

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA**

**IN THE MATTER OF THE APPLICATION BY DEUEL HARVEST WIND ENERGY LLC
FOR ENERGY FACILITY PERMITS OF A WIND ENERGY FACILITY AND A
345-KV TRANSMISSION LINE IN DEUEL COUNTY, SOUTH DAKOTA FOR THE
DEUEL HARVEST NORTH WIND FARM**

SD PUC DOCKET EL18-053

**PRE-FILED SUPPLEMENTAL DIRECT TESTIMONY OF JOANNE BLANK
ON BEHALF OF DEUEL HARVEST WIND ENERGY LLC**

February 14, 2019

1 **I. INTRODUCTION**

2

3 **Q. Please state your name, employer, and business address.**

4 A. My name is JoAnne Blank. I am a senior scientist and project manager in the
5 energy market sector at Stantec Consulting Services Inc. (“Stantec”). My business
6 address is 1165 Scheuring Road, De Pere, Wisconsin 54115.

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8 **Q. Did you provide Direct Testimony in this docket on October 26, 2018?**

9 A. Yes.

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11 **II. PURPOSE OF TESTIMONY**

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13 **Q. What is the purpose of your Supplemental Direct Testimony?**

14 A. My Supplemental Direct Testimony addresses the appropriate shadow flicker limit
15 for the Deuel Harvest North Wind Farm.

16

17 **III. SHADOW FLICKER LIMIT**

18

19 **Q. In your experience, are shadow flicker limits typically imposed on wind farms?**

20 A. It depends. Some jurisdictions do impose a shadow flicker limit on wind turbines,
21 but in my experience, many areas of the United States have no regulations for
22 limiting shadow flicker generated by wind turbines.

23

24 **Q. Is a 30-hour per year limit on shadow flicker a common standard or
25 requirement and, if so, why?**

26 A. When a standard or requirement is applied, I have typically seen the 30-hours per
27 year limit. Listed here are several instances to this limit that have been referenced:

- 28 • The Ohio Power Siting Board (“OPSB”) has previously applied a standard
29 of 30 annual hours of shadow flicker as a threshold of acceptability in
30 certifying commercial wind power projects.). *In the Matter of the*
31 *Application of Hardin Wind Energy LLC for an Amendment to its*

32 *Certificate to Install and Operate a Wind-Powered Electric Generation*
33 *Facility in Hardin County, Ohio*, OPSB Case No. 11-3446-EL-BGA,
34 Opinion and Order on Certificate Amendment, Opinion Section D, at 5
35 (2011).

- 36 • The New York State Department of Public Service (“NYSDPS”) has
37 suggested “operations shall be limited to a maximum of 30 hours annually
38 at any non-participating residential receptor”. *In the Matter of 14-F-490*
39 *Application by Cassadaga Wind LLC for a Certificate of Environmental*
40 *Compatibility and Public Need Pursuant to Article 10 of the New York*
41 *State Public Service Law for the Cassadaga Wind Project, Towns of*
42 *Charlotte, Cherry Creek, Arkwright, and Stockton, Chautauqua County,*
43 NYSDPS Case No. 14-F-0490. Proposed Certificate Conditions, Condition
44 55 (2017).
- 45 • A German court case concluded that 30 hours per year of flicker is
46 acceptable.¹
- 47 • In Dakota Range I and II, EL18-003, the South Dakota Public Utilities
48 Commission (“Commission”) imposed a condition requiring mitigation at
49 residences greater than 30 hours per year based on the applicant’s
50 voluntary commitment. Similarly, in Crocker, EL17-055, the Commission
51 limited shadow flicker to 30 hours per year at any residence based on the
52 applicant’s voluntary commitment.²

53
54 **Q. Have you also seen limits on minutes per day?**

55 A. I have seen such limits, but they are rare. German guidelines (Guideline for
56 Identification and Evaluation of the Optical Emissions of Wind Turbines) recommend
57 a limit of 30 hours per year and 30 minutes per day of shadow flicker. I am aware

¹ This citation comes from the following reference on the Danish Wind Industry Association website:
<http://xn--drmstrre-64ad.dk/wp-content/wind/miller/windpower%20web/en/tour/env/shadow/index.htm>

² Final Decision and Order Granting Permit to Construct Wind Energy Facility; Notice of Entry, Docket EL18-003, finding No. 62; condition No. 28; Final Decision and Order Granting Permit to Construct Wind Energy Facility; Notice of Entry, Docket EL17-055, finding No. 68, condition No. 30.

58 that several municipalities in the United States have also adopted, or are considering
59 adopting, a 30-minute per day standard.

60

61 **Q. Do you believe that a daily shadow flicker limit would be appropriate for the**
62 **Project?**

63 A. No, I do not.

64

65 **Q. Why not?**

66 A. I do not believe that the daily shadow flicker limit would be appropriate for the
67 Project, as it is difficult to fairly impose a limit on an event that can fluctuate from
68 zero to 100 percent on a given day, depending on the weather. As an example, a
69 home may have a potential for one hour of shadow flicker for six days in the month
70 of December. However, due to the South Dakota climate in December, the sun is
71 generally only shining approximately 50 percent of the time. The receptor, therefore,
72 may receive an hour of shadow on a certain day. However, for three of the six days
73 it may not receive any shadow flicker. Wind direction is also a variable affecting the
74 actual shadow flicker that will be received at a receptor, as the blades may be
75 oriented to cause less shadow flicker than the maximum represented by the model.
76 Obviously, there are numerous variations that could lead to the example average of
77 50 percent shadow flicker received. If a 30-minute per day shadow flicker limit were
78 imposed, the sample receptor would not be in compliance, even though it is
79 receiving an average of 30 minutes of shadow flicker per day.

80

81 **Q. What regulations do you believe would be appropriate to be imposed for the**
82 **Project?**

83 A. There are approximately 4,463 hours of daylight in South Dakota annually. The more
84 appropriate tool for limiting shadow flicker is the 30-hour per year limit. In percentage
85 terms, 30 hours represents less than 1 percent of daylight hours. This is a
86 reasonable limit that can be used to site wind turbines in a responsible manner. A
87 30-hour limit is also the limit set by Deuel County in Section 1215 of its Zoning
88 Ordinance, and was approved by the Commission in Dockets EL18-003 and EL17-

89 055. The Deuel County Zoning Ordinance provides that shadow flicker at
90 permanent residential dwellings may not exceed 30 hours annually. Deuel County
91 established that limit after a zoning amendment process. I believe it is the
92 appropriate community standard for the Project based on that community process
93 and based on the fact that the 30-hour annual limit is a typical standard in the United
94 States for shadow flicker when a limit is established.

95

96 **IV. CONCLUSION**

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98 **Q. Does this conclude your Supplemental Direct Testimony?**

99 A. Yes.

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101 Dated this 14th day of February, 2019.

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104

105 JoAnne Blank

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