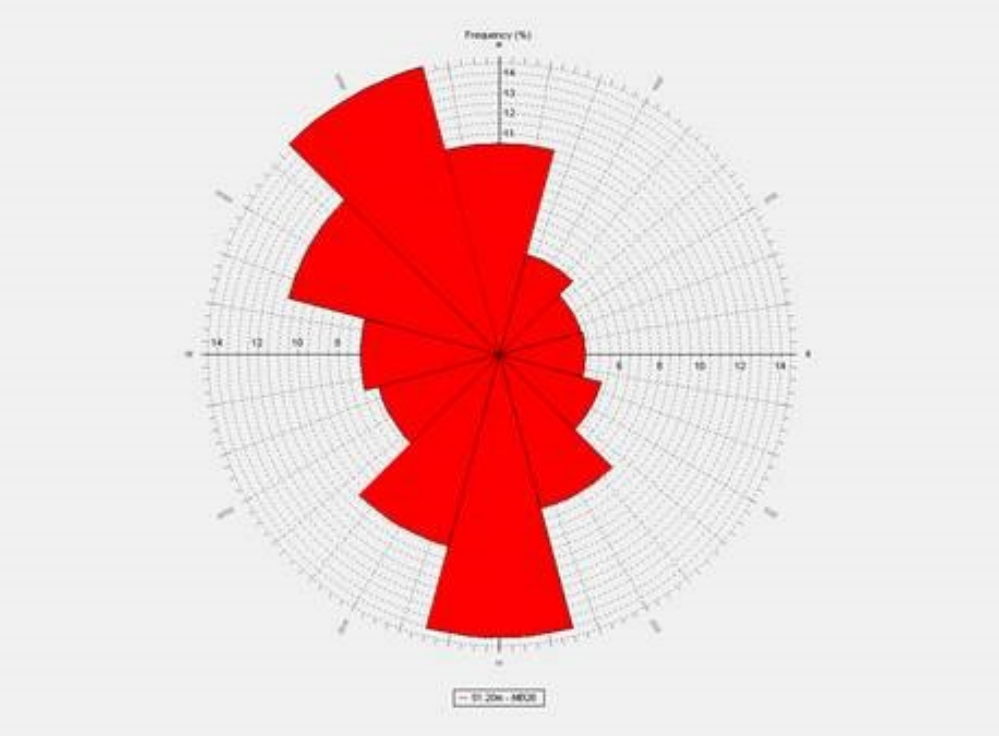
Setback Requirement	Distance for Setback	Authority
Wind Access Buffer – Prevailing Wind Directions	Five times the RD	PUC General Wind Permit Standards1
Wind Access Buffer – Non-Prevailing Wind Directions	Three times the RD	PUC General Wind Permit Standards1
Internal Turbine Spacing – Prevailing Wind Directions	Five times the RD	PUC General Wind Permit Standards1
Internal Turbine Spacing – Non-Prevailing Wind Directions	Three times the RD	PUC General Wind Permit Standards1
Residences	At least 150 m [500 ft] and sufficient distance to meet noise standards	PUC General Wind Permit Standards1
Noise	Setback distance calculated based on site layout and turbine for each residential receiver. State standard 50 decibels, A-weighted scale (dBA).	Minnesota Pollution Control Agency2
Public Roads and Recreational Trails	No closer than 75 m [250 ft] from the edge of the public ROW. Trails considered on a case-by-case basis. Setbacks are measured from the center of the tower.	PUC General Wind Permit Standards1
Wetlands	No turbines within public water wetlands. Collector and/or feeder lines can be within wetlands with approval from the agency having jurisdiction.	PUC General Wind Permit Standards1
Native Prairie	Facility infrastructure cannot be within a native prairie without an approved protection plan.	PUC General Wind Permit Standards1
Sand and Gravel Operations	Facility infrastructure cannot be within active sand and gravel operations without landowner approval.	PUC General Wind Permit Standards1
Aviation	Facility infrastructure cannot create an obstruction to navigable airspace.	PUC General Wind Permit Standards1

