

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

**IN THE MATTER OF THE APPLICATION OF  
CROWNED RIDGE, LLC FOR A FACILITIES PERMIT TO  
CONSTRUCTION 300 MEGAWATT WIND FACILITY**

**Docket No. EL19-003**

**SUPPLEMENT TESTIMONY AND EXHIBITS  
OF JAY HALEY**

**April 3, 2019**

**INTRODUCTION**

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**Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

A. My name is Jay Haley. My business address is 3100 DeMers Ave., Grand Forks, ND, 58201.

**Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

A. I am a Partner in EAPC Wind Energy and work as a Wind Engineer.

**Q. WHAT ARE YOUR RESPONSIBILITIES?**

A. My responsibility was to conduct the sound and shadow/flicker studies for Crowned Ridge Wind, LLC ("CRW").

**Q. ARE YOU THE SAME JAY HALEY WHO SUBMITTED DIRECT TESTIMONY IN THIS PROCEEDING ON JANUARY 30, 2019?**

A. Yes.

**Q. HAS THIS TESTIMONY BEEN PREPARED BY YOU OR UNDER YOUR DIRECT SUPERVISION?**

A. Yes.

**Q. PLEASE DESCRIBE THE PURPOSE OF YOUR SUPPLEMENTAL TESTIMONY.**

A. The purpose of my supplemental testimony is to update the sound and shadow/flicker studies based on updated participant information and to address comments made at the March 20, 2019 public input hearing on the sound and shadow/flicker studies.

**SOUND STUDY**

**Q. PLEASE ADDRESS ANY UPDATES TO THE SOUND STUDY SINCE IT WAS FILED ON JANUARY 30, 2019.**

**A.** The Sound Study has been updated to reflect the up-to-date participating landowner information. Exhibit 1 to this testimony provides supplemental material that updates the Sounds Study to reflect the number of participating landowners. For clarity, I also updated tables C-1 and C-2 of the Sound Study (Exhibit 2), and below I reproduced the revised summary tables 2 and 3 from the Study:

Table 1: Codington County property boundary realistic sound distribution

Realistic Sound (dBA)	Non-Participating Property Boundary	Participating Property Boundary
0 to 25	0	0
25 to 30	0	0
30 to 35	0	0
35 to 40	9	2
40 to 45	12	2
45 to 50	14	11
50+	0	17

Table 2: Grant County occupied structure realistic sound distribution

Realistic Sound (dBA)	Non-Participating Occupied Structures	Participating Occupied Structures
0 to 25	0	0
25 to 30	0	0
30 to 35	4	0
35 to 40	12	11
40 to 45	10	18
45 to 50	0	3
+50	0	0

1 **Q. AT THE PUBLIC INPUT HEARING THERE WERE COMMENTS ON THE**  
2 **LEVEL OF SOUND PARTICIPANTS AND NON-PARTICIPANTS WOULD**  
3 **EXPERIENCE. PLEASE EXPLAIN WHETHER YOUR STUDY USED**  
4 **CONSERVATIVE ASSUMPTIONS?**

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6 A. Yes, the Sound Study used the following conservative assumptions:

- 7 1. Turbines are always operating at maximum sound emission levels.
- 8 2. An additional 2 dBA was added to the turbine sound emission levels.
- 9 3. All turbines were modeled as if they were always downwind of each receptor.
- 10 4. The atmospheric conditions modeled were most favorable for sound transmission.
- 11 5. The receptors in Grant County were modeled 50 feet from the perimeter where the
- 12 ordinance specifies 25 feet.

13 In addition, all occupied non-participating structures in both Codrington and Grant Counties are  
14 below 45 dBA (which is not a requirement in Codrington County). All occupied participating  
15 structures are below 50 dBA for both Codrington and Grant Counties (also not a requirement in  
16 Codrington County).

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18 **Q. SINCE YOUR STUDY USED CONSERVATIVE ASSUMPTIONS, EXPLAIN HOW**  
19 **THE USE OF THOSE ASSUMPTIONS IMPACT THE SOUND LEVEL THAT**  
20 **WILL BE EXPERIENCED?**

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22 A. Given that the Sound Study issued conservative assumptions, the actual sound that will be  
23 experienced from the turbines will likely be less than as modeled. Since the turbines will  
24 not always be operating at maximum power, will not always be downwind of the receptors,  
25 and atmospheric conditions will not always be optimum for sound transmission, the sound  
26 levels will likely be less than as modeled.

