

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA**
500 East Capitol Building, Pierre SD 57501

COMPLAINT

Complainant(s) (Person(s) filing the complaint)		Respondent(s) (Person(s) or Company complained against) At a minimum, the name of the company	
Name	Amber Christenson	Utility Company	Crowned Ridge Wind LLC
Address	Tim & Linda Lindgren	Contact Person	NextEra Energy Resources
City, State, Zip		Address	
Work Phone	See attached	City, State, Zip	See attached
Home Phone		Phone	
Cellular Phone		Fax	

If the Complainant is represented by an attorney, please list the attorney's name, address, telephone number and fax number below: (If Complainant is not represented by an attorney, please leave blank:

These are the facts giving rise to my complaint: SEE FORMAL COMPLAINT ATTACHED

ALSO ATTACHED: ATTACHMENT 1
ATTACHMENT 2
ATTACHMENT 3
ATTACHMENT 4
ATTACHMENT 5a
ATTACHMENT 5b

Please complete the reverse side of this document

NOTE: Please attach additional pages, if necessary, to explain your situation. Also enclose copies of any bills or other documents which may pertain to your complaint.

RESOLUTION REQUEST

I ask that the Public Utilities Commission grant the following remedy. (What do you think the Commission should do to solve your complaint? Be specific in your request for a resolution.)

Included in the attached Formal Complaint

NOTE: Please attach any additional pages, if necessary

AFFIRMATION STATEMENT

I hereby affirm that these statements are true and accurate to the best of my knowledge.

Amber Christenson

Complainant's Signature(s)

Linda Lindgren

Complainant's Signature

Linda Lindgren

Complainant's Signature

9/16/22

Date

9/16/2022

Date

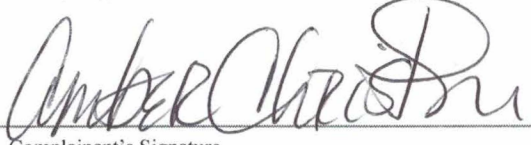
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Date

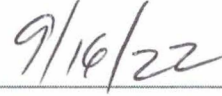


AFFIRMATION STATEMENT

I hereby affirm that these statements are true and accurate to the best of my knowledge.



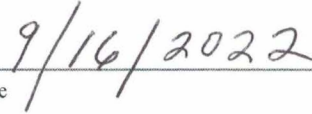
Complainant's Signature



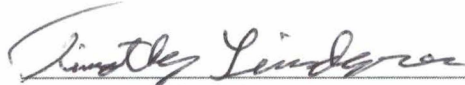
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Complainant's Signature



Date



Complainant's Signature



Date

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA
500 East Capitol Building, Pierre, SD 57501**

Formal Complaint

<u>Complainants</u>	*	<u>Respondents</u>	*
Amber Christenson	*	Crowned Ridge Wind, LLC	*
16217 466 th Avenue	*	700 Universe Blvd.	*
Strandburg, SD 57265	*	Juno Beach, FL 33408	*
Phone: 605-467-3535	*		*
Linda Lindgren	*	Crowned Ridge Wind, LLC	*
16050 464th Ave	*	Mr. Miles Schumacher – representing	*
South Shore, SD 57263	*	Crowned Ridge Wind, LLC	*
Phone: 507-430-9246	*	Attorney	*
Timothy Lindgren	*	Lynn, Jackson, Shultz and Lebrun, PC	*
16050 464th Ave	*	110 N. Minnesota Ave., Ste. 400	*
South Shore, SD 57263	*	Sioux Falls, SD 57104	*
Phone: 605-881-2398	*	Phone: (605) 332-5999	*
	*	NextEra Energy Resources, LLC	*
	*	Mr. Brian J. Murphy	*
	*	Senior Attorney, representing	*
	*	NextEra Energy Resources, LLC	*
	*	700 Universe Blvd.	*
	*	Juno Beach, FL 33408	*
	*	Phone: (561) 694-3814	*

Amber Christenson, Linda Lindgren and Timothy Lindgren hereby submit this Complaint against Crowned Ridge Wind, LLC, and its affiliates and/or partners for failure to comply with the Conditions of the Order granting a permit for the construction and operation of Crowned Ridge Wind, LLC (SDPUC Docket EL 19-003) and failure to comply with the Mitigation Plan of the Sound Study conducted in November of 2021.

