



Wisconsin Power and Light Company
An Alliant Energy Company

4902 North Biltmore Lane
Madison, WI 53718

Office: 1.800.822.4348
www.alliantenergy.com

February 22, 2018

Mr. Daniel Wolf, Executive Secretary
Minnesota Public Utilities Commission
121 Seventh Place East Suite 350
St. Paul, MN 55101-2147

**RE: Bent Tree Wind Noise Phase 2 Monitoring Report
Docket No. ET6657/WS-08-573**

Dear Mr. Wolf:

Wisconsin Power and Light Company (WPL) is writing to provide preliminary comments on the Bent Tree Wind Farm Phase 2 Post-Construction Noise Assessment Report (Report) filed in the above docket by the Minnesota Department of Commerce Energy Environmental Review and Analysis staff (EERA) on February 7, 2018.

At this time, WPL has completed only a preliminary assessment of the Report. Accordingly, this letter contains only WPL's preliminary comments. In addition, on February 19, 2018, a Motion for Order to Show Cause and Hearing was filed on behalf of David Langrud and Bernie and Cheryl Hagen (Motion). WPL will file its response to that Motion on March 5, 2018 as provided in Minn. Rule 7829.0410, subp. 2. WPL anticipates that its response to the Motion will include, among things, a further assessment of and response to the Report.

Based on WPL's preliminary review, and as explained below, the data and methodology underlying the Report do not support a conclusion that WPL has exceeded any noise limitations under its Large Wind Energy Conversion System (LWECS) permit¹ for the Bent Tree Wind Project (Bent Tree) at or near the residences of either Mr. Langrud or Mr. and Mrs. Hagen.

A. Applicable Noise Standards under the LWECS Permit

Any determination of whether the three turbines at Bent Tree referenced in the Report have exceeded noise limitations in the LWECS permit requires an application of those noise limitations to the data collected in the Report. Section E(3) of the LWECS permit incorporates by reference Minnesota Pollution Control Agency (MPCA) noise limitations

¹ *In the Matter of the Application of Wisconsin Power and Light Company for a Site Permit for up to 400 MW of Wind Generation in Freeborn County, DOCKET NO. ET-6657/WS-08-573 LWECS Site Permit for the 201.3 MW Bent Tree Wind Project Phase I to Wisconsin Power and Light, Section E (3) at p 9.*

at Minn. Rule 7030.0020. Those noise limitations are measured in terms of “L₁₀” and “L₅₀.” L₁₀ is defined as “the sound level, expressed as dB(A), which is exceeded ten percent of the time for a one hour survey.”² (Emphasis added). The L₅₀ is defined as “the sound level, expressed as dB(A), which is exceeded fifty percent of the time for a one hour survey.”³ (Emphasis added)

The MPCA standards for residential locations (Noise Area Classification 1) are as follows:

Noise Area Classification	Daytime		Nighttime	
	L ₅₀	L ₁₀	L ₅₀	L ₁₀
1	60 dBA	65 dBA	50 dBA	55 dBA

There is no indication in the Report of any daytime exceedances of the MPCA noise limitations. Instead, the Report alleges certain limited nighttime exceedances at three turbines when wind speeds reach certain levels and are in certain directions. As explained below, the Report does not support any conclusion that operation of Bent Tree, at the three turbine locations studied, caused exceedances of the MPCA nighttime noise limitations in the LWECs permit.

B. Results of Initial Review and Analysis

1. *The protocols used to prepare the Report conflict with MPCA noise standards.*

The MPCA noise limitations are based on results “for a one hour survey”. In contrast, the Report is based on a “number of 10 second samples ... for periods with the turbines on (i.e. “total” noise) and off (i.e. ambient background sound ...).”⁴ The 10 second measurement results were correlated with simultaneous measurements of wind speed at the turbine hub. In an effort to determine how measured sound levels change when hub height wind speed changes, those 10 second samples were then sorted according to how fast the wind was blowing (wind speed) at the turbine hub height.⁵

The Report’s methodology conflicts with the MPCA noise limitations. First, subject to WPL’s ongoing review of the data, these 10 second samples in each wind speed bin were likely measured in different hours rather than a single hour, as required by the MPCA noise limitations. There is no indication in the Report that these 10 second samples were taken from the same hour or for what portion of a given hour the total noise exceeded 50 dBA. Second, the MPCA nighttime L₅₀ noise limitation allows sound

² Minn. Rule 7030.0020, subp 7

³ Minn. Rule 7030.0020, subp 8

⁴ Report at 15.

⁵ *Id.* at 14.

to exceed 50 dBA for 30 minutes every hour. The Report does not identify whether the nighttime noise limitation was exceeded for 30 minutes in any single hour. At most, the Report measures sound levels as hub-height wind speeds change; it does not measure compliance with MPCA noise limitations in a single hour.

