

**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 to be placed 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 ON THE DEERFIELD WIND
SPRING SOUND REPORT AND MR. SHEA’S REQUEST FOR OINR TESTING**

NOW COMES the Windaction Group and Tom Shea, *pro se* parties to Docket 7250 (“Parties”), who, in accordance with the October 16, 2019 order of the Vermont Public Utilities Commission (“Commission” or “PUC”), submit these comments pertaining to the Deerfield Wind (“Project”) spring sound monitoring report. Additional comments herein address Mr. Shea’s request for OINR testing at his residence.

I. BACKGROUND

Per order of the Vermont Public Utilities Commission (“Commission”) and consistent with the Final Sound Monitoring Protocol (“Protocol”) as amended in April 2019, the Department conducted a second sound monitoring test at the Deerfield wind energy facility over a five week period from May 8 until June 12, 2019. Cross Spectrum Acoustics (“CSA”) was again engaged to conduct the Spring 2019 test on behalf of the Department. Monitoring occurred at three locations, Sites A, B, and C, where Site C is at the residence owned by Tom Shea. The amended Protocol also provided for a fourth monitoring site, Site C-Alt, to address noise inference from the existing Searsburg turbines.

In its August 13, 2019 *Deerfield Wind Spring 2019 Sound Monitoring Compliance* report (“Report”), CSA addresses a number of critical deficiencies from the fall report including the addition of Section 3.2.4 and Appendices G, H, and I. This added information was essential in understanding how, and whether CSA followed the Protocol when collecting and processing the sound data for both the fall and spring tests.

The purpose of the sound monitoring tests is to determine whether the Project is operating in compliance with the noise standard set by the Commission. According to 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 the Report that the Project operated in compliance with the permitted noise limit, however, the Parties have identified two fatal errors in CSA's data collection and analysis that render any conclusion about compliance unsubstantiated. The Parties also cite an additional problem with CSA's data processing that may have resulted in a substantial amount of valid sound data being discarded. Each of these errors relate, in whole, or in part, to incorrect assumptions by CSA in following the Protocol.

II. FINDINGS

1. CSA relied on hub height wind speeds to determine turbine operation levels

Wind turbines typically produce their maximum sound levels when operating at or near full electricity power output which for the Deerfield turbines would be around 2,000 kilowatts each (2 megawatts). Sound measurements during these periods are best suited for determining whether the Project is in compliance with the permit.

Appendix E of the Report provides the 10-minute wind speed and electric power output data for each of the 15 Deerfield Wind turbines for the period from May 17 through June 8. This period corresponds to the timeframe when Deerfield scheduled up to 22 turbine shutdowns.¹ From this data set, CSA cross-referenced and selected noise data at each of the monitoring sites based on the hub height wind speed at two turbines, W01 and W08. These turbines are the first and last turbines in the western array where W01 is situated closest to Site A. When hub-height wind speeds at these turbines reached 6 m/s or higher, CSA selected the noise data for further processing.² (Report Section 3.3.2 at 19)

During a November 4, 2019 conference call attended by the Parties and representatives from CSA, Deerfield, and the Department, CSA stated that the 6 m/s criterion was a requirement of the Protocol. In fact, the 6 m/s is not a directive of the Protocol nor is there any assertion that a 6 m/s wind speed is indicative of turbine operational conditions.

Section 2.6 of the Protocol only states that "During the measurement program, the turbines will be shut down for 20 minutes at a time no less once per night (10 pm to 7 am) where hub height wind speeds are at 6 m/s or above, *in order to ensure that the turbines would be operating at or near their maximum sound output* before and after each shutdown" [*emphasis added*] There is no information to

¹ See Table 2 of the Report at 18. Curtailments 14 and 15 did not occur as initially reported.

² In at least three instances at Site A and Site C, CSA used sound data where the wind speed was below 6 m/s.

suggest Avangrid based its shutdown periods on hub height wind speed since the shutdown periods were coordinated between Avangrid and CSA in advance of the Fall and Spring tests (*Appendix B at 3*)

In examining the data contained in Appendix E, it is apparent that hub height wind speed is not an appropriate proxy for electric power output.

Table A shows the curtailment periods around which CSA selected sound level data for further processing. The Parties examined each of the 10-minute periods CSA ultimately used in determining Project-related sound levels and found that nearly 45% of those periods showed the Project was operating below 70% of full power. Individual turbines were found to be operating at levels notably lower than 70%.