These are the facts giving rise to our complaint:

1. The Sound Study failed to meet all requirements of the facility's permit Conditions of the Final Order for Docket EL 19-003.

- Condition 26 of the Final Order, primarily Item A and Item E:
 - A) The post construction monitoring survey shall be conducted following applicable ANSI methods.
 - E) AT A MINIMUM, the closest five wind turbines will be operating for evaluation periods and when at least the closest wind turbine is operating at a condition at FULL (within one decibel of maximum sound power levels) acoustic emissions.

2. The Sound Study failed to meet requirements of the Mitigation Plan approved by the Commission.

- There is no mutually agreed upon waiver between all parties
- Did not comply with the shutdown requirement to shutdown at the specified times, 4 times per day in the two week period. Specifically the times specified in the Mitigation Plan: 1:00, 7:00, 13:00, 19:00.
- Did not comply with Page 3 of the Mitigation Memorandum submitted to the docket 1/19/21, CRW states they will perform the study in the fall of 2021 during similar weather patterns and wind turbine output ranges that were present in October of 2020.
- Did not comply with page 6, item 3, in Mitigation Memorandum, according to ANSI S12.18, the sound measurements are to be during a wind direction under which the measurement location is + or – 45 within the downwind direction of the sound source.
- Did not comply with the protocol extending from the second sound study, the study of 2020, in which the protocol states: On page 5, Sep 16, 2020, “The final decision requires that compliance evaluation periods be when the five closest wind turbines to the measurement locations are operating and when the absolute closest wind turbine is operating at a maximum sound power (within 1.0 dba)...” There was no action by the PUC to remove that requirement in the 2021 protocol.

Other important items pertaining to the Mitigation Plan:

- WIOM has no proven or claimed effect on noise reduction (Supported by GE Fact Sheet, copyright date of 2012, and GE Letter provided by CRW. (Attachment 3 and Attachment 4, respectively))
- We do not know why there was project wide sound exceedance in the 2020 study. An offered speculation was blade stall due to icing or frost.
- Frost and/or icing is **NOT** an anomaly, it is common. (supported by GE Fact Sheet)
- In the 2020 Sound Study, Location 3 (Mr. Welder) on October 22-23, the project was over 50 dBA, **out of compliance by over 5 dBA** for a non-participant home. Turbines were at full, or nearly full, power output when the high exceedance occurred. {See Attachments 5a and 5b of this Complaint.) Thus, *WIOM would do NOTHING to alleviate excessive noise because the turbines were NOT at low power, they were full, or nearly full, output.*

Crowned Ridge Wind, LLC, known as Crowned Ridge 1, (CRW), in Codington and Grant Counties, SD, was permitted for construction in July 2019. The Order and Conditions were entered by the Commission on July 26, 2019.

The permit Condition relating to noise/sound is **Condition 26** as shown here:

26. The Project, exclusive of all unrelated background noise, shall not generate a sound pressure level (10-minute equivalent continuous sound level, Leq) of more than 45 dBA as measured within 25 feet of any non-participating residence unless the owner of the residence has signed a waiver, or more than 50 dBA (10-minute equivalent continuous sound level, Leq) within 25 feet of any participating residence unless the owner of the residence has signed a waiver. The Project Owner shall, upon Commission formal request, conduct field surveys and provide monitoring data verifying compliance with specified noise level limits. If the measured wind turbine noise level exceeds a limit set forth above, then the Project Owner shall take whatever steps are necessary in accordance with prudent operating standards to rectify the situation.

If a field survey and monitoring data is requested by the Commission, the Project Owner shall submit the test protocol to the Commission prior to conducting the survey and sound monitoring for approval. The test protocol shall include and be implemented as follows:

- a) The post-construction monitoring survey shall be conducted following applicable American National Standard Institute (ANSI) methods.
- b) Sound levels shall be measured continuously for 14 days in an effort to capture a sufficient quantity of valid readings meeting the wind conditions delineated below in subpart (e). A sufficient quantity shall be defined as 0.5% of the total number of samples, or a minimum of 10 for a 14-day measurement period. As a precaution against the possibility that a sufficient number of valid readings are not automatically recorded during the chosen 14-day sampling period, 10 on/off tests shall be carried out during the survey period when the Project is operating at full power production irrespective of the ground level wind speed. For the on/off tests, all units in the Project shall be shut down for a 10-minute period synchronized with the monitor's clocks (starting, for example, at the top of the hour or 10 minutes after, 20 minutes after, etc.). The background level measured during the shutdown interval can then be subtracted from the average of the levels measured immediately before and after it to determine the Project-only sound level. The results from these tests may be used to make up for any shortfall in collecting 10 samples measured when the ground level wind speed is less than or equal to 5 m/s.
- c) Measurements shall be conducted at a select number of non-participating and participating residences with the highest expected noise levels and/or at specific residences identified in the Commission's formal request. Typically, 4 to 6 measurement locations total should be selected.
- d) Measurements shall be conducted using sound level meters meeting ANSI Type 1 specifications. An anemometer shall be placed within 20 feet of each microphone, and at a height of approximately 2 meters above the ground.

- e) The measurement data shall be analyzed as follows:
- i. At a minimum, the closest five wind turbines will be operating for evaluation periods and when at least the closest wind turbine is operating at a condition at full (within one decibel of maximum sound power levels) acoustic emissions.
 - ii. Discard those samples measured when the 10-minute average ground wind speed is greater than 5 m/s.
 - iii. Discard those samples measured during periods with precipitation.
 - iv. If measured (total) sound levels exceed the sound level limits, determine Project-only sound levels by removing transient background noise (i.e. occasional traffic, activities of residents, farming activities, and wind gusts) based upon audio recordings, excessive wind gusts, personal observations, and/or comparison of sound level metrics.
 - v. If measured (total) sound levels exceed the sound level limits, determine Project-only sound levels by removing, continuous background noise. This approach requires wind turbine shut-downs, where the background noise is measured directly. Background noise levels will be subtracted from total noise levels measured during these wind conditions to calculate turbine-only noise levels.
 - vi. As necessary, review of the frequency spectra of potential turbine-only samples to identify and remove outliers (spectral shape clearly differing from those samples measured under very low (less than 2 m/s) ground wind conditions, which are the samples most representative of turbine-only noise).
- f) Compare the resulting turbine-only noise levels to the 45 and 50 dBA limits. Compliance shall be demonstrated if all samples are less than the limits.

Also relevant to this complaint, is **Condition 35**, which pertains to icing:

35. Applicant will use two methods to detect icing conditions on turbine blades: (1) sensors that will detect when blades become imbalanced or create vibration due to ice accumulation; and (2) meteorological data from on-site permanent meteorological towers, on-site anemometers, and other relevant meteorological sources that will be used to determine if ice accumulation is occurring. These control systems will either automatically shut down the turbine(s) in icing conditions (per the sensors) or Applicant will manually shut down turbine(s) if icing conditions are identified (using meteorological data). Turbines will not return to normal operation until the control systems no longer detect an imbalance or when weather conditions either remove icing on the blades or indicate icing is no longer a concern. Applicant will pay for any documented damage caused by ice thrown from a turbine.

IF, in October and November of 2020, icing did occur, the turbines should have been shut down per Condition 35.

BACKGROUND

CRW failed to build the project as permitted by not installing low noise trailing edge blades. CRW also failed to install ADLS lighting as required by the permit. These two critical build omissions, plus other failures, led to a long docket.

The Commission approved a temporary waiver to allow CRW to operate under curtailment until all turbines were retrofitted with LNTE blade attachments. The Commission required a sound study during the waiver period (sound study number one) and a follow up sound study following the installment of the LNTE blade attachments (sound study number two) to determine if the project was in compliance with Condition 26 of the permit.

The protocol for the first sound study, submitted to the docket EL 19-003 on 2/13/20.

On 2/29/20, the Commission entered the Order Approving Post Construction Noise Compliance Test Protocol.

The second sound study was conducted in late October and early November of 2020. Six locations were studied. These six locations were named in the 2020 Sound Level Measurement Program Protocol submitted by CRW for approval by the Commission prior to conducting the sound study. The Commission approved the protocol as submitted and issued the Order Approving Sound Level Measurement Program Protocol on 10/2/20.

Tim and Linda Lindgren were a primary location selected in the protocol submitted to the PUC for the second sound study. The Lindgrens thought they were participating in the second sound study because they were told by the people who were placing the equipment to be used in the sound study, that because of the inclement weather, they (sound study technicians) would come back. The Lindgrens were surprised when the results of the second study came back and they were NOT a part of that study. As a reminder to the Commission, the Lindgren's were modeled to have the highest sound of any of the non-participants from the turbines in the project.