Note(s):
(1) Order Establishing General Wind Permit Standards, Docket Number E,G-999/M-07-I 102, January 11, 2008
(2) Minnesota Rules Chapter 7030

3.1.1 Wind Access Buffer

The PUC's General Wind Permit Standards, enacted after the issuance of the Original Site Permit, specify that turbine placement cannot be less than five RD from all boundaries of wind and land rights on the predominant wind axis and three RD on the secondary wind axis, without the approval of the permitting authority (1). Based on the wind energy rose provided below for the Facility, the prevailing wind directions are the northwest and south, and the non-prevailing wind directions are east and west.

Wind Rose Diagram



Section 4.1 of the Site Permit specifies that "Wind turbine towers shall not be placed less than five rotor diameters from the perimeter of the site." As previously noted, LBPP constructed the Facility with 48 m [157.5 ft] diameter rotors within the boundaries identified in the original Site Permit, with the following 26 turbines not meeting the 5 RD wind access setback from the perimeter of the Facility (refer to Figures 4c and d):

- LB-01
- LB-02
- LB-05
- LB-06
- LB-09
- LB-19
- LB-20
- LB-21
- LB-41
- LB-50
- LB-51
- LB-68
- LB-74
- LB-75
- LB-76
- LB-88
- LB-133
- LB-134
- LB-135
- LB-136

- LB-138
- LB-139
- LB-140
- LB-141
- LB-142
- LB-143

LBPP understands that these 26 turbines were erected and operated under a PUC grant of exceptions from the 5 RD wind access setback included as a condition in the original Site Permit.

By applying the PUC's 2008 General Wind Permit Standards, including a 5 x 3 RD wind access setback, to the Facility turbines using the prevailing wind data and the proposed increase to 50 m [164 ft] RD, only the following 16 turbines do not conform to the wind access setback (refer to Figures 4a and 4b):

- 1
- 2
- 9
- 20
- 21
- 41
- 68
- 76
- 134
- 135
- 138
- 139
- 140
- 141
- 142
- 143

These 16 turbines are among the 26 turbines that are currently operating under wind access setback exceptions granted during the original permitting process. Accordingly, LBPP requests that the PUC amend the Site Permit to apply the current wind access guidelines to the Facility, while maintaining the original wind access setback exceptions for the 16 turbines listed above (refer to Site Permit provided as Attachment A).

Retrofitting the Facility turbines to 50 m [164 ft] diameter rotors would result in two additional turbines not meeting the wind access buffer setback under the 2008 Standards. However, a recently-executed wind rights easement between LBPP and the landowner affected by these two turbines avoids the need to request additional wind access buffer exceptions.

3.1.2 Residences

Section 4.2 of the Site Permit specifies that turbines must be at least 150 m [500 ft] from residences and comply with the state noise standard (the most restrictive of which is 50 dBA at night) (2). All turbines are at least 150 m [500 ft] from residences. In addition, the original Post-Construction noise study demonstrated compliance with the state noise standards (3).

3.1.3 Noise

Barr Engineering conducted an evaluation of the potential change to sound impacts of the Facility based on the Project (Attachment B). Based on engineering analysis, the reduced revolutions per minute (RPM) associated with a 50 m [164 ft] RD is expected to offset any potential sound increase from the increased RD, and no significant change in sound levels is expected. The operational target for 50 meter rotors is 32.3 RPM, slightly lower than the 48 meter rotor operation target of 34.44 RPM.

Field measurements of sound levels taken at 85 m [279 ft] downwind of several active turbines to verify current conditions reinforced that sound levels are similar for 48 or 50 m rotors. Measured levels for a mix

of Z48 and Z50 units were within a range of 58 to 63 dBA, with average levels by type of 59.5 dBA (48m [157.5 ft] rotor) vs 59 dBA (50m [164 ft] rotor). This represents essentially no difference in average sound level and there was no particular trend between types. Based on this comparison, no significant change in sound impacts from 48 to 50m [157.5 or 164 ft] turbines is expected.

