

DEC 13 '19 04:11:47
PUBLIC UTILITY COMMISSION

**STATE OF VERMONT
PUBLIC UTILITY COMMISSION**

Docket No. 7250

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))

**DEPARTMENT OF PUBLIC SERVICE REPLY TO COMMENTS REGARDING
SPRING SOUND MONITORING REPORT AND MOTION FOR OINR TESTING**

The October 16, 2019 order of the Public Utility Commission (Commission) directed the parties to file comments on the spring 2019 sound monitoring report and the motion for outside-to-inside noise reduction testing by November 15, 2019, and to file responsive comments by December 13, 2019. The Department of Public Service (Department) responds below to the comments filed by petitioner Deerfield Wind, LLC (Deerfield) and the joint comments filed by Windaction Group (Windaction) and Tom Shea (Mr. Shea).

The Department explains below how its experts Cross Spectrum Acoustics (CSA) interpreted and implemented the Sound Monitoring Protocol (Protocol), since the Department's role is to implement the Protocol as written. The Department is able to implement any modifications directed by the Commission, which would generally involve reprocessing the data rather than conducting additional monitoring. The Department does not make additional comments regarding the motion for outside-to-inside noise reduction testing.¹

¹ See *Amended Petition of Deerfield Wind, LLC*, Docket 7250, Department Comments on Spring Sound Monitoring Report and Motion for OINR Testing, at 3–4, filed 11/15/19.

I. Background

The Department conducted two sound monitoring campaigns in fall 2018 and spring 2019 and produced reports for each: the “Fall Monitoring Report” and the “Spring Monitoring Report.” The reports found project-only sound levels at the three monitoring locations—Sites A, B, and C—within allowable limits, *i.e.*, project-related sound levels were not found to exceed 45 dBA (exterior) or 30 dBA (interior).² The data at all three sites for both monitoring periods satisfied the requirements of the Protocol,³ with one exception. The Fall Site C data set was short of that required: two hours of data were required to determine compliance with the CPG, yet only 48 minutes were available that met the Protocol’s requirements.⁴

On March 18, 2019, landowner Tom Shea filed a motion for outside-to-inside noise reduction (OINR) testing. The Site C monitoring location is on Mr. Shea’s property; the results in the Fall Monitoring Report found a 41 dBA turbine-only sound level at Site C, based on 48 minutes of data.⁵ OINR testing is available under the Protocol where post-construction sound monitoring shows, “Deerfield Project sound levels of 40 dBA (Leq)(1 hr) or higher at the location.”⁶

² *Amended Petition of Deerfield Wind, LLC*, Docket 7250, Deerfield Wind - the Fall 2018 Sound Monitoring Compliance Report, at Section 4.2.1, p. 18 (PDF p. 22); Section 4.3, pp. 27-28 (PDF pp. 31-32)(filed 1/7/2019, revised 10/23/19) (“Fall Monitoring Report”); Deerfield Wind - the Spring 2019 Sound Monitoring Compliance Report, at Section 4.2.1, p. 26 (PDF p. 31); Section 4.3, p. 35 (PDF p. 40) (filed 8/14/19; revised 10/11/19) (“Spring Monitoring Report”).

³ See Fall Monitoring Report, Appendix A & Spring Monitoring Report, Appendix A—Final Sound Monitoring Protocol.

⁴ Fall Monitoring Report at Section 4.2.4, p. 26 (PDF p. 30).

⁵ *Id.*

⁶ Protocol § 2.5.

II. Governing ANSI Standard

There is a threshold matter of professional disagreement as to the more relevant sound monitoring standard to apply to these campaigns. Resolving this issue will inform the issues that are discussed in the subsequent sections. The parties agree that the Sound Monitoring Protocol does not provide a sound monitoring standard.

Deerfield maintains that the ANSI S12.9 Part 3, “Short-term Measurements with an Observer Present,” (Part 3 Standard) should be applied. Deerfield argues this is the standard to measure the sound of a specific source at a specific location.

The Department’s experts, CSA, concluded that the ANSI S12.9 Part 2, “Measurement of Long-Term Wide-Area Sound,” (Part 2 Standard) was the more relevant standard, for the following reasons.

