

**STATE OF VERMONT
PUBLIC UTILITIES COMMISSION**

Amended Petition of Deerfield Wind, LLC, for a certificate of public good authorizing it to construct and operate a 15-turbine, 30 MW wind generation facility, and associated transmission and interconnection facilities, on approximately 80 acres in the Green Mountain National Forest, located in Searsburg and Readsboro, Vermont, with 7 turbines on the east side of Route 8 on the same ridgeline as the existing GMP Searsburg wind facility (Eastern Project Area), and 8 turbines along the ridgeline to the west of Route 8 in the northwesterly orientation (Western Project Area)	PUC Docket N. 7250
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**WINDACTION-SHEA JOINT COMMENTS IN RESPONSE TO
VERMONT PUC ORDER OF FEBRUARY 12, 2020**

NOW COMES the Windaction Group and Tom Shea, *pro se* parties to Docket 7250 (Parties), who, in accordance with the February 12, 2020 order of the Vermont Public Utilities Commission (Commission), respectfully submit these comments pertaining to the Deerfield wind energy facility (Project) sound monitoring.

1. INTRODUCTION

The purpose of post-construction sound monitoring is to determine whether the Project is operating in compliance with the noise standard established by the Commission. Under the CPG, Project-related sound levels at existing residences cannot exceed 45 dBA (exterior) (Leq, 1 hour) or 30 dBA (interior bedrooms) (Leq, 1 hour). CSA asserts in each of its compliance reports, Fall 2018 and Spring 2019, that the Project is operating within the limits established by the Commission. CSA's conclusion assumes a calculated interior sound level based on a fixed 15 dBA reduction from exterior levels.¹ Sound measurements at Tom Shea's property (Site C) during the Fall 2018 testing met the criterion for OINR testing. The Parties believe OINR testing will reveal interior turbine sound exceedances with windows open.² Mr. Shea has asked that OINR testing be performed at his residence. In lieu of OINR testing, Deerfield Wind LLC (Deerfield) requested another round of sound measurements in fall 2020 at Site C.

¹ Protocol §2.5.

² Site B exterior sound levels during the Fall 2018 and Spring 2019 monitoring periods qualified for OINR testing. It is not clear whether the homeowner at Site B is aware that OINR testing is available. The Parties recommend the Commission reach out to the homeowner and make them aware of their rights under the CPG.

2. RESPONSE TO COMMISSION ORDER

a. Additional Testing at Sites A, B, and C is Necessary

The Parties' primary complaint regarding the results of CSA's testing centered on CSA's use of 6 m/s hub height wind speed as an indicator of maximum, or near maximum sound power levels.³ The Department and Deerfield Commission dismissed our concerns as either unproven or inaccurate. The Parties do not wish to annoy the Commission by re-litigating the question of compliance, however, the Commission should be made aware that Deerfield's acoustician, Kenneth Kaliski, provided new information in his December 13, 2019 letter that, to our knowledge, had previously been unreported and which directly validates the Parties complaint regarding CSA's test results.

Specifically, Mr. Kaliski stated "wind turbines produce full sound power at full electrical output."⁴ Mr. Kaliski also offered that the Gamesa G87 turbines (eastern array) emit at or near maximum sound power levels when producing at 44% of total electric output and the Gamesa G97 turbines (western array) produce at or near maximum sound levels at 67% of total electric output or approximately 1,350 kW.⁵

Mr. Kaliski's new information *substantiates, and does not refute*, the Parties finding that during notable percentages of time when CSA was collecting sound data, the turbines were emitting sound levels that were below maximum levels. The quote in the Commission's January 9, 2020 order that "[T]he

³ The 6 m/s threshold is based on a literal, and overly simplistic interpretation of the Protocol that disregards nearly 15-years of peer-review data showing that other critical factors influence turbine noise emissions, including rotor RPMs and blade attack angle, each of which relate directly to electricity output. The most prominent sound produced by wind turbines is aerodynamic noise caused by the blades cutting through the air. As the speed of the blades increases (i.e. higher RPMs) so does the sound level. Both the Gamesa G87 and G97 models are variable speed machines which means that rotor speed (RPMs) varies at different *electric* outputs. Maximum rotor speed occurs at full electric output while at lower electric output levels, rotor speed slows and the sound level reduces.