Using sound levels derived from these measurements and corrected for background levels, an approximation of the projected noise contours was prepared. Figure 16 shows the projected extent of the 50 dBA noise contour. This contour does not encompass any residential receptors, meeting the most stringent nighttime limits (NAC-1 L50 = 50 dBA). The township hall (receptor #40) is subject to higher noise limits (NAC-2 L50 = 65 dBA), and is projected to experience levels slightly above 50 dBA, well below the applicable standard for its classification. While the projections are based on spot measurements during high winds with accompanying elevated background levels, they provide additional assurance that sound levels are expected to be consistent with the compliant levels originally demonstrated by the Facility's post-construction survey.

LBPP has not received complaints regarding sound throughout the 19-year operation of the Facility, no additional modeling or monitoring is proposed to demonstrate ongoing compliance as part of the refurbishment.

3.1.4 Roads

LBPP is not proposing to relocate turbine locations originally constructed in compliance with the 75 m [250 ft] setback for road right-of-ways (ROWs) and state or other recreational trails in the vicinity of the Facility. Therefore, the proposed turbine retrofits will comply with the current Site Permit and the PUC's General Wind Permit Standards for roads and no changes are necessary to this section of the permit.

3.1.5 Public Lands

The PUC's General Wind Permit Standards apply the wind access buffer setback requirement to public lands where the permittee does not have wind access rights (1). This includes but is not limited to:

- Wildlife Management Areas
- State Game Refuges
- State Wildlife Management Areas
- State Parks
- Scientific and Natural Areas

As illustrated on Figure 3, the turbines are not located on public lands. However, there are turbines that do not meet the wind access buffer requirements for public lands (refer to Section 3.3.1). For these 5 turbines (138 through 140, 142, and 143), LBPP requests an exception to the Wind Access Buffer setback based on the premise that the public lands are undevelopable for wind energy resources; therefore, no off-site wind rights will be impacted by the buffer exceedance in these cases.

3.1.6 Wetlands

The Site Permit does not allow turbines or aboveground structures within Public Waters (2), but there is no specific setback or other restriction applicable to other wetlands and waters. The existing Facility infrastructure is not located within Public Waters, as defined in Minnesota Statue Chapter 103G, and the retrofitting activities will not affect Public Waters (refer to Figure 10). LBPP will locate laydown areas and temporary access routes outside of Public Waters and wetlands identified on Figure 9. Therefore, LBPP is compliant with the current Site Permit conditions and will continue to be so after completion of the proposed turbine retrofitting activities.

In addition, the existing turbines and aboveground infrastructure are not within 45 m [150 ft] of Protected Water Shoreland in Lincoln County (refer to Figure 6). The proposed retrofitting activities do not include modifications to the location of Facility infrastructure, therefore LBPP is compliant with Lincoln County Shoreland requirements.

In areas of potential maintenance-related disturbance, LLBP will evaluate the presence of wetlands. If temporary or permanent impacts to wetlands or waters may occur due to maintenance activities, LBPP will obtain applicable permits from the applicable agencies (U.S. Army Corps of Engineers [USACE], Minnesota Department of Natural Resources [DNR], and/or Lincoln County Soil and Water Conservation District [SWCD]).

3.1.7 Native Prairie

The PUC General Wind Permit Standards specify that turbines and associated facilities cannot be within native prairie unless approved in a native prairie protection plan (1). The Minnesota Biological Survey (MBS) includes an inventory of native plant communities.

Mitigation for impacts to native prairie occurred associated with the original Facility construction. The proposed amended Site Permit prohibits temporary equipment storage in native prairie areas, unless otherwise approved.

LBPP will locate laydown areas and temporary access routes outside of MBS sites. Therefore, an amendment to the previously approved prairie protection and management plan is not necessary and LBPP is compliant with the current Site Permit conditions and will continue to be so after completion of the proposed retrofitting activities.

3.1.8 Sand and Gravel Operations

There are no active sand and gravel operations within the Facility. LLBP will seek landowner approval for use of any sand and gravel operations for temporary laydown areas during maintenance activities.

