

From: [Charles Hoemberg](#)
To: [George, Kevin \(PUC\)](#)
Cc: [DeBleeckere, Tricia \(PUC\)](#); [Eknes, Bret \(PUC\)](#); [Davis, Richard \(COMM\)](#)
Subject: RE: MPUC Information Requests - June 29, 2017
Date: Friday, July 07, 2017 1:56:57 PM
Attachments: [170629 -- 10-1238 -- MPUC IR 1-5.pdf](#)
[Response to Requesting Info dated 06.29.2017 Docket Number IP-6851.WS-10-1238.docx](#)
[Big Blue Wind Noise Study. March-April 2016.pdf](#)

Kevin,

Please find attached responses and additional information as requested.

Thanks

Charlie Hoemberg

Site Manager

Big Blue Wind Farm

8261 320th Ave.

Blue Earth, MN 56013

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From: George, Kevin (PUC) [mailto:kevin.george@state.mn.us]
Sent: Thursday, June 29, 2017 10:13 AM
To: Charles Hoemberg <choemberg@bigbluewindfarm.com>
Cc: DeBleeckere, Tricia (PUC) <tricia.debleeckere@state.mn.us>; Eknes, Bret (PUC) <bret.eknes@state.mn.us>; Davis, Richard (COMM) <richard.davis@state.mn.us>
Subject: MPUC Information Requests - June 29, 2017

Hi Charlie,

Hope you're well. I have attached Information Requests 1-5 for information relating to noise complaints at Big Blue. This should be filed in the docket today.

Let me know if you have any questions.

Thanks,
Kevin

Kevin George

Minnesota Public Utilities Commission
121 7th Place East, Suite 350 | St. Paul, MN 55101
(651) 201-2251 | Kevin.George@state.mn.us | mn.gov/puc/

June 29, 2017

Charlie Hoemberg
Site Manager, Big Blue Wind Farm
8261 320th Avenue
Blue Earth, MN 56013

Subject: Commission Information Requests 1-5

Dear Charlie,

Enclosed you will find Commission Information Requests 1-5 regarding noise issues at the Big Blue Wind Farm. We've requested a response no later than July 11th. However a response before then would be appreciated.

Thank you,

Kevin George
Minnesota Public Utilities Commission

This question is:

Trade Secret

X

Public

**State of Minnesota
Public Utilities Commission**

Utility Information Request

Docket Number: IP-6851/WS-10-1238

Date of Request: June 29, 2017

Requested From: Charles Hoemberg, Big Blue

Response Due: July 11, 2017

Analyst Requesting Information: Kevin George

Type of Inquiry:

<input type="checkbox"/>	Financial	<input type="checkbox"/>	Rate of Return	<input type="checkbox"/>	Rate Design
<input type="checkbox"/>	Engineering	<input type="checkbox"/>	Forecasting	<input type="checkbox"/>	Conservation
<input type="checkbox"/>	Cost of Service	<input type="checkbox"/>	CIP	<input checked="" type="checkbox"/>	Other:

If you feel your responses are proprietary, please indicate.

Request Number	
1.	If eFiled, what is the eDocket Document ID of the original noise study done to satisfy the conditions of the site permit?
2.	Has Big Blue undertaken any additional noise studies since the original study? And if so, what were the dates of those studies? Provide a summary of any results or eFile the resulting reports.
3.	In a letter filed in the docket June 8 (dated May 7), a remedy to the "clicking" noise complaint is identified and a maintenance action was outlined. Has the maintenance action taken place? If so, on what date was the maintenance was conducted, and has the "clicking" been eliminated?
4.	The Commission understood that Big Blue was going to undertake other noise mitigation measures to counteract a "jet-like" noise resulting from curtailment. Please outline what measures have been identified, when those measures went into or will go into effect, and what changes will be or have been made to rectify the problem.
5.	If the above mitigation measures for the "jet-like" noise have already been implemented, has any further noise testing been done? If so, please indicate any results and study protocols.

1. If eFiled, what is the eDocket Document ID of the original noise study done to satisfy the conditions of the site permit?

The original noise study was completed on February 5, 2013 and the summary report was written the same day. Please note that the report contains a typo listing the study date as Tuesday, February 6, 2013.

The report was not uploaded to eDockets until July 7, 2017 (Submission Number: 20177-133620) as the original author was involved in a companywide layoff. The responsibility of uploading to eDockets was overlooked in the transition of projects to remaining staff.

2. Has Big Blue undertaken any additional noise studies since the original study? And if so, what were the dates of those studies? Provide a summary of any results or eFile the resulting reports.

A study was completed between the dates of March 30, 2016 and April 14, 2016. Please find attached a summary of the results.