Table A

Location	Curtailment Number	Start Date & Time	End Date & Time
Site A	4	May 19, 5:25 AM	May 19, 5:45 AM
	5	May 19, 11:01 PM	May 19, 11:21 PM
	18	May 31, 11:23 PM	May 31, 11:58 PM
Site B	2	May 18, 1:31 AM	May 18, 1:51 AM
	3	May 18, 3:51 AM	May 18, 4:11 AM
	9	May 21, 3:41 AM	May 21, 4:01 AM
	11	May 22, 1:20 AM	May 22, 1:40 AM
	12	May 22, 3:40 AM	May 22, 4:00 AM
Site C	4	May 19, 5:25 AM	May 19, 5:45 AM
	18	May 31, 11:23 PM	May 31, 11:58 PM
	19	June 3, 1:21 AM	June 3, 1:41 AM

Exhibit A (attached) shows the electric power output (in kilowatts) and corresponding percentage of full power for each turbine during the periods used by CSA in determining Project sound levels. For example, on May 19, 2019, in the 10-minute period ending 4:30 am eastern time, turbine W01 produced only 441 kilowatts out of a possible 2,000 kilowatts, or 22% of full power. Turbine W01 is one of the turbines closest to Site A, and likely to be a dominating noise source for that site. Yet, 40% of the time periods used by CSA in determining Leq for Site A, W01 was operating *below 30% of its full power*. This low electric power output would bias the sound study toward the lower noise levels at Site A. Similar conditions are shown for Sites B and C.

2. CSA sourced data from different shutdowns and combined data to compute Leq by Site

In an April 4, 2019 response to Mr. Shea's request for OINR testing, Deerfield includes a memorandum authored by Mr. Ken Kaliski wherein at footnote #2, Mr. Kaliski asserts that the Protocol, which is based on ANSI S12.9 Part 3, "does not allow for the combination of data for different shutdowns to make a full one-hour period, as appears to have been done in the CSA Fall Report." He adds that "turbine-only sound level must be estimated for each shutdown independently."

The Parties agree with this statement. Despite this, the Spring monitoring data show that CSA again combined data from different shutdown periods that occurred many hours and days apart when determining the 1 hour Leq value at each site.

Referencing Table A above, it is evident that sound data at Site A was collected during shutdowns that were at least 15-hours apart on May 19 and 10-days apart from May 19 to May 31. Similarly, Sites B and C show sizable gaps between when source sound data is collected.³ Given different meteorological conditions and turbine operating conditions spanning the 5-week test period, combining data in this way is inappropriate and contrary to the applicable noise testing standard, ANSI S12.9 Part 3.

During the November 4 conference call, CSA representatives defended their work claiming the Protocol's 2-hour requirement for collecting data could not be met. This is concerning and raises questions over why CSA did not broach this issue before the Spring test was conducted. The Protocol was adopted prior to any sound studies being performed at the Project site. It is reasonable that given the complex terrain where the Project is located that this requirement should be revisited. Still, the Protocol allows for the 2-hour requirement to be relaxed if 5-weeks of data monitoring does not produce 2-hours of valid data. In that instance, the valid data collected would be used for compliance purposes.

3. CSA relied on ground wind direction to determine upwind conditions

In the third pass for data filtering, CSA excluded sound data from its analysis if, "there was an upwind vector component to the nearest turbines for at least a portion of the 10-minute interval." (Report at 19 and Appendix G at G-1) CSA situated wind vanes at each monitor site to measure ground wind direction where the Protocol only required one vane at one site. (Protocol at 5).

This level of data exclusion is not supported by the Protocol and likely resulted in significant amounts of valid sound-level data being removed from the analysis. The Protocol only references upwind conditions as they pertain to noise events over 40 dBA. Specifically the Protocol states:

Events over 40 dBA (i.e., 5 dBA lower than the CPG exterior noise limit) where the *hub height* wind speed is sufficient to generate within 1 dB of the maximum sound power

³ Site B had gaps in sound data that were 19-hours and 3-days apart. Site C gaps were 12-days and 2-days long.

(over a reasonable period of time and number of turbines), *and* the wind direction is not upwind of the nearest turbines shall be investigated by listening to the audio tape or reviewing the spectrogram of the event and determining if the cause is wind turbine noise. [*emphasis added*]

If the three conditions (40 dBA event, and wind speed and direction at hub height) are met, the Protocol requires the sound be further investigated⁴ to determine if the cause is Project-related. (Protocol at 8) The automatic exclusion of sound data based on ground wind direction alone is not defensible and likely contributed to CSA's inability to collect sufficient valid data. CSA admits that wind direction was the most common reason for excluding data. (Report Appendix G at G-1)

III. CONCLUSION and RECOMMENDATIONS

The errors identified by the Parties were the result of a lack of clarity in the Protocol or in CSA's understanding of the Protocol. Regardless, the seriousness of the errors should disqualify any claim that the Project is operating in compliance with the certificate. In fact, with turbines operating at levels significantly below their maximum electric output and CSA averaging sound data sourced from different shutdowns spaced days apart, it's likely the Leq's computed by CSA are lower than actual levels at the Project.