The second sound study (2020), the study the Lindgren's thought they were participating in, determined THREE of the SIX study locations were out of compliance by having the sound pressure above permitted limits. One of those locations where CRW was out of compliance was the home of Robert Welder, a neighbor living on the same section as the Lindgrens. Because of the exceedance of noise on three of the six properties, CRW was ordered to conduct a third sound study compliance evaluation. For the sake of this complaint, we will refer to that study as Sound Study Three.

SOUND STUDY THREE and CORRESPONDING MITIGATION PLAN

Sound Study Three was conducted the first part of November of 2021.

The Mitigation Plan for Sound Study 3 was submitted to the docket on 3/18/31. Copied from the Mitigation Plan and pasted here for the Commission to easily review, are the particulars for Sound Study 3 as submitted and approved by the Commission, Section 1, The Introduction, is shown here:

The Introduction of the Mitigation Plan lists this as the number one item:

1. Introduction

Crowned Ridge Wind, LLC ("Crowned Ridge") hereby moves for an order approving a Mitigation Plan, as further described herein, which involves: (1) executing waivers of Condition No. 26 with the landowners at *Position 1-3 in exchange for mutually agreed on compensation*;... [emphasis mine]

As part of this Complaint, we remind the Commission that Location 3, as the Commission was informed by Mr. Welder's attorney at a Commission meeting, Mr. Welder asserts he does not have a mutually agreed waiver.

Section 3, the particulars of the Mitigation Plan for Sound Study 3 laid out by CRW, is shown here:

“3. Additional Sound Study

To verify compliance under the modified sound study protocol, Crowned Ridge will have Epsilon conduct a sound study in the Fall of 2021 for the wind energy facility under conditions which resulted in limited sound threshold exceedances. Epsilon will conduct the sound study at three locations near Locations 1-3 for receptors that are modelled to be close the Commission approved sound thresholds. The sound study will use the protocols approved by the Commission on October 2, 2020, with the following changes: (1) perform the study at three locations; (2) require that the study and report focus on time periods near wind turbine shutdowns; **(3) modify the wind turbine shutdown procedure to perform four shutdowns daily at 1 :00 a.m., 7:00 a.m., 1 :00 p.m., and 7:00 p.m. for wind turbines within 1.75 miles of a measurement location shutdown**, [emphasis mine] which is sufficient to conduct sound measurements at the three locations, and, which, also, can be modified, as requested, by the Epsilon acoustical consultant; **(4) perform the study in the Fall of 2021 during similar weather patterns and wind turbine output ranges that were present in October of 2020**; [emphasis mine] and (5) require that an acoustical consultant from Epsilon remain in Watertown, South Dakota for the duration of the sound level measurement to allow for frequent personal observations...”

Our Complaint brings to your attention item number 3 from Section 3, the shutdown requirements. The report by Epsilon, clearly notes three missed shutdowns. We assert there were more missed shutdowns, especially coordinating with Crowned Ridge 2, which affected the results of the study for Location 6, the home of Amber Christenson. The shutdown times *were specified, by and through specifically listed times*, in the Mitigation Plan, with the option for additional shutdowns to be requested by Epsilon if they felt additional shutdowns were needed:

From Epsilon’s report to the Commission, on page 6-7

the wind turbines turned off (or “shutdown”) were made during the program. The following language is provided in the Mitigation Plan regarding shutdowns, “...perform four shutdowns daily at 1:00 a.m., 7:00 a.m., 1:00 p.m., and 7:00 p.m. for wind turbines within 1.75 miles of a measurement location”. Table C-1 in Appendix C identifies the wind turbines that were within

On the following page of the report, page 6-8

- ⁸ The 10-minute shutdown periods utilized in the analysis in this report were based on electrical output data provided by ROCC and Xcel Energy. There are instances when the shutdown lasted longer than 10 minutes, but those additional periods have not been identified as shutdown periods and have not been used as part of the evaluation.
- ⁹ There were 3 scheduled shutdowns that were not implemented, or otherwise delayed; therefore, no evaluations were performed during these times: 11/7 at 1:00 (Daylight Savings Time Change), 11/7 at 13:00, and 11/11 at 13:00.

Footnote 9, above, is especially important. Two of these missed shutdowns were CRITICAL.