See: Pantazopoulou, Panagiota. *Chapter 20 Wind turbine noise measurements and abatement methods*. 2010 BRE, Watford, UK. At 656.

<https://www.witpress.com/Secure/elibrary/papers/9781845642051/9781845642051020FU1.pdf>

See also *Lempster Wind Project Noise Assessment* § 2.1.2 August 10, 2006
https://www.nhsec.nh.gov/projects/2006-01/documents/22_noise_assessment.pdf

See also van den Berg, G. P. *The sounds of high winds* 2006
<http://www.aph.gov.au/DocumentStore.ashx?id=12de591b-804c-47c1-894b-e6156f9f5078>

⁴ Kenneth Kaliski, RSG, *Response to Deerfield Filings of November 15, 2019 Letter*, Dec. 13, 2019 at 1-2.

⁵ *Order Finding Project in Compliance with Amended CPG and Ordering Deerfield to Select Next Step in Resolving OINR Testing Issue*, January 9, 2020 at 6

maximum power output data for the Gamesa G87 and G97 turbines used at the Project does not equate to the maximum sound output” is an incomplete characterization of what Mr. Kaliski wrote in his letter.

Applying Mr. Kalisk’s new information makes clear that the turbines produced less than full sound power levels roughly 30% of the time CSA collected data.⁶ *See Exhibit A-1 attached.* The western G97 turbines closest to Sites A and B operated below full sound power levels 41% and 47% of the time respectively. These are material reductions that bias the sound data toward lower levels and cannot be ignored. Specific to Mr. Shea’s property, the western array turbines produced below maximum sound output nearly 20% of the time which the Parties consider material.⁷

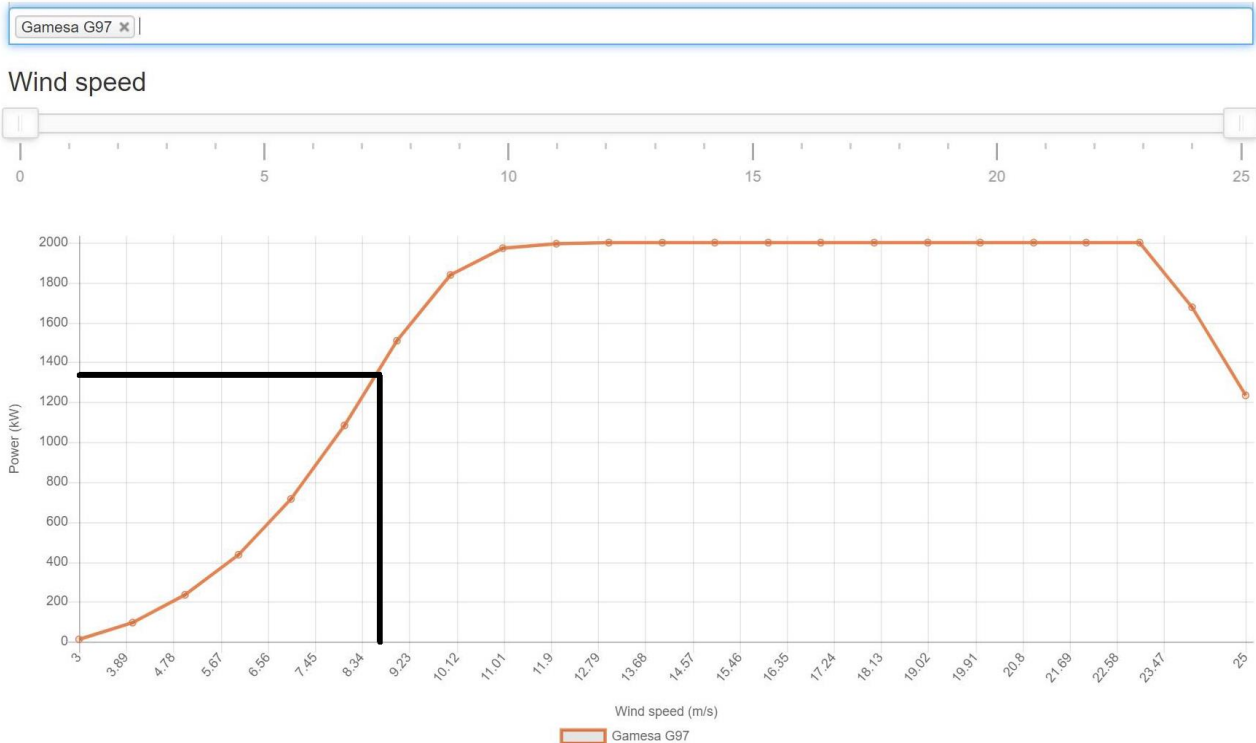
Mr. Kaliski’s figures further confirm that the Department’s strict adherence to the 6 m/s threshold is incorrect. The manufacturer’s power curve for the Gamesa G97 turbines (below) shows the G97 does not achieve 67% of full electric output (1,350± kW) until hub height wind speeds reach nearly 9 m/s.