3. In a letter filed in the docket June 8 (dated May 7), a remedy to the “clicking” noise complaint is identified and a maintenance action was outlined. Has the maintenance action taken place? If so, on what date was the maintenance was conducted, and has the “clicking” been eliminated?

The maintenance work started June 6, 2017 and finished June 7, 2017. The trial was unsuccessful and the “clicking” noise was not eliminated. Gamesa (WTG Manufacturer) is working on gathering materials and tools to complete their back-up plan. The back-up plan is very intense and will require extensive manufacturing and planning before the plan is worked.

4. The Commission understood that Big Blue was going to undertake other Noise mitigation measures to counteract a “jet-like” noise resulting from curtailment. Please outline what measures have been identified, when those measures went into or will go into effect, and what changes will be or have been made to rectify the problem.

The “jet-like” noise is not perceived equally to each individual and or tied to a mechanical error. This was expressed to the Commission in previous phone calls received. The “jet-like” noise could be stemmed from curtailment received, but again, is not a direct noise stemmed from mechanical error. “Jet-like” noise could be a nuisance noise emitted from the normal operation of any wind turbine.

Big Blue tried to potentially reduce the “jet-like” noise by eliminating or reducing the amount of curtailment at particular turbines. However, when this task was completed, it resulted in further issues and we were forced to revert back to prior settings.

5. If the above mitigation measures for the “jet-like” noise have already been implemented, has any further noise testing been done? If so, please indicate any results and study protocols.

Mitigation measures for the “jet-like” noise have not been implemented. Noise monitoring is currently being conducted at this time. The monitoring began on June 19, 2017 and will be completed on July 10, 2017. The data will then be collected and analyzed.

**Operational Sound Levels at Selected Wind Turbines
March 30-31 and April 13-14, 2016
Big Blue Wind Farm, Faribault County, Minnesota**

Charlie,

In response to your 3/28/16 e-mail request, Fagen Engineering conducted daytime and nighttime noise monitoring near five selected wind turbines at Big Blue Wind Farm. Noise measurements were taken at or near the property line of the closest residence to each of the subject turbines (see attached maps).

Noise measurements were taken using an Extech Model 407736 sound level meter which meets ANSI S1.4 Type 2 Standard, per MPCA guidance. At each location, one-minute sound measurements were recorded on the dBA scale at a height of approximately 2 meters above ground level for a minimum of one hour.

Weather conditions were cool and dry during the testing with wind speeds varying between 6.2 and 27.0 miles per hour. The average wind speed during most test periods exceeded the recommended 11 miles per hour MPCA standard, but is representative of “normal” wind farm conditions and would likely approximate worst case noise levels. The Extech windscreen device was used during all measurements to reduce wind interference with sound measurements. To the extent practicable, periods of intermittent background noise (passing vehicles, wildlife, etc.) were excluded from the sound level averages.

The Gamesa Sound Level Warranty listed in the Turbine Supply Agreement specifies that the sound level of the turbines shall not exceed the Lwd value specified in Exhibit Z of the Agreement.

The following table shows estimates of aero-acoustic noise emitted by the rotor or the G97 2MW turbine, with wind speed measured 10 meters above ground level, listed in Exhibit Z.

Wind Speed (m/s)	dB
3	95.3
4	95.9
5	99.6
6	103.0
7	105.6
8	105.8
9	105.8
10	105.8

The tables below contain results of actual noise measurements taken at each of the five subject turbines separated by daytime versus nighttime measurement periods.

Daytime Sound Measurement Results

Turbine	Date	Timeframe	Average Windspeed	L ₁₀ (dBA)	Daytime Standard	L ₅₀ (dBA)	Daytime Standard
T-6	3/31/16	12:34-13:45	22.6 mph	54	65	49	60
T-7	3/31/16	11:02-12:13	20.8 mph	50	65	48	60
T-8	3/30/16	10:10-11:20	13.3 mph	45	65	43	60
T-9	3/30/16	13:00-14:00	6.2 mph	42	65	40	60
T-14	3/31/16	15:00-16:05	12.2 mph	43	65	38	60

Nighttime Sound Measurement Results

Turbine	Date	Timeframe	Average Windspeed	L ₁₀ (dBA)	Nighttime Standard	L ₅₀ (dBA)	Nighttime Standard
T-6	4/13/16	23:31-00:43	26.1 mph	52	55	50	50
T-7	4/13/16	22:00-23:20	25.8 mph	50	55	49	50
T-8	4/14/16	12:55-02:00	27.0 mph	53	55	48	50
T-9	4/14/16	02:15-03:15	24.5 mph	52	55	48	50
T-14	4/14/16	03:30-04:30	24.9 mph	48	55	43	50

As noted in the tables, sound levels approached but did not exceed the allowable noise standards, even with the significant high wind contribution.

Mike Rutledge
Environmental Services Dept. Head
Fagen Engineering, LLC