- 11/7, 1:00, the 5 closest turbines were operating at full power at Locations 6 and 9. This shutdown would have been critical for background noise in comparison full turbine output.
- ***11/11 at 13:00, one of the crucial missed shutdowns. This shutdown would have been when turbines were at full power and it was listed by Epsilon as a potential icing period. The exact, or nearly exact, condition of Mr. Welder’s sound exceedance in the 2020 study, or at least one of them. See Attachments 5a and 5b***

If you look at Table D-2 of the Epsilon Report, there is NOT ONE scheduled shutdown lasting for just the required 10 minutes at (Location 6). All shutdowns were much longer, and some did not happen at all, especially with coordination with CR2, as required. Even though these periods are not contaminated with turbine noise, Epsilon did not use these periods as evaluation periods, however, Dr. Hessler noted that he ‘averaged’ background noise during the shutdown period when Lindgren’s home was above 45 dBA. The ten minute periods as shown on the Table are already ‘averaged’ for the ten minute periods, but then Hessler Associates *averaged the ‘average’* for two ten minute periods, thus diluting the true turbine noise vs background noise by 2 dBA. This error put the dBA at 46, when it should have been shown to be 48 dBA, had the

sample background noise not been diluted by averaging the averages of the two ten minute periods.

Similarly, Table D-5 shows the Lindgren home, there is NOT ONE 10 minute shutdown, all shutdowns last longer. Shutdowns during this study were never less than twice the mandated shutdown time of ten minutes, and even 14 times the shutdown 10 minute requirement, and that is in addition to curtailments and shutdowns that lasted hours. Additionally shutdowns are not implemented November 17, 7:00 am, and November 17, 13:00 (1:00 pm). These shutdown periods were critical to the study because the turbines were at full power during these time periods and an evaluation of turbine noise vs background noise are crucial to the accuracy of the study.

At both locations (6 and 9), on November 15, the 7:00 shutdown was delayed (and also not a 10 minute shutdown). This delay is especially problematic for Location 6 because of the contamination of CR2 turbine noise.

As part of data gathering of study location 6, on the morning of November 11th, Amber Christenson documented the turbines being louder than the background sound of Location 6. The winds were from the west with possible icing conditions and the turbines were at approximately half power. This particular period was important to Ms. Christenson's location because west, west southwest, and south southwest wind directions are particularly noisy at Location 6. Even though turbines were at half power, they were much louder than the background environment, but as Ms. Christenson was outside making personal observations and recording the data, the turbines were suddenly turned off so the effects could not be further monitored. This event solidifies the importance of personal observations, and the ruinous effect the curtailments had on the sound study.

Location 6, November 18th evaluation is questioned in this Complaint. The 1:00 period was evaluated, but neither Epsilon, nor Hessler address 7:00 shutdown vs the full power output noise at 7:40 am. Ms. Christenson is unaware if CR2 turbines were shutdown at 7:00 am on the 18th, but with or without CR2, there is an issue with the noise as shown on Table D-2, page 22. An excerpt is shown here, the 7:00 am shutdown, during a potential icing period, and the sound comparison of full turbine output 40 minutes later. Clearly, the turbines are adding substantial

noise to the environment. There was no curtailment of the project at 7:40 am. Curtailment started at 7:50, thus a reduction in noise. More ruinous effects to the validity of the study by the project curtailment.

Thursday, November 18, 2021	6:40	00:10:00	46	52	48	43	653	640	649	655	655	0.5
Thursday, November 18, 2021	6:50	00:10:00	45	51	48	41	0	0	0	0	0	0.5
Thursday, November 18, 2021	7:00	00:10:00	44	52	46	41	0	0	0	0	0	0.5
Thursday, November 18, 2021	7:10	00:10:00	46	52	49	43	0	0	0	0	0	0.5
Thursday, November 18, 2021	7:20	00:10:00	50	57	52	47	1365	1413	1447	1416	1345	0.5
Thursday, November 18, 2021	7:30	00:10:00	51	60	53	49	1723	1727	1687	1726	1712	0.5
Thursday, November 18, 2021	7:40	00:10:00	52	65	53	49	2300	2300	2301	2300	2301	0.5
Thursday, November 18, 2021	7:50	00:10:00	49	56	52	46	925	920	896	927	957	0.5
Thursday, November 18, 2021	8:00	00:10:00	52	69	52	47	0	0	0	0	1413	0.5