3.1.9 Turbine Spacing

The Site Permit requires that turbines be at least 3.6 RD apart and 10 RD between strings. The Site Permit allows up to 10 percent (14 turbines) to be closer than 3.6 RD. Under the originally approved permit, the largest deviation was thirty-three turbines (24 percent) that did not meet this condition between strings.

With the slight increase in rotor diameter to 50 m [164 ft], thirty-six turbines (26 percent) would not meet this criteria. Therefore, because the turbine locations will not change, LLBP requests an exception to allow up to 26 percent of turbines to be closer than 3.6 RD and strings closer than 10 RD.

3.1.10 Aviation

The Federal Aviation Administration (FAA) conducted their aeronautical study and issued a Determination of No Hazard (DNH) in 1997 for the Facility based on a tip height of 78 m [256 ft] above ground level (AGL), which corresponds to a RD of 50 m [164 ft]. Therefore, no further evaluation of aviation impacts associated with the Project is necessary.

3.2 General Conditions

LBPP will comply with the following sections of the Site Permit during execution of the Project:

- Field representative
- Employee training and education of permit terms and conditions
- Topsoil protection
- Soil compaction
- Soil erosion and sediment control
- Wetlands
- Vegetation management
- Application of pesticides
- Invasive species
- Noxious weeds
- Public roads
- Turbine access roads
- Private roads
- Archaeological and historical resources
- Livestock protection
- Fences
- Drainage tiles
- Equipment storage

- Restoration
- Cleanup
- Pollution and hazardous waste
- Damages
- Public safety
- Tower identification
- Federal Aviation Administration lighting

3.2.1 Other Permits and Regulations

LBPP will seek any necessary authorizations to complete the proposed retrofitting activities. Such authorizations may include, but are not limited to, National Pollution Discharge Elimination System/State Discharge System (NPDES/SDS) permit for Construction Stormwater discharge from the Minnesota Pollution Control Agency (MPCA). Therefore, no changes are necessary to this section of the Site Permit.

3.3 Surveys and Reporting

3.3.1 Biological and Natural Resources Inventories

In 1997, Braun Intertec conducted a pre-construction inventory of existing wildlife management areas, scientific and natural areas, recreation areas, wetlands, forests, and other biologically sensitive areas. None of these resources was identified within the site boundaries (4).

A wetland delineation was conducted between April 30 and May 2, 1997 for the proposed turbines and associated Facility locations including foundations, access roads, underground cables, and transformers. Fifteen palustrine emergent marsh and either temporarily- or seasonally-flooded wetlands were delineated.

The Native Prairie Protection and Management Plan (NPPMP) includes figures and descriptions of seven locations where construction of the Facility impacted approximately 120 acres of identified native prairie (5). The NPPMP included an agreement to mitigate for the 120 acre impact at a ratio of 1:1. Lake Benton Power Partners I, LLC purchased 146.5 acres in the vicinity of the Hole-in-the-Mountain Prairie Preserve located 1.5 miles south of Lake Benton, and donated it to The Nature Conservancy for restoration and management. In 2003, the DNR confirmed that this fulfilled the mitigation obligations[1]. LBPP plans to locate any potential additional laydown areas to facilitate the project adjacent to existing Facility infrastructure, or temporary modifications to access road turning radii outside of identified native prairie areas to the extent practicable. Therefore, no modifications to the NPPMP are necessary.

[1] February 28, 2003 letter from the DNR to the EQB

To evaluate current conditions, Barr completed a desktop review of threatened and endangered plant and wildlife species within one mile of the proposed Project area using the Minnesota DNR Natural Heritage Information System (NHIS) database under an existing license agreement (LA-898). According to the NHIS database, the Topeka shiner (*Notropis topeka),* Poweshiek skipperling (*Oarisma Poweshiek),* Ottoe skipper (*Hesperia ottoe),* and Dakota skipper *(Hesperia dacotae)* have been documented within one mile of the Facility. Native plant communities and sites of biodiversity significance are located within the Site boundary.