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1 **Q. DID YOU ANALYZE THE CUMULATIVE EFFECTS OF SOUND IN THE**  
 2 **CONTEXT OF NEARBY WIND PROJECTS?**

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 4 A. Yes, I considered the cumulative effects from the yet to be filed Crowned Ridge Wind II  
 5 project and the nearby Dakota Range wind project. All wind turbines from both the  
 6 Crowned Ridge II and Dakota Range wind farms were included in my analysis so any  
 7 contributions from those turbines at the receptors in the CRW project are represented in  
 8 the results of the Sound Study. My prior conclusions were not changed as a result of these  
 9 impacts.

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 11 **SHADOW/FLICKER STUDY**

12 **Q. PLEASE ADDRESS ANY UPDATES TO THE SHADOW/FLICKER STUDY**  
 13 **SINCE IT WAS FILED ON JANUARY 30, 2019.**

14 A. The Shadow/Flicker Study has been updated to reflect the participating landowner  
 15 information. Exhibit 3 provides supplemental material that updates the Shadow/Flicker  
 16 Study to reflect the number of participating landowners. For clarity, I also updated tables  
 17 C-1 and C-2 of the Shadow Flicker Study (Exhibit 4) and below I reproduced the revised  
 18 summary tables 2 and 3 from the Study:

19 Table 3: Codington County occupied structures realistic shadow/flicker distribution.

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<b>Realistic Shadow Flicker (hrs/year)</b>	<b>Number of Non-Participating Occupied Structures</b>	<b>Number of Participating Occupied Structures</b>
0	12	1
0 to 5	4	3
5 to 10	11	6
10 to 15	5	6
15 to 20	2	6
20 to 25	2	6
25 to 30	2	6
30+	1	1



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Table 4: Grant County occupied structures realistic shadow/flicker distribution.

Realistic Shadow Flicker (hrs/year)	Number of Non-Participating Occupied Structures	Number of Participating Occupied Structures
0	12	6
0 to 5	6	6
5 to 10	4	5
10 to 15	2	5
15 to 20	1	5
20 to 25	1	2
25 to 30	0	3
30+	0	0

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**Q. AT THE PUBLIC INPUT HEARING THERE WERE COMMENTS ON THE LEVEL OF SHADOW FLICKER PARTICIPANTS AND NON-PARTICIPANTS WOULD EXPERIENCE. PLEASE EXPLAIN WHETHER YOUR STUDY USED CONSERVATIVE ASSUMPTIONS?**

**A.** Yes, the study used the following conservative assumptions:

1. The receptors were omni-directional (windows all around).
2. No credit was taken for the blockage of shadow/flicker by trees or buildings.
3. The study assumes 100% turbine availability.
4. The study assumes all turbine locations, including 20 alternates.

1 **Q. DID YOU ANALYZE THE CUMULATIVE EFFECTS OF SHADOW FLICKER**  
2 **STUDY IN THE CONTEXT OF NEARBY WIND PROJECTS?**

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4 A. Yes, I considered the cumulative effects from the yet to be filed Crowned Ridge Wind II  
5 project and the Dakota Range wind project. My conclusions were not altered as a result of  
6 these impacts, with the exception of two receptors. Receptor CR1-C106-P shows a total of  
7 50 hours and 20 minutes of shadow flicker hours per year. This receptor was not included  
8 in the original study because our records indicate that it is an abandoned building. It was  
9 included because of the Intervenors' input that it was an occupied residence. The other  
10 receptor, CR1-C61-NP shows a total of 49 hours and six minutes of shadow flicker hours  
11 per year. This receptor would experience 27 hours and 42 minutes of shadow flicker from  
12 Crowned Ridge wind turbines. An additional 21 hours and 33 minutes of shadow flicker  
13 hours are contributed by Dakota Range wind turbines.

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15 **Q. DOES THIS CONCLUDE YOUR SUPPLEMENTAL TESTIMONY?**

16 A. Yes, it does.

