

**BEFORE THE SOUTH DAKOTA PUBLIC UTILITIES COMMISSION**

**DOCKET EL18-026**

**IN THE MATTER OF THE APPLICATION BY PREVAILING WIND PARK, LLC FOR A  
PERMIT OF A WIND ENERGY FACILITY IN BON HOMME, CHARLES MIX AND  
HUTCHINSON COUNTIES, SOUTH DAKOTA, FOR THE PREVAILING WIND PARK  
PROJECT**

**Direct Testimony of David M Hessler  
On Behalf of the Staff of the South Dakota Public Utilities Commission  
September 10, 2018**

1 **Q. Please state your name and business address.**

2 A. My name is David M. Hessler. The address of my company's administrative  
3 offices is 38329 Old Mill Way, Ocean View, DE 19970, and my personal office is  
4 located at 1012 W Las Colinas Dr., St. George, UT 84790.

5  
6 **Q. Mr. Hessler, by whom are you employed and in what capacity?**

7 A. I have been employed for over 27 years by Hessler Associates, Inc., as Vice  
8 President and a Principal Consultant. Hessler Associates, Inc. is an engineering  
9 consulting firm that specializes in the acoustical design and analysis of power  
10 generation and industrial facilities of all kinds, including wind energy projects.

11

12 **Q. Please describe your educational background and your professional  
13 experience?**

14 A. I received my Bachelor of Science in Mechanical Engineering (B.S.), 1997,  
15 *Summa cum Laude*, at the A. James Clark School of Engineering, University of  
16 Maryland, College Park, MD, and a Bachelor of Arts (B.A.), 1982, at the  
17 University of Hartford, Hartford, Connecticut. I am a registered Professional  
18 Engineer (P.E.) in the Commonwealth of Virginia and I am a member of the  
19 Institute of Noise Control Engineering (INCE). My professional specialization is  
20 the measurement, analysis, control and prediction of noise from both fossil fueled  
21 and renewable power generation facilities. I have been the principal acoustical  
22 designer and/or test engineer on hundreds of power station projects all over the

1 world and on roughly 70 industrial scale wind energy projects. My resume is also  
2 attached for reference as Exhibit DMH-1.

3  
4 **Q. Have you ever testified as an expert witness before any court or  
5 administrative body? If so, what was the nature of your testimony?**

6 A. Yes, on a number of occasions. Most recently I have reviewed, on behalf of the  
7 South Dakota Public Utilities Commission Staff, the noise aspects of the  
8 applications for the Crocker and Dakota Range Wind projects in South Dakota  
9 and provided written and oral testimony in those cases. In addition, I have  
10 provided both written and extensive oral testimony before the Ohio Energy  
11 Facility Siting Board on behalf of the Applicant in support of the Buckeye Wind  
12 Farm project in Champaign County, OH. I prepared the noise impact  
13 assessment study for that project and testified with regard to that study. On  
14 another occasion I testified before the Wisconsin Public Service Commission on  
15 behalf of Clean Wisconsin, Inc., a non-profit environmental advocacy  
16 organization, with regard to the proposed Highland Wind Farm project in St.  
17 Croix County, WI where I was tasked with reviewing and evaluating the validity of  
18 the Applicant's noise assessment study for that project. A further listing of all  
19 cases where I have testified is included in Exhibit DMH-1.

20  
21 **Q. What is the purpose of your testimony in this case?**

22 A. I have been asked by the Staff of the South Dakota Public Utilities Commission  
23 to review and evaluate the adequacy of the noise assessment study carried out

1 by Burns & McDonnell Engineering Company in support of the Prevailing Wind  
2 Park Project, to consider any public/intervenor comments on the project  
3 regarding noise, and to review and comment on, as appropriate, any testimony  
4 relevant to noise issues filed by or on behalf of the Applicant.

5  
6 **Q. What materials have you reviewed in this matter?**

7 A. I have reviewed Appendix M of the Application, which is the noise impact  
8 assessment prepared for the Project by Burns & McDonnell Engineers (“Sound  
9 Study, Prevailing Wind Park”, Rev. 5, 5/30/18) and the responses to data  
10 requests recently submitted to the PUC Staff by Intervenors.

