

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

**IN THE MATTER OF THE APPLICATION BY ENGIE NORTH AMERICA, INC. FOR
A PERMIT FOR A WIND ENERGY FACILITY IN HYDE COUNTY, SOUTH
DAKOTA, FOR MERIDIAN WIND PROJECT
SD PUC DOCKET EL _____**

PRE-FILED DIRECT TESTIMONY OF TED GUERTIN, ON BEHALF OF ENGIE NORTH
AMERICA, INC.

April 8, 2020

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1 **Q. Please state your name, employer and business address for the record.**

2 A. My name is Ted W. Guertin and I am Senior Air Quality Meteorologist with Tetra Tech,
3 Inc (“Tetra Tech”). My business address is 2 Lan Drive, Suite 210, Westford, MA 01886.

4 **Q. Briefly describe your educational background.**

5 A. I have a MS in Atmospheric Science from the University of New York at Albany where
6 I graduated in 1989. I also have Bachelor of Science Degree in in Atmospheric Science from the
7 University of New York at Albany where I graduated in 1986.

8 **Q. Briefly describe your professional experience.**

9 A. I have over 30 years of consulting experience. My experience includes environmental
10 licensing, shadow flicker analyses, wind power related visual assessments, wind resource
11 assessments, dispersion modeling, air toxic assessments, air quality permitting and monitoring,
12 and preparation of technical reports to support environmental impact review. I have extensive
13 experience utilizing a wide range of models, including the use of the WindPro software for
14 analysis of shadow flicker, zone of visual impact (“ZVI”), wind farm photo simulations, and
15 initial wind resource evaluation. I have also served as a testifying expert witness and have
16 prepared technical documentation in support of testifying expert witnesses.

17 **Q. Have you attached a resume or CV.**

18 A. Yes, my resume is attached.

19 **Q. Have you previously submitted or prepared testimony in this proceeding in South**

20 **Dakota?**

21 A. No, I have not.

22 **Q. What is the purpose of your direct testimony?**

23 A. The purpose of my direct testimony is to discuss the modeling the Project used to
24 determine anticipated locations and effects of shadow flicker, and to discuss the mitigation
25 measures which will be implemented in constructing and operating the project.

26 **Q. Which sections of the application are you responsible for?**

27 A. I am responsible for Section 11.5 on Shadow Flicker.

28 **Q. What is shadow flicker?**

29 A. A wind turbine's moving blades can cast a moving shadow on locations within a certain
30 distance of a turbine. These moving shadows are called shadow flicker and can be a temporary
31 phenomenon experienced at nearby residences or public gathering places.

32 **Q. Is shadow flicker regulated at the local level?**

33 A. Hyde County Zoning Ordinance Section 9-104-A-20 establishes that flicker at any
34 receptor shall not exceed 30 hours per year within an established dwelling and 40 hours per year
35 from any occupied structure.

36 **Q. Will the project meet the Hyde County ordinances?**

37 A. Yes. An analysis of potential shadow flicker impacts from the Project was conducted
38 using the WindPro software package. The Project will install up to 64 wind turbines; however,
39 74 potential turbine locations were evaluated. The WindPro analysis was conducted to determine
40 shadow flicker impacts under realistic impact conditions (actual expected shadow) which
41 includes measured historical meteorological conditions. This analysis calculated the total amount
42 of time (hours and minutes per year) that shadow flicker could occur at receptors surrounding the
43 Project turbines. Tables 11-3 and 11-4 in the application illustrate the results of the analysis and
44 shows that the Project will meet the requirements in local ordinance.

45 **Q. If necessary, what mitigation measures will the project implement for project area
46 residents?**

47 A. Section 11.5.3 outlines the procedures for the Project to follow in the event of shadow
48 flicker mitigation needs. Essentially the project will meet with a resident, work on site specific

49 measures and implement them at project cost.

50 **Q. Are there known health impacts from shadow flicker?**

51 A. No, not that I am aware of. Shadow flicker frequency is related to the wind turbine's
52 rotor blade speed and the number of blades on the rotor. From a health perspective, the relatively
53 low flicker frequencies rates associated with the proposed wind turbines are harmless, and public
54 concerns that flickering light from wind turbines can have negative health effects, such as
55 triggering seizures in people with epilepsy are unfounded. Epilepsy Action (working name for
56 the British Epilepsy Foundation) states that there is no evidence that wind turbines can cause
57 seizures. However, they recommend that wind turbine flicker frequency be limited to 3 Hz (for
58 comparison, strobe lights used in discos have frequencies which range from about 3 Hz to 10 Hz
59 (1 Hz = one flash per second)). Since the proposed Project's wind turbine blade pass frequency is
60 approximately 0.79 Hz (less than one alternation per second), no negative health effects to
61 individuals with photosensitive epilepsy are anticipated.

62

63 Dated this 8th day of April, 2020.

64 /s/ Ted Guertin

65 Ted Guertin, Shadow Flicker – Tetra Tech