Contrary to the Commission’s conclusion, CSA’s data collection and analysis do not prove the reported numbers are “too low.” Rather the results are inconclusive and suggest CSA’s sound levels were skewed toward quieter sound emissions where higher sound levels were likely. The Parties reassert that CSA has failed to properly assess Project-related sound levels at existing residences. The comments filed by Deerfield and the Department do not negate this position.

⁶ The Parties appreciate Deerfield’s review of the spreadsheet submitted with our November 15, 2019 comments. The minor corrections identified by Deerfield were made and are reflected in the attached Exhibit A-1. These amendments did not change our conclusion that, during the period of time when CSA was collecting sound data, the turbines were producing at sound power levels materially below maximum levels.

⁷ Kaliski, K. *Review of Deerfield Wind - Fall 2018 Sound Monitoring Report* of April 4, 2019 at 4, At Site C, the Eastern wind turbines will not “significantly contribute to any measured level over 40 dBA (<0.5 dB).”

Source: <https://en.wind-turbine-models.com/powercurves>



The Parties disagree with Deerfield and the Department that any additional round of sound surveys be limited to Site C. There is only a small window in which compliance testing at the Project will be conducted by the Commission. The Protocol requires two rounds of testing in total. There is general consensus among all involved that the Fall 2018 test carried uncertainties leaving just one potentially valid test. The Parties have shown using Mr. Kaliski's information that turbine sound emissions measured during the Spring 2019 period clearly did not reach maximum levels during many periods of testing. Ignoring this finding might serve Deerfield and bring finality to this Docket, but it does so at the expense of residents living near the turbines. The Parties believe it is reasonable to require sound measurements and analysis be conducted again at all three monitoring sites and not be limited to Site C only.

In a final round of testing, the Parties ask that CSA collect and analyze sound emission data based on electric power output *in addition* to hub-height wind speed and not rely solely on a 6 m/s wind speed threshold. The Parties agree with the Department that utilization of Site C-Alt is unnecessary and that the amount of sound data collected be reduced to one-hour or less. The Parties also agree that attended monitoring is unnecessary provided audio recordings of all sounds are made to validate suspicious sound events.

b. Managing Wind Gusts Greater Than 4 to 5 M/S

The Parties disagree with Deerfield's request that CSA remove data during any period when wind gusts at the microphone measure between 4 and 5 m/s. The Protocol § 3.0 allows for removal of this data if wind-induced noise is identified by CSA. Mr. Kaliski's complaint as cited in his December 13, 2019 letter appears to focus solely on the results of the Fall 2018 sound study. The Parties are unaware whether Deerfield found the same issues in the Spring test.

c. ANSI/ASA S12.9-2013 Part Should Be Followed

It is not clear to the Parties why CSA is resistant to following the ANSI S12.9-2013/Part 3 standard in conducting the sound survey. The Parties agree with Deerfield that audio recordings provide sufficient information to address the "Observer Present" condition. As cited in the introduction of Part 3, [t]he purpose of this part is to provide the method(s) to measure the sound of a specific source at a specified location, such as the noise from a specific power plant in some specified person's backyard." The introduction further states that the Part 3 method is intended to "measure the total sound and then to subtract the background, which is all sound at the location in question except for the sound from the specified sound in question." This language describes exactly that of the Protocol. In contrast, Part 2 applies when looking to capture the long-term average sound levels outdoors within an environment, which is a very different type of test. Since the two standards, Part 2 and Part 3, have very different purposes, the Parties can see no justification for applying two standards for comparison. Application of Part 2 is not appropriate; application of Part 3 is appropriate.