The United States Fish and Wildlife Service (USFWS) County Distribution list identifies three federally-threatened species, the northern long-eared bat (NLEB; *Myotis septentrionalis*), western prairie-fringed orchid (*Platanthera praeciara),* and the Dakota skipper as occurring in Lincoln County. Two federally-endangered species, the Topeka shiner and the Poweshiek skipperling, are known to occur within Lincoln County.

Suitable summer habitat for the NLEB includes upland forest, with trees measuring greater than three inches diameter at breast height with loose or peeling bark. NLEB winter habitat includes caves and mines. According to data provided by USFWS and DNR, there are no known, occupied roost trees or hibernacula in Lincoln County. According to the 4(d) rule, associated programmatic Biological Opinion, and guidance provided by the USFWS, no prohibited take of NLEB will occur based on implementation of the Avian and Bat Protection Plan (ABPP).

The western prairie-fringed orchid is known to occur within mesic to wet unplowed tallgrass prairies and meadows, but can be found in old fields and roadside ditches. The existing turbines are not located in wetlands mapped by the National Wetlands Inventory (NWI) and LBPP will avoid impacts to wetlands during maintenance activities to the extent practicable.

The Dakota skipper is known to occur within two types of native prairies: moist bluestem and upland prairie that is relatively dry and often found on ridges and hillsides. The Poweshiek skipperling is known to occur within high quality tallgrass prairies in both upland and wetland areas. The Ottoe skipper is known to occur in native dry-mesic to dry prairie with mid-height grasses. Native plant communities are present within the project boundary, and may contain suitable habitat for the Dakota skipper. The USFWS has designated critical habitat for the Dakota skipper and Poweshiek skipperling in Lincoln County. However, these areas are located outside of the Facility boundary. The existing turbines are not located in mapped native prairie or sites of biodiversity significance. LBPP will avoid mapped native prairie or sites of biodiversity significance during maintenance to the extent practicable.

The Topeka shiner is known to occur in prairie rivers and streams. The project will not impact rivers or streams.

3.3.2 Shadow Flicker

When the Facility was originally constructed, shadow flicker analyses were not required. In addition, Minnesota does not currently have established limits for shadow flicker. However, LBPP commissioned a preliminary model for 76 receptors based on a 50 m [164 ft] RD (Attachment C). The preliminary model represents the extreme case that does not take into account such mitigating factors as weather, residence window orientation, and objects that could obstruct the shadow flicker effect (for example, trees, other buildings, etc.). Based on the preliminary model, there are 6 receptors that could experience more than 40 hours of shadow flicker per year. LBPP conducted further examination of these 6 receptor points for their potential high shadow flicker taking into consideration window orientation, trees and foliage, and other potential mitigating factors as summarized below. Refer to the report provided in Attachment C for further details.

- Receptor 1: Obstructions mostly mitigate shadow flicker, with a range of 6 hours to 11 hours per year expected.
- Receptor 25: Obstructions mitigate shadow flicker, with a range of 1 to 2 hours per year expected.
- Receptor 26: Obstructions mostly mitigate shadow flicker to about 5 hours per year, although northern windows could experience more shadow flicker with a range of 24 to 40 hours per year.
- Receptor 37: The lack of tree and building obstructions shows no mitigation of shadow flicker. Including cloud cover, the expected range of shadow flicker is expected to be within 26 to 40 hours per year.
- Receptor 40 (Township Hall): Most shadow flicker occurs in the early mornings and evenings. The Township Hall will not be occupied in the early mornings. Occupation in the evenings is sporadic. There are no building obstructions. Deciduous trees to the north and west provide some blockage. Expected shadow flicker ranges from 37 to 47 hours per year.
- Receptor 64: No buildings provide blockage for shadow flicker, and many of the trees in line with turbines are scattered. This results in high uncertainty for this receptor, with a range of 18 to 43 hours per year of shadow flicker.