A substantial quantity of data was collected by CSA during both the Fall and Spring tests. The Parties trust that these data are still available and can be reprocessed according to the Parties comments. The requirement that 2-hours of valid data be obtained at a shutdown appears unreasonable for the site and should be explicitly relaxed. In Deerfield's responsive comments from April 4, 2019, Mr. Kaliski's footnote #2 argues that while 2-hours is not required, ANSI S12.9 Part 3 requires 1-hour of data in order to determine an Leq (1-hour). This is not accurate. In fact, ANSI S12.9 Part 3 makes clear that the measurement duration can be as short as several minutes.⁵ Regardless of the duration, it is essential that any sound measurements taken during Turbine-ON occur when the turbines are operating at or near their maximum noise levels and, during Turbine-OFF when the turbines are fully shutdown and emitting no residual noise.

Finally, with regard to Mr. Shea's request for OINR testing, we respectfully ask that the test be conducted at Site C. Despite the issues raised by the Parties, the turbine-only sound level at Site C was within 2-dBA of the Fall study. And as stated, there is good reason to believe these sound levels are lower

⁴ Investigated meant listening to the audio tape or reviewing the spectrogram of the event.

⁵ The Introduction of ANSI S12.9 Part 3 states: "As an example, one hour (1 h) is used as the basic measurement duration in [ANSI S12.9] Part 3. One hour is not a measurement duration required by this standard; it is only an example of a basic measurement duration, though a common one."

than the Project's actual emissions. The Parties note that Site B is also a candidate for OINR testing. Mr. Shea has waited eight months for the Spring test to be concluded. It is evident that additional processing will be required which could take another six months before compliance is determined. Mr. Shea should not have to wait any longer.

WHEREFORE, in view of the foregoing, the Parties respectfully request that the Commission:

1. Require the data collected for the Fall and Spring tests be reprocessed in accordance with the Protocol and the applicable ANSI standard;
2. Require that any confusion pertaining to the Protocol be resolved prior to the reprocessing and that CSA be fully informed on how to address the data;
3. Establish a schedule for when the reprocessing will be completed for both the Fall and Spring tests;
4. Require that OINR testing be conducted at Mr. Shea's residence and that there be no further delay.