In any event, the Parties wish to remind CSA that both Parts 2 and 3 include "uncertainty factors" that are up to 5 dB. For Part 3, the degree of correction relates to the amount of time between on-off measurements. (*ANSI S12.9-2013/Part 3 Section 7.3.3 a-d*) There is no information in either the Fall or Spring sound monitoring reports that confirms whether CSA applied any uncertainty factor to its data. For completeness, we add that Part 2 accuracy limits apply depending on the "Class" of measurements. (*ANSI S12.9 1992/Part 2 Sections 9.3 and 9.4*)

3. CONCLUSION AND RECOMMENDATIONS

The Parties wish to extend our thanks to the Commission for the opportunity to participate in this important process. We have been engaged in wind energy siting issues for nearly fifteen years beginning before the Deerfield Project was adjudicated by the Commission. It is not our intent to try the patience of the Commission by re-litigating the issues surrounding CSA's sound testing. Unfortunately, despite

multiple efforts by the Parties to work with Deerfield and the Department in a way that avoids the Commission arbitrating on highly technical facts, we find ourselves in that place today.

Our sole objective is to ensure the sound study produces accurate results and that Mr. Shea and his neighbors, who ultimately will live with the final decision of the Commission, trust that the Project is operating within the limits set in the CPG. We believe the issues we raised regarding the Spring 2019 survey disqualify any claim that the Project is operating in compliance with the certificate. With the turbines producing at levels below their maximum sound output and CSA averaging sound data sourced from different shutdowns spaced days apart, the Parties believe the Leq's computed by CSA are lower than actual levels at the Project.

In view of the foregoing, the Parties respectfully request that the Commission:

1. Require a sound test in Fall 2020 at Sites A, B, and C and that every effort be made to ensure the data used in computing Leq represents periods when the turbines were producing at or near maximum sound power levels.
2. Amend the Protocol to remove the requirement for an on-site observer, remove Site C-Alt, and waive the requirement for two hours of data while allowing only one-hour or less of data.
3. Require CSA to follow ANSI standard Part 3 and ensure the correct accuracy factor is applied.
4. Retain the current process of allowing 4-5 m/s gusts with CSA analyzing data as needed to confirm whether wind-induced noise contaminated the sound data.
5. Convene a hearing moderated by the Commission with Deerfield, the Department, CSA and the Parties prior to the Fall 2020 testing in order that any remaining open issues be discussed and resolved before testing is initiated. Dated this day of March 4, 2020.

Respectfully submitted,



Tom Shea, Searsburg



Lisa Linowes, The Windaction Group

EXHIBIT A-1

Red Cells indicate turbine producing at less than full SOUND power levels
Eastern array G87 turbines <44% ELECTRIC power output; Western array G97 <67% ELECTRIC power output