First, Deerfield’s Part 3 Standard is for “Measurements with an Observer Present,” yet the Protocol calls for attended and unattended measurements.⁷ The Department does not agree with Deerfield that an observer reviewing the audio recording is equivalent to attended measurements. The Part 2 Standard meanwhile accurately describes the monitoring that occurred here: it provides “recommended procedures for *measurement of long-term, time-average environmental sound outdoors* at one or more locations in a community for environmental assessment or planning for compatible land uses and for other *purposes such as noise prediction validation and regulation*.”⁸ The Protocol similarly requires that monitoring occur over a large area, and determines the turbine-only sound level “by logarithmically subtracting the energy-averaged background sound level for all remaining measurement periods

⁷ See Protocol, §§ 2.2, 2.7.

⁸ ANSI S12.9 Part 2, Section 1 “Scope,” (emphasis added).

from the energy-averaged measured Turbine-On sound levels for all remaining measurement periods.”⁹ The Part 2 standard also provides a “sampling strategy for *discontinuous* measurements,”¹⁰ as were used here. Therefore, CSA concluded that the Part 2 Standard is the more relevant standard. If the Commission were to conclude that the Part 3 Standard is the more relevant standard, CSA would reprocess the existing measurement data in accordance with the Commission’s interpretation of the Protocol.

III. Deerfield’s Comments

Deerfield’s November 15, 2019 comments both noted that the Spring Monitoring Report found the project complies with the CPG’s sound limit of 45 dBA (exterior, L_{eq}), and argued for three “methodological” changes. The Department explains its methodology below.

First, Deerfield argued to exclude “contaminating sound,” *i.e.*, wind gusts. Deerfield maintains that these are “transient” sounds that must be excluded under its preferred Part 3 Standard.

CSA did not exclude all wind gusts because it concluded that excluding all wind gusts was not required the Protocol. Protocol Section 3.0 provides that:

Data during some periods will be removed from the results. These include periods when:

- Wind speeds (average or gusts) at a monitoring site are above 4 to 5 m/s – Winds above 5 m/s create a large amount of false noise generated from pressure fluctuations around the microphone. Data for wind speeds between 4 and 5 m/s (or below, as needed) *should be carefully reviewed to identify any wind contamination that creates a pseudo-noise or wind-induced noise that is sufficient to mask wind turbine sound prior to its inclusion in the filtered set.*¹¹

⁹ Protocol § 3.0.

¹⁰ ANSI S12.9 Part 2, Section 9 “Temporal Sampling Requirements” (emphasis added).

¹¹ Protocol, § 3.0 (emphasis added).

CSA reviewed the data and kept wind gusts that it concluded did not constitute “wind contamination that creates a pseudo-noise or wind-induced noise that is sufficient to mask wind turbine sound prior to its inclusion in the filtered set.” CSA applied the Protocol rather than the Part 3 standard.

Second, Deerfield challenges CSA’s decision to exclude a ten-minute block of data if one minute within that block showed wind speeds above 5 m/s, claiming this could disproportionately increase the L_{eq} .

The Department responds that the Protocol states that, “Sites will include meteorological instrumentation logging data in no more than ten-minute increments[.]”¹² Based on this, in the Fall Monitoring Report CSA excluded a ten-minute block if the average wind speed over the 10-minute interval did not meet the Protocol’s requirements. Additionally, as required by the Protocol, CSA performed supplemental filtering by reviewing all events over 40 dBA and also periods with wind speeds between 4 m/s and 5 m/s.¹³ The Commission’s April 25, 2019 order increased “the wind speed logging frequency from a 10-minute interval to a 1-minute interval”¹⁴ for the Spring 2019 testing. Yet there was sufficient data at all sites for the Spring 2019 monitoring. The Protocol merely requires, “At least two valid hours of Turbine-On data will be needed to determine compliance.”¹⁵ CSA’s initial filtering did not include a ten-minute block if one-minute was excluded in the Spring 2019 monitoring. In some cases, during the subsequent,

¹² Protocol, § 2.4.

¹³ It is not clear whether applying Deerfield’s methodology would have resulted in sufficient data at Site C for Fall 2018, since the Fall 2018 weather data used 10-minute intervals.

¹⁴ *Amended Petition of Deerfield Wind, LLC*, Docket 7250, Order of 4/25/19 at 4, 6.

¹⁵ Protocol, § 3.0.

secondary filtering, the one-minute weather data were used to exclude shorter intervals of acoustic data.¹⁶

Third, Deerfield argues that subtraction of background sound should be done between adjacent Turbine-On and Turbine-Off periods, claiming this is required under the Part 3 standard. The Department responds that Protocol Section 3.0 prescribes how to process the data, and does not require that data only be compared between adjacent turbine-on and turbine-off periods. It would be improper for the Department to process the data in the manner advocated by Deerfield absent the Commission's direction, since this method could favor Deerfield.