Our Complaint brings to your attention item number 4 from Section 3, turbine outputs. *The Epsilon report states NUMEROUS times that the project was running abnormally.* Again, we direct you to Attachment 1 to review the output references in the sound study submission. Such as this excerpt from page 6-7 of the Epsilon report, “*Curtailments limited the electrical output of the site as a whole and SUBSTANTIALLY IMPACTED the TYPICAL OPERATION of the wind turbines.*”

depending on operational or meteorological conditions. There were also periods when meteorological conditions were appropriate for observations, but CRW was being curtailed by the Midcontinent Independent System Operator (MISO). The MISO curtailments limited the electrical output of the site as a whole and substantially impacted the typical operations of the wind turbines when these curtailments occurred. It is Epsilon’s understanding that the curtailments were based on decisions by MISO, were unscheduled (i.e., dependent upon real time conditions), and were out of the control of CRW operations. During MISO curtailments, auditory observations

Epsilon 7-3, *Curtailed 10 days out of 14*

As discussed in the earlier Section 6.3, CRW was curtailed by MISO on occasion throughout the program, and it is Epsilon's understanding that the curtailments were based on decisions by MISO, were unscheduled (i.e., dependent upon real time conditions), and were out of the control of CRW operations. The electrical output limitations from the curtailments, i.e., 'setpoints', were either the full power capacity of the Project (200 MW) or some lesser value, e.g., 100 MW, such that some subset of the wind turbines were limited in power production or shut down entirely. Consequently, these curtailments impacted the typical operations of certain wind turbines when they occurred, and unlike the wind turbine shutdowns scheduled as part of the program, the MISO curtailments did not always result in wind turbines being completely shut down.

- ◆ November 4: 20:30-24:00
- ◆ November 5: 0:00-9:20, 10:40-11:10, 11:20-11:40, 12:10-14:40, 15:10-16:20, 18:40-19:00
- ◆ November 10: 5:00-5:20, 19:30-19:50, 23:10-23:40
- ◆ November 11: 0:00-0:20, 1:30-3:00, 3:10-4:00, 5:10-7:50, 8:00-11:30
- ◆ November 12: 13:40-14:00, 14:30-22:50, 23:00-23:40
- ◆ November 14: 0:20-1:10, 1:20-4:30
- ◆ November 15: 19:30-19:40
- ◆ November 16: 0:30-0:50, 1:30-14:10, 14:20-20:10
- ◆ November 17: 0:00-0:10, 1:40-2:00, 2:10-2:50, 4:20-4:40, 17:20-17:40, 18:00-18:20, 18:30-18:50, 20:30-20:50, 21:00-21:20
- ◆ November 18: 5:50-6:20, 6:30-7:40, 7:50-8:20

Also required to comply with the Mitigation Plan, Item 4, was similar weather. Icing or frost was ASSUMED, but the turbines were never reported to be shut down due to ICING, as required in Condition 35, and according to the Data Response to Ms. Christenson, WIOM engaged on SOME turbines, not all, and the WIOM engaged intermittently only ONCE, November 13, some turbines showing an ON for a couple of minutes, then OFF for a couple of minutes, then On again for a couple of minutes. IF there was a frost or icing event, it was insubstantial and short lived, not affecting all turbines in relation to a study location/home. The tables of the Epsilon report show that WIOM engaged ONLY at low power and only that short period time on SOME turbines. Our conclusion being that the Fact Sheet is correct, that WIOM is used at low power stalls to increase output, and that it would have had no effect on the issue of noise exceedance as shown in the 2020 study. The WIOM software is not a 'fix' for the noise issues in the project.

Turbine outputs when WIOM did engage in the limited turbines:

- Lindgren's Table D5, page 18, 5 closest turbines, when power was at 22-580 MW.

- Christenson’s Table D-2, page 15, 5 closest turbines, when power was 64-629 MW.