11  
12 **Q. Can you please summarize your overall opinion of the sound study  
13 submitted on behalf of the project?**

14 A. In general, the noise modeling methodology and assumptions are satisfactory but  
15 the graphical presentation is fairly primitive in the sense that the turbines, sound  
16 contours and houses are not shown over a base map or aerial image, so it is  
17 virtually impossible to identify specific residences. More importantly, however, I  
18 would fault the study for focusing entirely on whether the Project complies with  
19 the Bon Homme County noise limit of 45 dBA at occupied residences rather than  
20 assessing or addressing in any way the potential for an adverse community  
21 reaction to project noise or discussing other aspects of wind turbine noise, such  
22 as issues potentially associated with low frequency sound emissions.

1 **Q. Does the modeling indicate that the project will meet the Bon Homme**  
2 **County 45 dBA noise limit at all residences, including those in Charles Mix**  
3 **and Hutchinson Counties where no noise limit is in force?**

4 A. Yes. The maximum predicted sound level at any residence is 43 dBA.

5  
6 **Q. Is that sufficient to adequately protect the health, safety and welfare of the**  
7 **community?**

8 A. In my experience 45 dBA is an appropriate and reasonably fair regulatory noise  
9 limit for wind projects at non-participating residences generally balancing the  
10 interests of the both the community and developers; however, it does not  
11 guarantee that everyone will be completely satisfied with the sound emissions  
12 from the turbines or rule out the small potential for adverse health effects, such  
13 as sleep disturbance or vertigo. In general, in the course of testing newly  
14 operational wind projects for noise compliance and talking with residents at the  
15 closest and most impacted houses, I find that noise is not an issue for the vast  
16 majority of residents living in or near the turbine array, but also that it is not  
17 possible to please everyone. At almost every project that I'm familiar with there  
18 is one person or a few people that are extremely upset with project noise, largely  
19 irrespective of the specific sound level at their house. Consequently, there really  
20 isn't a regulatory sound level that would satisfy everyone.

21

22

1 **Q. In your experience how does a typical community's expectations about the**  
2 **noise from a wind project compare to how it is viewed once in operation?**

3 A. During the development phase there is often a lot of fear and resistance that is  
4 largely attributable to highly biased, even scary, anti-wind websites. Formal  
5 opposition groups are sometimes formed complete with their own websites.  
6 However, once the project becomes operational it is usually realized that many of  
7 the fears were unfounded and the large opposition groups evaporate leaving a  
8 few people who not only remain adamantly opposed but who are legitimately  
9 disturbed. Additionally, there are also sometimes people who were for the  
10 project but become unexpectedly irritated by it. The bottom line is that some  
11 level of discontent is practically inevitable from a typical wind project.

12  
13 **Q. Could this perhaps be avoided with large setbacks of, say, several miles?**

14 A. It takes quite some distance for a typical wind turbine project to become  
15 completely imperceptible under all wind and atmospheric conditions, which vary  
16 with time. Based on some long-distance wind turbine complaint cases I am  
17 familiar with, I would estimate that the setback necessary to result in a miniscule  
18 possibility of disturbance would be on the order of 2 miles. However, the  
19 immediate problem with that is such a huge setback on a project-wide basis  
20 would leave few or no viable turbine sites and make it impossible to site most  
21 projects - and it does not appear to be a viable or realistic option in this case  
22 either. As far as I can determine with some difficulty from the very crude sound

1 contour plot<sup>1</sup> in the sound study, about 5 to 8 turbines would need to be  
2 eliminated or relocated just to satisfy this condition at two Intervenor residences.  
3 To be fair, wind turbines cannot simply be located in remote, unpopulated areas  
4 because transmission lines or other infrastructure are lacking in those areas.

5  
6 **Q. Have you read the response to the Staff's data request to Intervenor Karen**  
7 **Jenkins, dated August 24, 2018?**

8 A. I have. In response to Staff Data Request 1-5, Ms. Jenkins expresses concerns  
9 about audible noise, infrasound and negative health effects and asks for the  
10 Prevailing Wind Application to be denied or, if approved, for a maximum noise  
11 level of 35 dBA to be imposed.