Table 3-1 in the Report (Langrud residence) and Table 3-2 (Hagen residence) were prepared based on this 10-second sampling approach. However, there is no indication that the Report's allegations of noise exceedances are based on an analysis of each 10 second period in a single hour. Nor is there any analysis of whether the aggregate of any 10 second periods totaled 30 minutes of exceedance in a given hour, in accordance with MPCA noise standards. The data is not represented as a "one hour survey" as required by the MPCA noise standards and instead incorrectly implies that any noise level over 50 dBA, regardless of duration, is an exceedance of the limitation. Thus, there is no basis to conclude from Tables 3-1 and 3-2 (or from the rest of the Report) that operation of the three turbines resulted in noise exceedances at either the Hagen or Langrud residences.

Because the methodology described in the Report is inconsistent with the MPCA noise limitations, relying on the Report to conclude that WPL exceeded noise limits at the three turbines would, in effect, improperly amend or modify the noise limitations under LWECS permit and the MPCA regulations. The Commission and the EERA should avoid doing so, which would be unfair to WPL, create uncertainty for other wind project operators in Minnesota, and result in an inconsistent and arbitrary application of MPCA noise limitations.

2. *The Report does not measure any alleged exceedances of noise limitations at the Hagen residence.*

MPCA regulations require measurement of actual sound levels. Minn. Rule 7030.0060. In conflict with that requirement, the Report acknowledges that any contribution to any alleged exceedances from the two turbines near the Hagen residence "was not specifically measured."⁶ As such, Report contains no measured instances of any alleged exceedances, even with 10 second intervals, at the Hagen residence. The highest measurement data of actual sound in the Report indicated that the noise contribution from operation of Turbines was 46 dBA, which is below the 50 dBA nighttime noise limitation.⁷ The Report also noted that turbine sound was not a "significant contributor" at the Hagen residence.⁸

⁶ Report at 19 (included in quote at footnote 8 below).

⁷ Report Table 3-2 at 19.

⁸ Report at 17 ("This indicates that the turbines were not the significant contributor for the night...").

To the extent the Report alleges nighttime noise exceedances at the Hagen residence, such an allegation appears to be based on “extrapolated results”⁹ rather than any measured result. Even those “extrapolated” estimates barely exceed the noise limitation, if at all. (See Report at 19, indicating 50 dBA Turbine Contribution (of a total of 50 dBA) and 51 dBA Turbine Contribution (of a total of 51 dBA)). Indeed, the Report acknowledges the lower reliability of the extrapolated results.¹⁰

Importantly, the Report *did* measure low frequency sound, which the Hagens have attributed to Bent Tree’s operations. However, the Report states that low frequency sound at the property was measurable regardless of whether the turbines were operating, and indicates that there may be another source of low frequency sound at the Hagen residence. Specifically:

The A-weighted data demonstrates a concentration of acoustic energy between 100-200 Hz regardless of whether the turbines were operational or not, which resulted in high measured sound levels. There were minor differences between the turbine on and turbine off levels for this night, with some turbine off binned data being louder than turbine on data. This indicates that the turbines were not the significant contributor for the night, and indicates a possibility that when winds are from the south-southwest, there is a strong predominance of low frequency sound on the property which does not originate from the wind turbines.¹¹

Thus, in addition to failing to establish the measured exceedance of any nighttime noise standards, the Report should not be interpreted in any way to suggest that WPL’s operations have contributed to low frequency sound at the Hagen residence.

3. *The Report does not show any recording of sources of sound at levels below 60 dBA.*

The protocol used to gather the data for the Report required the recording of sound at levels above 60 dBA. The Report protocol did so because identification of the sources of the noise was necessary to determine whether the three Bent Tree turbines or other sources of sound were causing sound levels above 60 dBA. Indeed, Minn. R. 7030.0060, Subpart 5.D. requires the identification and documentation of the noise

⁹ Report at 19.

¹⁰ Report at 19 reads in part: “Preliminary analysis indicates that the turbine contribution may exceed 50 dBA at higher hub height wind speeds, and be considered a significant contributor to exceedances under the assumptions of this report. However, this was not specifically measured. The extrapolated results show the turbine is a significant contributor above 12 m/s, but there is increased uncertainty in the extrapolation process when compared to noise measurements.” (Emphasis added.)

¹¹ Report at 17 (emphasis added).

source in measuring noise data. However, Report protocol did not include any recording of sources of sound at levels below 60 dBA. In effect, there is no recording of sound and there is no other basis to determine whether exceedances at sound levels below 60 dBA were the result of any significant contribution by Bent Tree turbines or other noise sources. As a result, there is no way to determine whether operations of Bent Tree were the dominant source of the alleged noise exceedances.

The significance of the failure to record sound below 60 dBA is compounded by the facts that 1) the MPCA noise standards are based on a 50 dBA level, not a 60 dBA level; and 2) the only two instances (both at the Langrud residence) of Turbine Contribution in excess of 50 dBA (as shown on Table 3-1 of the Report) were 52 dBA Turbine Contribution (of a total of 53 dBA) and 55 dBA Turbine Contribution (of a total of 55 dBA).¹² And, as indicated above, the Report does not appear to identify the duration of these exceedances. Since MPCA noise standards allow noise levels to exceed the nighttime noise limit of 50 dBA for 30 minutes each hour (via the L₅₀ metric), any reported noise level above 50 dBA does not necessarily indicate noncompliance.