Dated this day of November 15, 2019



Tom Shea, Searsburg



Lisa Linowes, The Windaction Group

cc: Parties to Docket 7250

EXHIBIT A

SITE A		Turbine Power Output (kW)															
Date	Time	E1	E2	E3	E4	E5	E6	E7	W1	W2	W3	W4	W5	W6	W7	W8	
5/19/2019	4:30	522	154	80	613	723	745	692	441	1,284	1,220	1,534	1,240	1,188	1,377	1,182	
5/19/2019	4:40	583	158	115	669	786	744	658	398	1,076	1,137	1,483	1,037	927	1,111	966	
5/19/2019	4:50	954	114	483	756	988	815	744	334	945	1,012	1,393	1,031	928	1,303	1,109	
5/19/2019	5:00	1,206	218	851	963	1,165	900	790	340	1,157	1,073	1,484	1,178	1,170	1,677	1,516	
5/19/2019	5:10	1,011	152	838	1,130	1,340	1,103	983	488	1,544	1,376	1,807	1,389	1,299	1,698	1,478	
5/19/2019	5:20	646	49	521	1,010	1,169	1,094	1,049	531	1,463	1,316	1,640	1,419	1,432	1,622	1,465	
5/19/2019	6:30	1,999	1,639	1,999	1,999	1,999	1,999	1,986	1,568	1,965	2,014	1,999	1,999	1,999	2,000	1,999	
5/19/2019	6:40	1,999	1,516	2,000	2,001	1,999	1,999	1,938	1,645	2,014	2,001	1,999	1,999	1,999	2,006	1,998	
5/19/2019	6:50	1,999	1,856	1,999	1,999	1,999	1,999	2,002	1,939	1,999	2,000	1,999	1,999	1,999	2,001	1,999	
5/19/2019	22:20	358	124	382	1,205	1,254	1,192	1,132	433	749	953	1,447	1,000	856	1,411	1,415	
5/19/2019	22:40	700	125	707	1,488	1,519	1,373	1,216	550	1,511	1,491	1,864	1,509	1,301	1,769	1,494	
5/19/2019	22:50	615	197	1,038	1,650	1,894	1,434	1,486	699	1,389	1,621	1,999	1,797	1,844	1,858	1,823	
5/19/2019	23:00	756	287	1,055	1,867	1,884	1,616	1,626	1,069	1,505	1,400	1,948	1,778	1,871	1,907	1,991	
5/19/2019	23:50	983	712	1,754	-3	1,872	1,777	1,812	1,229	1,916	1,970	2,000	2,011	1,984	2,005	2,009	
5/20/2019	0:00	1,250	738	1,739	-3	1,986	1,842	1,860	1,642	1,983	1,999	2,001	2,000	1,991	1,999	1,997	
5/31/2019	23:10	1,848	1,630	1,797	1,731	2,001	1,999	1,999	1,824	1,285	1,358	1,673	1,299	1,022	1,303	1,518	
6/1/2019	0:10	1,790	1,554	1,683	1,639	1,978	1,964	2,014	1,190	894	934	1,170	858	805	1,104	1,251	
6/1/2019	0:30	1,714	1,692	1,720	1,727	1,991	1,937	1,882	1,512	1,187	1,186	1,387	907	799	1,264	1,515	
6/1/2019	0:40	1,731	1,815	1,855	1,676	2,000	1,981	1,919	1,471	1,142	1,208	1,353	987	918	1,344	1,584	
6/1/2019	0:50	1,765	1,569	1,709	1,534	1,924	1,856	1,812	1,476	1,143	1,201	1,339	977	860	1,293	1,522	
Average		1,221	815	1,216	1,283	1,624	1,518	1,480	1,039	1,408	1,423	1,676	1,421	1,360	1,603	1,592	

Turbine % Full Power																											
E1	E2	E3	E4	E5	E6	E7	W1	W2	W3	W4	W5	W6	W7	W8	Overall Average*												
26%	8%	4%	31%	36%	37%	35%	22%	64%	61%	77%	62%	59%	69%	59%	43%												
29%	8%	6%	33%	39%	37%	33%	20%	54%	57%	74%	52%	46%	56%	48%	39%												
48%	6%	24%	38%	49%	41%	37%	17%	47%	51%	70%	52%	46%	65%	55%	43%												
60%	11%	43%	48%	58%	45%	40%	17%	58%	54%	74%	59%	59%	84%	76%	52%												
51%	8%	42%	57%	67%	55%	49%	24%	77%	69%	90%	69%	65%	85%	74%	59%												
32%	2%	26%	51%	58%	55%	52%	27%	73%	66%	82%	71%	72%	81%	73%	55%												
100%	82%	100%	100%	100%	100%	99%	78%	98%	101%	100%	100%	100%	100%	100%	97%												
100%	76%	100%	100%	100%	100%	97%	82%	101%	100%	100%	100%	100%	100%	100%	97%												
100%	93%	100%	100%	100%	100%	100%	97%	100%	100%	100%	100%	100%	100%	100%	97%												
18%	6%	19%	60%	63%	60%	57%	22%	37%	48%	72%	50%	43%	71%	71%	46%												
35%	6%	35%	74%	76%	69%	61%	28%	76%	75%	93%	75%	65%	88%	75%	62%												
31%	10%	52%	83%	95%	72%	74%	35%	69%	81%	100%	90%	84%	65%	51%	65%												
38%	14%	53%	93%	94%	81%	81%	53%	75%	70%	97%	89%	94%	95%	100%	75%												
49%	36%	88%	0%	94%	89%	91%	61%	96%	99%	100%	101%	99%	100%	100%	80%												
63%	37%	87%	0%	99%	92%	93%	82%	99%	100%	100%	100%	100%	100%	100%	83%												
92%	81%	90%	87%	100%	100%	100%	91%	64%	68%	84%	65%	51%	65%	76%	81%												
89%	78%	84%	82%	99%	98%	101%	59%	45%	47%	58%	43%	40%	55%	63%	69%												
86%	85%	86%	86%	100%	97%	94%	76%	59%	59%	69%	45%	40%	63%	76%	75%												
87%	91%	93%	84%	100%	99%	96%	74%	57%	60%	68%	49%	46%	67%	79%	77%												
88%	78%	85%	77%	96%	93%	91%	74%	57%	60%	67%	49%	43%	65%	76%	73%												
61%	41%	61%	64%	81%	76%	74%	52%	70%	71%	84%	71%	68%	80%	80%	69%												