Page 33, Epsilon 7-4

In addition, the SD PUC ordered that the sound study be conducted during similar weather patterns as to those experienced during the Fall of 2020 sound study. Given that there were potential frost/icing periods during the previous study, **Epsilon identified potential periods when frost/icing could have occurred on the wind turbines during the current program.** These potential periods were identified based on 2 meteorological conditions; 1) when the NWS Watertown Station measured or observed precipitation, 2) when the temperature measured at Location 3A was freezing or lower (i.e., 32°F). Under the **assumption that potential frost/icing could be present**

Another issue regarding a potential frost or icing event, is in relation to Location 8. November 12th -13th was a potential icing or frost situation. A list of those potential times from the Epsilon report is here:

- ◆ November 4: 3:00-10:40
- ◆ November 11: 12:00-24:00
- ◆ November 12: 0:00-16:10, 17:00-22:00
- ◆ November 13: 11:00-16:00
- ◆ November 14: 22:00-24:00
- ◆ November 15: 0:00-1:00
- ◆ November 18: 4:00-10:00

Location 8’s study was affected by nearby Turbine 71 being offline for approximately 18 hours during that time. (See Attachment 1, the final page, for Maintenance down times affecting the sound study.)

A disturbing issue regarding Location 8, is that it has no mailbox. If unoccupied, why was this an approved study location? This property has not been an occupied home for well over 30 years, perhaps well over 40. Why study an unoccupied property, when Mr. Welder’s home could have been studied as a comparison to the 2020 study? Why study an unoccupied property at all?

Table 6-1 Sound Level Measurement Locations

Loc. ID	Property Information	Latitude (N)	Longitude (W)
3A	15924 465 th Avenue, South Shore – Closest Wind Turbine: #21 – Non-Participating residence	45.071804°	96.902955°
6	16217 466 th Avenue, Strandburg – Closest Wind Turbine: #38 – Non-Participating residence	45.033714°	96.885158°
7	46309 161 st Street, South Shore - Closest Wind Turbine: #33 – Participating residence	45.049067°	96.942347°
8	160 th Street ¹ , Strandburg- Closest Wind Turbine: #81 – Non-Participating residence	45.061914°	96.834287°
9	16050 464 th Avenue, South Shore – Closest Wind Turbine: #26 – Non-Participating residence	45.056703°	96.922946°

Notes:

1. This house was at the west-most end of 160th Street as a dead-end driveway. No number for this address was available on the house, and there was no mailbox.

Compliance of Condition 26, Section A, requires the sound study be conducted following applicable ANSI methods. We bring attention to both the Epsilon and Hessler reports, reference was made to the reliance of audio files. There is no mention of what instrument or instruments recorded the audio, the quality, nor the format (WAV or MP3). Also, we question if the audio files were compressed when passed to Hessler and Associates? **ANSI S12.9/ANSI S1.13 would require those recordings to be high quality recordings for compliance.** We again refer you to Attachment 1-- Epsilon curtailment, tree/leaf noise and Maintenance Excerpts.

Another issue involving Condition 26, Item A pertaining to applicable ANSI rules, would be **ANSI S12.9, Part 3** to exclude dbA corruption from audible natural sounds, by excluding octave bands from 2 kHz (kilohertz) thru 8 kHz, that would have excluded contamination from: insects, treefrogs, and leaf rustle, thereby reducing the large amount of masking that plagued these study results. See Attachments 1 and 2 for notations by Epsilon and Dr. Hessler regarding tree/leaf noise. Below is a photo from Epsilon, page 6-12, showing leaves on the trees of Location 6. This photo is of trees on the west side of the property. Dr. Hessler, in the Hessler Associates report, refers to Location 6 trees as ‘barren’. In the second below, the tree that is casting a shadow on the equipment is fully leaved, and the trees you can see that are leaved are on the north side of the property. The second photo below was taken by Ms. Christenson.

Epsilon 6-12, Leaves on Trees, Location 6

Figure 6-7 Epsilon Meteorological Instrumentation – Location 6 - HOBO



Photo 2, Location 6, Christenson



And the third issue regarding complying with ANSI rules, according to ANSI S12.18, the sound measurements are to be during a wind direction under which the measurement location is + or – 45 within the downwind direction of the sound source. This rule was not applied according to Epsilon, stating it was not a specific condition of the Final Decision. We rely on Condition 26, Item A asserting that ANSI S12.18, like ALL APPLICABLE ANSI rules, must be applied to a sound study.