SITE A		Turbine % OF FULL ELECTRIC POWER															
Date	Time	E1	E2	E3	E4	E5	E6	E7	W1	W2	W3	W4	W5	W6	W7	W8	
5/19/2019	4:30	26%	8%	4%	31%	36%	37%	35%	22%	64%	61%	77%	62%	59%	69%	59%	
5/19/2019	4:40	29%	8%	6%	33%	39%	37%	33%	20%	54%	57%	74%	52%	46%	56%	48%	
5/19/2019	4:50	48%	6%	24%	38%	49%	41%	37%	17%	47%	51%	70%	52%	46%	65%	55%	
5/19/2019	5:00	60%	11%	43%	48%	58%	45%	40%	17%	58%	54%	74%	59%	59%	84%	76%	
5/19/2019	5:10	51%	8%	42%	57%	67%	55%	49%	24%	77%	69%	90%	69%	65%	85%	74%	
5/19/2019	5:20	32%	2%	26%	51%	58%	55%	52%	27%	73%	66%	82%	71%	72%	81%	73%	
5/19/2019	6:30	100%	82%	100%	100%	100%	100%	99%	78%	98%	101%	100%	100%	100%	100%	100%	
5/19/2019	6:40	100%	76%	100%	100%	100%	100%	97%	82%	101%	100%	100%	100%	100%	100%	100%	
5/19/2019	6:50	100%	93%	100%	100%	100%	100%	100%	97%	100%	100%	100%	100%	100%	100%	100%	
5/19/2019	22:20	18%	6%	19%	60%	63%	60%	57%	22%	37%	48%	72%	50%	43%	71%	71%	
5/19/2019	22:40	35%	6%	35%	74%	76%	69%	61%	28%	76%	75%	93%	75%	65%	88%	75%	
5/19/2019	22:50	31%	10%	52%	83%	95%	72%	74%	35%	69%	81%	100%	90%	92%	93%	91%	
5/19/2019	23:00	38%	14%	53%	93%	94%	81%	81%	53%	75%	70%	97%	89%	94%	95%	100%	
5/19/2019	23:50	49%	36%	88%	0%	94%	89%	91%	61%	96%	99%	100%	101%	99%	100%	100%	
5/20/2019	0:00	63%	37%	87%	0%	99%	92%	93%	82%	99%	100%	100%	100%	100%	100%	100%	
5/31/2019	23:10	92%	81%	90%	87%	100%	100%	100%	91%	64%	68%	84%	65%	51%	65%	76%	
6/1/2019	0:10	89%	78%	84%	82%	99%	98%	101%	59%	45%	47%	58%	43%	40%	55%	63%	
6/1/2019	0:30	86%	85%	86%	86%	100%	97%	94%	76%	59%	59%	69%	45%	40%	63%	76%	
6/1/2019	0:40	87%	91%	93%	84%	100%	99%	96%	74%	57%	60%	68%	49%	46%	67%	79%	
6/1/2019	0:50	88%	78%	85%	77%	96%	93%	91%	74%	57%	60%	67%	49%	43%	65%	76%	
SITE B		Turbine % OF FULL ELECTRIC POWER															
Date	Time	E1	E2	E3	E4	E5	E6	E7	W1	W2	W3	W4	W5	W6	W7	W8	
5/18/2019	0:40	89%	75%	79%	84%	91%	85%	91%	65%	43%	53%	59%	53%	49%	56%	59%	
5/18/2019	0:50	82%	76%	80%	85%	94%	84%	89%	60%	44%	52%	59%	48%	33%	51%	59%	
5/18/2019	1:00	81%	63%	74%	73%	83%	82%	87%	62%	48%	54%	63%	56%	39%	49%	52%	
5/18/2019	1:10	78%	71%	68%	69%	88%	73%	80%	56%	50%	51%	61%	48%	38%	42%	51%	
5/18/2019	1:20	72%	65%	72%	68%	91%	73%	82%	56%	44%	47%	62%	50%	39%	59%	65%	
5/18/2019	1:30	80%	81%	78%	79%	93%	72%	77%	57%	45%	55%	60%	48%	43%	58%	68%	
5/18/2019	2:20	77%	81%	86%	0%	98%	87%	88%	72%	75%	90%	89%	70%	63%	60%	82%	
5/18/2019	2:30	79%	85%	92%	0%	99%	93%	96%	59%	59%	75%	92%	88%	77%	59%	96%	
5/18/2019	2:40	65%	64%	75%	0%	96%	71%	75%	87%	85%	90%	91%	68%	49%	36%	81%	
5/18/2019	3:20	95%	84%	100%	0%	96%	78%	72%	99%	96%	97%	100%	98%	95%	87%	100%	