12  
13 **Q. Do you believe Ms. Jenkins' concerns about low frequency noise and**  
14 **health effects are warranted?**

15 A. Yes, to a certain extent. I believe, based on some recent research<sup>2</sup>, that a very  
16 small minority of people are susceptible to vertigo and nausea symptoms that are  
17 apparently caused by inaudible pressure pulsations at the blade passing  
18 frequency of wind turbines, which is typically just below 1 Hertz. When this  
19 occurs it is severely problematic and has forced people to move from, or even  
20 abandon, their homes. However, my view is that this is an extremely rare

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<sup>1</sup> No roads are shown and no addresses are given for the receptors in the tabular results, nor are the coordinates for the receptors given in a form that can be accessed through conventional mapping programs.

<sup>2</sup> Cooper, Steven E., "Subjective perception of wind turbine noise – The stereo approach", 174<sup>th</sup> meeting of the Acoustical Society of America, New Orleans, LA, December 2017.

1 phenomenon. According to the latest quarterly report<sup>3</sup> of the American Wind  
2 Energy Association there are now over 90,000 MW of installed wind power in this  
3 country involving more than 50,000 wind turbines. To my knowledge, instances  
4 of apparent adverse health effects from wind turbines have occurred at only a  
5 small handful of sites with only a few turbines each, such as Falmouth in  
6 Massachusetts (three 1.5 MW GE units) and Shirley Wind in Wisconsin (eight 2.5  
7 MW Nordex units). I have been to the latter site and taken sound measurements  
8 in the middle of the night inside the homes of those complaining of ill effects from  
9 the project. In one instance the wife was very disturbed by the noise while the  
10 husband said he's never noticed, heard or felt anything. If a large proportion of  
11 the population were susceptible to this effect it would be a major issue disrupting  
12 the entire industry, but the fact of the matter is that health issues from low  
13 frequency noise are quite rare. There is a risk here at Prevailing Winds but the  
14 evidence suggests that it is very small.

15  
16 **Q. What about Ms. Jenkins' proposed conditions of 35 dBA?**

17 A. While I sympathize with everyone who is currently opposed to the project and  
18 would certainly like to see sound levels of 35 dBA or less at all residences,  
19 because such a level is so utterly quiet that most people wouldn't hear anything  
20 at all, its implementation would most likely force the elimination of so many  
21 turbines that the project would become unfeasible. As an impartial technical  
22 advisor to the PUC Staff I have no interest in whether this project goes forward or

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<sup>3</sup> American Wind Energy Association, Second Quarter 2018 Market Report, AWEA Data Services, July 26, 2018.



1 not, but I believe it is incumbent upon me to fairly balance the interests of both  
2 the community and the project. I am not aware of any wind project being  
3 designed to such a low standard.

4  
5 **Q. Have you read the response to the Staff's data request to Intervenor**  
6 **Sherman Fuerniss, dated August 21, 2018?**

7 A. I have. In response to Staff Data Request 1-4, Mr. Fuerniss recommends  
8 modeling the project sound levels in terms of the C-weighted sound level in order  
9 to take into account the low frequency content of the project's sound emissions.

10  
11 **Q. Would you agree with this recommendation?**

12 A. No. The low frequency sound emissions that appear to be associated with  
13 adverse health effects are so low in frequency (less than 1 Hz) that they are  
14 below the range of all weighting networks, which only go down to 10 Hz, and  
15 even beyond the ability of normal instrumentation to measure. Consequently, in  
16 addition to other serious technical problems, C-weighting would not capture or  
17 represent in any way the frequency of concern.

18  
19 **Q. Did Mr. Fuerniss have any other concerns?**

20 A. Yes. He refers to the work of Dr. Alec Salt who claims to have found a possible  
21 physiological link between very low frequency sound and various adverse health  
22 effects and goes on to assert, based on Dr. Salt's theories, I believe, that larger

1 wind turbines, presumably like those proposed for this project, produce more or  
2 worse low frequency noise than earlier smaller models.

3

4 **Q. Would you agree with this assertion?**

5 A. No. In fact, it is remarkable how similar the sound emissions are from all the  
6 various turbine models irrespective of rotor diameter. One of the worst sites for  
7 low frequency noise issues was Falmouth, which used very early GE 1.5 MW  
8 turbines with a rotor diameter of about 77 meters, about half the diameter of the  
9 GE 3.8-137 unit proposed for Prevailing Wind. All more recent projects normally  
10 involve rotors well over 100 meters in diameter with a power output of 2.5 MW or  
11 more each.

12

13 **Q. Does this conclude your testimony?**

14 A. Yes.