3.3.3 Wake Loss Studies

LBPP conducted an analysis in April 1997 for the original Facility construction that estimated wake losses for each turbine (6). LBPP will provide the results of any additional wake loss studies to the PUC upon completion.

3.3.4 Noise Studies

Refer to Section 3.1.3 of this application for details regarding noise studies.

3.3.5 Electromagnetic Interference

Section 5.2.16 of the Site Permit indicates that the Facility cannot cause microwave, television, radio,

telecommunications, or navigation interference in violation of Federal Communications Commission (FCC) regulations. To date, LBPP has not received complaints related to microwave, television, radio, telecommunications, or navigation interference.

3.3.6 Avian and Bat Protection Plan

LBPP prepared an updated Avian and Bat Protection Plan (ABPP) that addresses steps to identify and mitigate impacts to avian and bat species during continued operation of the retrofitted Facility (referred to as the Bird and Bat Conservation Strategy (BBCS), Attachment E). It includes formal and incidental post-construction fatality monitoring, training, wildlife handling, documentation, and reporting protocols for each phase of the project.

By March 15 of each year, LLBP will file an annual report with the Commission detailing findings of the annual audit. The annual report shall include summarized and raw data of bird and bat fatalities and injuries and shall include fatality estimates for the project. The report will also identify deficiencies and recommended changes to the ABPP to reduce fatalities. The annual report will also be provided to the Minnesota DNR and USFWS.

In addition to the annual report, LBPP will submit quarterly avian and bat reports to the PUC by the 15th of January, April, July, and October of each year. Each report will identify any dead or injured avian and bat species, location and date of find, the potential cause of the occurrence, and steps to address and prevent future occurrences. LBPP will also provide the quarterly report to the DNR and USFWS.

LBPP will notify the PUC, DNR, and USFWS within 24 hours if any of the following occur:

- Observation of five or more dead or injured birds or bats within a five-day reporting period;
- Observation of one or more dead or injured state- or federally-threatened, endangered, or special-concern species; or,
- Observation of one or more dead or injured bald or golden eagle.

LBPP will file a compliance report to the Commission within seven days identifying the details of the discovery, the location, a detailed log of agencies and individuals contacted, and current plans to address the issue.

4.0 References

1. **Commerce, Minnesota Department of.** *Application Guidance for Site Permitting of Large Wind Energy Conversion Systems in Minnesota.* August 2010.

2. **Commission, Minnesota Public Utilities.** *Order Amending Site Permit.* 2017. IP-6908/WS-13-294.

3. **Hersh Acoustical Engineering, Inc.** *Lake Benton NSP Phase II Wind Development - Acoustical Measurement and Analysis Summary.* 1998.

4. **Intertec, Braun.** *Wildlife Protection - Zond Minnesota Development Corporation NSP - Phase II 100 MW LWECS Lincoln County Minnesota.* 1997.

5. **Lake Benton Power Partners, LLC and Minnesota Department of Natural Resources.** *Native Prairie Protection and Management Plan for Large Wind Energy Conversion System - Permit No. NSP and Lake Benton Power Partners LWECS-1-1997.* 1997.

6. **HDR Engineering, Inc.** *NSP Phase II 100 MW LWECS - Micrositing AnalysisReport.* 1997.

7. **Service, U.S. Fish and Wildlife.** *Land-Based Wind Energy Guidelines.* 2012.

8. —. Endangered Species in Minnesota, County Distribution of Federally-Listed Threatened and Endangered Species. [Online] September 18, 2017. [Cited: October 12, 2017.] https://www.fws.gov/midwest/endangered/lists/pdf/MinnesotaCtyList18Sept2017.pdf.

9. **Agency, Minnesota Pollution Control.** *A Guide to Noise Control in Minnesota: Acoustical Properties, Measurement, Analysis, and Regulation.* 2015.

Figures

Attachments

Attachment A

Site Permit

Attachment B

Noise Analysis Summary

Attachment C

Analysis of Potential Shadow Flicker

Attachment D

Agency Correspondence

Attachment E

Bird and Bat Conservation Strategy