7.1 Evaluation Criteria

In order to compare the measured sound data to the applicable sound pressure level limits, Epsilon evaluated the sound level data meeting the following criteria:

1. There is no precipitation during the measurement period.¹¹
 2. The average ground level wind speed is 5 m/s (11.2 mph) or less.¹²
 3. According to ANSI S12.18 the sound level measurements are to be during a wind direction under which the measurement location is ± 45 degrees within the downwind direction of the sound source.¹³ Evaluating only downwind periods is not a specific requirement identified in the conditions of the Final Decision. In addition, according to a 2016 Massachusetts Clean Energy Center report¹⁴ on wind turbine acoustics, wind direction only affects sound levels by "generally less than 1 dB". Therefore, it is reasonable to include additional wind directions in the analysis when downwind periods meeting the other criteria are not present and potentially uncommon.
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Epsilon writes that the Mitigation Plan deviates from the second sound study and permit Conditions in a number of ways. We assert the two deviations listed below are in error:

- The Mitigation Plan should only focus on periods near shutdowns.
- The current Mitigation Plan does not set a limit on turbine outputs like the second sound study required (nearest turbine at full power).

We assert these two claims are not correct.

1. While it is true the mitigation plan suggested the study focus on times near shutdown periods, the analysis was not LIMITED to those periods.
2. The current mitigation plan was in addition to the second study's protocol, it did not replace the second sound study's protocol entirely.

Epsilon 5-1:

5.0 SOUND AND ELECTRICAL POWER DATA

The Final Decision contains the following condition regarding the wind turbine operation requirements for sound level evaluation:

“At a minimum, the closest five wind turbines will be operating for evaluation periods and when at least the closest wind turbine is operating at a condition at full (within one decibel of maximum sound power levels) acoustic emissions.”

While this sound level evaluation utilized the wind turbine electrical output to put the measured sound levels into their proper context, the closest wind turbine operating at a condition at full acoustic emissions was not a criterion for determining whether a measurement period would be evaluated with respect to the sound level limit. Per the Mitigation Plan, found within the Motion for Approval of Mitigation Plan dated March 18, 2021, this sound study was to use the methodology applied in the January 2021 Sound Level Compliance Evaluation Report with the following change with respect to periods to be analyzed, “Require that the study and report focus on time periods near wind turbine shutdowns”.

Therefore, the current (Fall 2021) sound level evaluation focused on time periods near shutdowns regardless of whether the period was during maximum electrical output, i.e., full acoustic emissions. Nevertheless, a relationship remains between electrical output and the sound level generated by the wind turbine. Through a comparison of the electrical power specification and the sound power level specification, it can typically be determined at what electrical output a maximum sound level is reached under normal operations. All wind turbines at CRW are

Page 31, Epsilon 7-2 (correlate to turbine outputs being loudest at high power from page 16 above)

In addition, the evaluations conducted in the previous studies conservatively reviewed only periods when electrical output at the closest wind turbine was at its rated maximum, i.e., 2,300 kW. This output was considered to provide ‘worst-case’ sound levels from the wind turbines. The current study does not set a limitation on the wind turbine power output for evaluation periods; however, the closest 5 wind turbines needed to be operating for an evaluation of the period.

Enclosures:

- Attachment 1
- Attachment 2
- Attachment 3
- Attachment 4
- Attachment 5a
- Attachment 5b

REQUESTED REMEDY

The Complainants request the following remedies:

1. A sound study to be conducted January 15th-28th of 2023, paid by Crowned Ridge Wind, LLC, with approval by the Complainants of the company providing the testing.
2. A third party review of the January 2023 sound study results paid by the South Dakota Public Utilities Commission. The third party review company will be selected/approved by the Complainants.
3. The testing locations for the January 2023 sound study shall be approved prior to the study by the Complainants.
4. The testing locations will include at the very least, but not limited to, the Lindgren property (Location 9 of the 2021 study), the Christenson property (Location 6 of the 2021 study), the Welder property (Location 3 of the 2020 study).
5. If during the January 2023 sound study, the project is curtailed, turbines are shut down for maintenance, or there is any other anomaly which would affect the loudest possible sound emission to each of the study locations, the Complainants would require either the study be restarted or extended until a 14 day continuous valid study can be achieved.
6. The Complainants shall be entitled to the full force and effect of the controlling protective provisions of Condition 26, including, but not limited to, the shut down of the entire project for true background measurement purposes, all applicable ANSI rules, and the closest 5 turbines operating with the closest turbine at full output, and all other items of Condition 26.
7. The Mitigation Plan for the January 2023 sound study must be mutually agreeable.
8. Finally, any other relief the Commission may deem just and equitable as related to this Complaint