In sum, because there was no sound recording at the 53 dBA and 55 dBA total noise levels, there is no basis in the Report to conclude that these noise levels were caused by Bent Tree turbines rather than other sources of noise.

4. Other Issues

WPL's preliminary review of the Report identifies other issues not included in these preliminary comments. However, WPL intends to raise those other issues as appropriate in its response to the Motion filed by Mr. Langrud and Mr. and Mrs. Hagen.

C. WPL's Interim Measures in Response to the Report

The Report's methodology and data do not support a conclusion that operations at Bent Tree resulted in exceedances of any MPCA noise limitations at the three turbines identified in the Report. However, in an abundance of caution and without conceding to the Report's conclusions, WPL has immediately put into effect interim turbine curtailments between the hours of 7:00 PM and 7:00 AM during weather conditions identified in the Report, as indicated in WPL's February 8, 2018 letter to the Commission. Similarly, the curtailment with respect to the residence of Mr. Langrud involves the one turbine identified in the Report near that residence. The curtailment with respect to the residence of Mr. and Mrs. Hagen involves the two turbines referenced in the Report near that residence. Despite the cost of those curtailments, WPL has committed to maintaining those interim measures while it reviews the Report and until the Commission issues a decision addressing the Report.

¹² Report Table 3-1 at 16.

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D. Conclusion

Based on WPL's preliminary review, the data and methodology in the Report do not support any conclusion that operations at Bent Tree have resulted in any exceedance of MPCA noise limitations. Nevertheless, WPL intends to maintain the interim measures described above pending the Commission's decision on the Report. WPL also intends to continue to assist the Commission as necessary and appropriate in its resolution of the issues raised by Mr. Langrud and Mr. and Mrs. Hagen.

Respectfully submitted,

Wisconsin Power & Light Company

By: Brad Kulka, Director
Wind Operations

cc: Service List
Ms. Louise Miltich, Minnesota Department of Commerce
Ms. Tricia DeBleekere, Minnesota Public Utilities Commission

STATE OF MINNESOTA
BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Nancy Lange	Chair
Dan Lipschultz	Commissioner
Matt Schuerger	Commissioner
Katie Sieben	Commissioner
John Tuma	Commissioner

**IN THE MATTER OF WISCONSIN
POWER AND LIGHT COMPANY'S
SITE PERMIT APPLICATION FOR
A LARGE WIND ENERGY
CONVERSION SYSTEM**

DOCKET NO. ET6657/WS-08-573

AFFIDAVIT OF SERVICE

STATE OF WISCONSIN)
) ss.
COUNTY OF DANE)

Annette K. Behnke, being first duly sworn on oath, deposes and states:

That on the 22nd day of February, 2018, copies of the foregoing Affidavit of Service, together with Wisconsin Power and Light Company's Comments to the Bent Tree Wind Noise Phase 2 Monitoring Report, was served upon the parties on the attached service list, by e-filing, overnight delivery, electronic mail, and/or first-class mail, proper postage prepaid from Madison, Wisconsin.

/s/ Annette K. Behnke

Annette K. Behnke

Subscribed and Sworn to Before Me
This 22nd day of February, 2018.

/s/ Kathy M. Chiono

Notary Public, State of Wisconsin
My Commission expires February 5, 2021

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Service List Member Information

Electronic Service Member(s)

Last Name	First Name	Email	Company Name	Delivery Method	View Trade Secret
Anderson	Julia	Julia.Anderson@ag.state.mn.us	Office of the Attorney General-DOC	Electronic Service	Yes
Dobson	Ian	Residential.Utilities@ag.state.mn.us	Office of the Attorney General-RUD	Electronic Service	Yes
Ferguson	Sharon	sharon.ferguson@state.mn.us	Department of Commerce	Electronic Service	Yes
Hanson	Andrew	andrewhanson@alliantenergy.com	Alliant Energy Corporation	Electronic Service	No
Lepinski	Jim	jim.lepinski@wisconsin.gov	Public Service Commission of Wisconsin	Electronic Service	No
Norris	Samantha	samanthanorris@alliantenergy.com	Interstate Power and Light Company	Electronic Service	No
Overland	Carol A.	overland@legalelectric.org	Legalelectric - Overland Law Office	Electronic Service	No
Ruen Blanchard	Sarah	sarahruenblanchard@alliantenergy.com	Interstate Power & Light Company - Electric	Electronic Service	No
Woeste	Robyn	robynwoeste@alliantenergy.com	Interstate Power and Light Company	Electronic Service	No
Wolf	Daniel P	dan.wolf@state.mn.us	Public Utilities Commission	Electronic Service	Yes

Paper Service Member(s)

Last Name	First Name	Company Name	Address	Delivery Method	View Trade Secret
Troe	Katie	Safe Wind in Freeborn County	27510 - 775th Avenue, Clarks Grove, MN-56016	Paper Service	No

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