5/21/2019	4:30	71%	74%	80%	0%	84%	96%	99%	96%	75%	91%	84%	90%	79%	60%	63%	
5/21/2019	5:00	88%	72%	80%	0%	97%	84%	93%	91%	97%	100%	100%	91%	93%	96%	76%	
5/21/2019	5:10	94%	85%	85%	0%	94%	96%	99%	100%	100%	100%	100%	96%	82%	98%	101%	
5/22/2019	0:30	88%	80%	98%	0%	97%	70%	60%	100%	97%	99%	100%	91%	75%	53%	99%	
5/22/2019	0:40	92%	87%	96%	0%	100%	74%	60%	99%	101%	101%	99%	81%	75%	72%	100%	
5/22/2019	1:00	97%	87%	95%	0%	98%	72%	49%	101%	95%	100%	88%	71%	54%	37%	90%	
5/22/2019	1:10	93%	87%	95%	0%	96%	71%	55%	100%	91%	92%	96%	80%	66%	40%	98%	
5/22/2019	1:20	97%	83%	85%	0%	99%	66%	43%	98%	78%	95%	99%	81%	60%	44%	93%	
5/22/2019	3:10	81%	77%	88%	0%	98%	41%	25%	85%	66%	70%	74%	52%	46%	17%	81%	
5/22/2019	3:20	82%	72%	79%	0%	95%	43%	21%	73%	77%	75%	86%	61%	28%	23%	63%	
5/22/2019	3:30	93%	77%	72%	0%	91%	46%	26%	82%	71%	74%	84%	54%	23%	18%	55%	
5/22/2019	3:40	96%	89%	75%	0%	91%	55%	33%	79%	72%	63%	76%	49%	15%	26%	54%	
5/22/2019	4:20	101%	95%	94%	0%	92%	80%	81%	93%	71%	73%	87%	17%	6%	64%	45%	
5/22/2019	4:40	99%	96%	92%	0%	97%	77%	71%	88%	64%	67%	89%	27%	6%	41%	30%	
5/22/2019	5:10	100%	100%	21%	0%	100%	100%	100%	100%	101%	97%	100%	51%	15%	81%	65%	
SITE C		Turbine % OF FULL ELECTRIC POWER															
Date	Time	E1	E2	E3	E4	E5	E6	E7	W1	W2	W3	W4	W5	W6	W7	W8	
5/19/2019	5:00	60%	11%	43%	48%	58%	45%	40%	17%	58%	54%	74%	59%	59%	84%	76%	
5/19/2019	5:10	51%	8%	42%	57%	67%	55%	49%	24%	77%	69%	90%	69%	65%	85%	74%	
5/19/2019	5:20	32%	2%	26%	51%	58%	55%	52%	27%	73%	66%	82%	71%	72%	81%	73%	
5/19/2019	6:10	100%	74%	100%	101%	100%	101%	99%	70%	84%	83%	100%	94%	91%	100%	100%	
5/19/2019	6:20	100%	78%	100%	100%	100%	100%	98%	82%	90%	88%	100%	96%	94%	100%	100%	
5/19/2019	6:30	100%	82%	100%	100%	100%	100%	99%	78%	98%	101%	100%	100%	100%	100%	100%	
5/19/2019	6:40	100%	76%	100%	100%	100%	100%	97%	82%	101%	100%	100%	100%	100%	100%	100%	
5/19/2019	6:50	100%	93%	100%	100%	100%	100%	100%	97%	100%	100%	100%	100%	100%	100%	100%	
5/31/2019	22:30	86%	74%	87%	82%	97%	96%	99%	96%	73%	73%	89%	71%	64%	77%	76%	
5/31/2019	22:40	93%	82%	96%	92%	101%	101%	100%	100%	77%	77%	90%	73%	65%	81%	84%	
5/31/2019	22:50	95%	87%	100%	93%	100%	100%	100%	100%	94%	92%	100%	91%	76%	91%	95%	
5/31/2019	23:50	90%	79%	91%	85%	100%	100%	100%	89%	72%	74%	86%	64%	58%	74%	78%	
5/31/2019	23:10	92%	82%	90%	87%	100%	100%	100%	91%	64%	68%	84%	65%	51%	65%	76%	
5/31/2019	23:20	89%	86%	94%	90%	99%	100%	100%	86%	66%	68%	81%	62%	61%	77%	82%	
6/3/2019	1:20	100%	100%	100%	100%	100%	100%	100%	98%	87%	92%	100%	93%	74%	95%	96%	