SITE B		Turbine Power Output (kW)															
Date	Time	E1	E2	E3	E4	E5	E6	E7	W1	W2	W3	W4	W5	W6	W7	W8	
5/18/2019	0:40	1,771	1,492	1,571	1,670	1,810	1,703	1,827	1,307	865	1,052	1,189	1,067	978	1,113	1,176	
5/18/2019	0:50	1,644	1,529	1,604	1,697	1,884	1,670	1,783	1,206	873	1,033	1,172	963	661	1,023	1,183	
5/18/2019	1:00	1,629	1,267	1,489	1,457	1,658	1,639	1,745	1,235	960	1,076	1,254	1,128	770	970	1,042	
5/18/2019	1:10	1,550	1,421	1,355	1,371	1,763	1,468	1,593	1,111	1,003	1,020	1,211	967	765	842	1,018	
5/18/2019	1:20	1,444	1,304	1,438	1,362	1,815	1,452	1,639	1,118	884	935	1,232	1,007	783	1,173	1,306	
5/18/2019	1:30	1,594	1,613	1,559	1,583	1,851	1,446	1,548	1,137	905	1,096	1,194	962	853	1,152	1,359	
5/18/2019	2:20	1,544	1,626	1,713	-2	1,967	1,742	1,765	1,435	1,495	1,809	1,783	1,403	1,268	1,205	1,643	
5/18/2019	2:30	1,577	1,703	1,833	-2	1,989	1,854	1,928	1,183	1,176	1,504	1,847	1,760	1,538	1,183	1,925	
5/18/2019	2:40	1,305	1,270	1,500	-3	1,920	1,415	1,499	1,732	1,699	1,798	1,812	1,361	976	712	1,629	
5/21/2019	3:20	1,416	1,622	1,629	1,571	1,754	1,346	1,636	1,556	1,839	1,912	1,870	1,813	1,804	1,790	1,703	
5/21/2019	4:30	1,419	1,470	1,591	-3	1,684	1,912	1,985	1,916	1,493	1,812	1,684	1,804	1,577	1,192	1,266	
5/21/2019	5:00	1,751	1,443	1,603	-4	1,934	1,689	1,855	1,821	1,941	2,000	1,992	1,816	1,850	1,926	1,524	
5/21/2019	5:10	1,873	1,699	1,698	-4	1,885	1,921	1,978	1,992	2,002	2,000	2,005	1,918	1,636	1,954	2,013	
5/22/2019	0:30	1,762	1,609	1,951	-2	1,932	1,400	1,192	2,000	1,939	1,987	2,009	1,819	1,504	1,052	1,979	
5/22/2019	0:40	1,847	1,732	1,929	-2	2,002	1,476	1,199	1,982	2,011	2,011	1,976	1,616	1,506	1,437	2,006	
5/22/2019	1:00	1,930	1,744	1,890	-2	1,959	1,442	974	2,014	1,903	2,001	1,755	1,417	1,075	732	1,804	
5/22/2019	1:10	1,866	1,738	1,906	-2	1,915	1,417	1,101	2,000	1,813	1,848	1,913	1,603	1,314	800	1,960	
5/22/2019	1:20	1,945	1,667	1,704	-2	1,975	1,314	851	1,956	1,553	1,907	1,979	1,613	1,196	883	1,855	
5/22/2019	3:10	1,620	1,545	1,758	-2	1,957	812	507	1,705	1,317	1,395	1,473	1,035	927	342	1,614	
5/22/2019	3:20	1,646	1,441	1,574	-1	1,901	857	425	1,461	1,531	1,499	1,710	1,210	568	460	1,251	
5/22/2019	3:30	1,869	1,543	1,439	-1	1,818	928	522	1,641	1,413	1,470	1,675	1,070	468	357	1,107	
5/22/2019	3:40	1,921	1,774	1,497	-1	1,826	1,102	654	1,584	1,435	1,254	1,520	981	297	510	1,081	
5/22/2019	4:20	2,020	1,905	1,876	-1	1,844	1,592	1,611	1,853	1,429	1,458	1,743	338	120	1,272	895	
5/22/2019	4:40	1,978	1,918	1,844	-2	1,949	1,542	1,410	1,756	1,284	1,339	1,777	535	112	829	596	
5/22/2019	5:10	1,998	1,999	412	-2	2,000	2,001	2,005	2,000	2,011	1,947	1,993	1,028	290	1,628	1,299	
Average		1,717	1,603	1,615	427	1,880	1,486	1,409	1,628	1,471	1,567	1,671	1,289	993	1,061	1,449	