ATTACHMENT 3

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

IN THE MATTER OF THE	)	
APPLICATION OF CROWNED	)	
RIDGE WIND, LLC FOR A	)	**AFFIDAVIT**
PERMIT OF A WIND ENERGY	)	
FACILITY IN GRANT	)	
AND CODINGTON COUNTIES	)	
		EL-19-003

AFFIDAVIT OF
JAY HALEY

1. I am a Partner in EAPC Wind Energy. I am responsible for the sound modelling and studies for the Crowned Ridge Wind, LLC ("Crowned Ridge Wind") wind facility ("Project").
2. I have more than 30 years of experience in wind farm design. I have performed more than 60 sound impact assessments in more than 15 states. I have trained hundreds of engineers and environmental consultants on the use of the windPRO software tool to conduct wind study assessments. I have provided expert witness testimony on sound modeling and impacts in administrative and judicial proceedings.
3. Intervener Mogen recommended that Crowned Ridge Wind use a ground attenuation factor of 0.0 for the sound study supporting the limited and temporary waiver of the installation of low noise tailing edge (LNTE) attachments. There is no technical basis to use a 0.0. ground attenuation factor to simulate wind conditions in South Dakota. The industry standard approach is to use a 0.5 ground attenuation factor, which has been included in each of the sound studies I submitted in this proceeding.
4. I also considered the suggestion of the Commission that I use a 0.3 ground attenuation factor. After consideration, I also cannot support the use of a 0.3 ground attenuation factor because it is not the industry standard approach and misrepresents the already conservative approach I took in modeling sound, including (1) the wind turbines were assumed to be operating at maximum sound emission levels; (2) a 2 dBA adder was applied to the wind turbines sound emission levels; (3) the wind turbines were assumed to be downwind of the receptor; and (4) the atmospheric conditions were assumed to be the most favorable for sound to be transmitted. To selectively replace the 0.5 ground attenuation factor with a 0.3 factor would ignore the core approach I undertook in this proceeding which was to conservatively model the Crowned Ridge Wind turbine sound. Thus, I cannot support the use of a 0.3 ground attenuation factor to determine which turbines should be curtailed under the Waiver.
5. In addition to my conservative modeling approach, it is my understanding that Crowned Ridge Wind will use General Electric's ("GE") newly developed Enhanced Power Curve

Operation ("EPCO") mode, which GE expects will reduce sound by 1.5 dBA when compared to the normal operation mode. Thus, it is my opinion that Crowned Ridge Wind's use of conservative modeling assumptions coupled with the EPCO provides a more than sufficient buffer between the sound produced by the wind turbine and the Commission's imposed sound thresholds.

6. My results using a 0.5 ground attenuation factor to model sound show that Crowned Ridge Wind should curtail CR1-29, CR1-44, CR1-48, and CR1-95 at wind speeds above 6 meters per second prior to the installation of LNTEs on CR1-21, CR1-29, CR1-33, CR1-37, CR1-41, CR1-44, CR1-46, CR1-48, CR1-50, CR1-52, CR1-61, CR1-63, CR1-64, CR1-66, and CR1-95. I have provided CRW an updated sound study using the 0.5 ground attenuation factor to support these curtailments. The updated study backed out the alternative turbines that Crowned Ridge Wind did not construct, and corrected one issue in the study, which reduced the wind speed at which the turbines should be curtailed.

STATE OF NORTH DAKOTA)

) ss

COUNTY OF GRAND FOLKS)

I, Jay Haley, being duly sworn on oath, depose and state that that the statements in my Affidavit are true to the best of my knowledge, information and belief.

Jay Haley

Jay Haley

Subscribed and sworn to before me this 3rd day of January 2020.

SEAL

CAROL ENGLUND
Notary Public
State of North Dakota
My Commission Expires April 11, 2023

Carol Englund

Notary Public

My Commission Expires April 11, 2023

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AFFIDAVIT OF
RICHARD LAMPETER

1. I am employed at Epsilon Associates, Inc. ("Epsilon"). I am an Associate at the company and manage the Acoustics Group.
2. I have over 15 years of experience in conducting impact assessments for various developments across the United States. While at Epsilon, I have been involved in approximately 90 wind energy projects evaluating potential impacts from sound. As part of project evaluations, I have assisted in refinements in wind turbine layouts to evaluate mitigation options. My other areas of expertise include the measurement of ambient sound levels, modeling sound levels from proposed developments, evaluation of conceptual mitigation, and compliance sound level measurements.
3. Intervener Mogen recommended that Crowned Ridge Wind use a ground attenuation factor of 0.0 for the sound study supporting the limited and temporary waiver of the installation of low noise tailing edge (LNTE) attachments. The use of a ground attenuation factor of 0.0 is inappropriate. A ground attenuation factor of 0.5 as originally modeled in combination with the other model inputs and settings applied for this study is the appropriate methodology. Based on the modeling parameters for this study which include a ground attenuation factor 0.5, the inclusion of an uncertainty factor of two decibels for all wind turbines, all modeled sound sources assumed to be operating simultaneously and at the design wind speed corresponding to the greatest sound level impacts, selection of meteorological conditions to minimize atmospheric attenuation in the 500 Hz and 1 kHz octave bands where the human ear is most sensitive, and per ISO 9613-2 the model assumption of favorable conditions for sound propagation (a moderate, well developed ground-based temperature inversion as might occur on a calm clear night or equivalently downwind propagation), the model yields conservative results. Adjusting the ground attenuation factor to a more conservative value such as 0.0 is unnecessary. The sound level modeling as originally presented was conducted to demonstrate compliance in all seasons and not just a summertime period with soft ground. Post-construction measurement programs conducted by Epsilon have found measured sound levels have met similar

regulatory limits for projects where the pre-construction modeling analysis followed a similar modeling methodology.

4. I also understand the Commission may be considering the use of a 0.3 ground attenuation factor for determining which wind turbines should be curtailed under the Waiver. The use of a 0.3 ground attenuation factor is inappropriate for the same reasons as stated above.
5. The appropriate ground attenuation factor to use is 0.5 which is the typical value currently used in the industry. That is the factor that should be used in the sound studies to determine which wind turbines should be curtailed because it results in reasonably conservative modeled sound levels as described above and is consistent with the previous approved modeling methodology for demonstrating compliance with the sound level limits applicable in all seasons.

STATE OF MASSACHUSETTS)

) ss

COUNTY OF MIDDLESEX)

I, Richard Lampeter, being duly sworn on oath, depose and state that that the statements in my Affidavit are true to the best of my knowledge, information and belief.

Richard Lampeter

Subscribed and sworn to before me this 3rd day of January 2020.

SEAL

Notary Public

My Commission Expires

KAREN LYN ROTH
Notary Public
Commonwealth of Massachusetts
My Commission Expires
April 10, 2026