IV. WindAction and Mr. Shea's Comments

WindAction and Mr. Shea's joint comments contend there are two "fatal errors in CSA's data collection and analysis," and an "additional problem with CSA's data processing. . . ."¹⁷ The Department addresses each in turn.

A. Hub-Height Wind Speeds

WindAction claims monitoring should be based on power output rather than hub height wind speeds. The Department interprets the Protocol to require that shutdowns occur when hub height wind speeds are over 6 m/s, and to state a causal relationship between hub height wind speeds and maximum sound output, due to the following language:

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

¹⁶Spring Monitoring Report at Section 3.3.2, p. 19 (PDF p. 24).

¹⁷ *Amended Petition of Deerfield Wind, LLC*, Docket 7250, WindAction-Shea Joint Comments on the Deerfield Wind Spring Sound Report and Mr. Shea's Request for OINR Testing, at 2, filed 11/15/19 (WindAction Comments).

near their maximum sound output before and after each shutdown (assuming the wind conditions remain relatively constant over that period).¹⁸

The Department does not identify a requirement in the Protocol that sound measurements be conducted based on maximum power output rather than hub height wind speeds. Furthermore in CSA's professional experience there is an established correlation between wind speed and sound level, yet less empirical support for a correlation between power output and sound level. WindAction does not provide support for its claim that, "Wind turbines typically produce their maximum sound levels when operating at or near full electricity power output. . . ." ¹⁹

Finally, the Department responds to WindAction's claim that, "the shutdown periods were coordinated between Avangrid and CSA in advance of the Fall and Spring tests." ²⁰ Shutdowns were not pre-determined before testing. Prior to the start of the fall monitoring, CSA provided Avangrid with a "Turbine-off Measurement Shut-down Protocol" describing the operating conditions under which to attempt shutdowns. Ultimately, Avangrid determined the exact times during which shutdowns occurred and (with the exception of shutdowns that occurred during the sessions of attended monitoring) only informed CSA after the shutdowns had been completed.

B. Data from Different Shutdown Periods

WindAction contends that data from different shutdowns cannot be combined, per the Part 3 Standard, as Deerfield advocated in its April 4, 2019 filing.

Protocol § 3 states (emphasis added):

The Turbine-only sound level for the monitoring period will *be determined by logarithmically subtracting the energy-averaged background sound level for all*

¹⁸ Protocol § 2.6 (emphasis added).

¹⁹ See WindAction Comments at 2.

²⁰ *Id.* at 3.

remaining measurement periods from the energy-averaged measured Turbine-On sound levels for *all remaining measurement periods*. This value will be used to compare to the appropriate CPG limits.

The reasonable interpretation of this language—and the rest of the data processing requirements in Section 3—is that data will be combined across shutdowns to collect the two hours required to determine CPG compliance. Requiring two hours of compliant data within a single shutdown is not expressly called for in the Protocol. CSA would expect such a restrictive condition to be expressly stated in the Protocol, since it would materially impair the ability to collect sufficient data.

Furthermore, though WindAction argues that the Part 3 Standard should have been applied, the Department previously stated that the Part 2 Standard is more relevant,²¹ for the reasons restated in section II, *supra*. Therefore, WindAction is stating that CSA should have followed the methodology advocated by Deerfield, even though CSA did not do so because this was not required by the Protocol and could have unanticipated impacts (such as decreasing or increasing the sound levels). Furthermore, WindAction is making a different argument than was the topic of the parties' April 2019 filings, where Deerfield and the Department were debating whether data could be combined for the *one-hour* *L_{eq}* applicable to *OINR testing*. WindAction is now arguing a separate point: that the *two hours of data* used to determine *CPG compliance* must be collected in a single shutdown.

C. Ground Wind Direction to Determine Upwind Conditions

WindAction contests CSA excluding data where there was an upwind vector component to the nearest turbines for at least a portion of the 10-minute interval, and argues this

²¹ *Amended Petition of Deerfield Wind, LLC*, Docket 7250, Department Response to Deerfield Comments, at 2–3, filed 4/18/19.

determination should be based on hub height wind speed. WindAction further contends that excluding this data, “likely contributed to CSA’s inability to collect sufficient valid data.”²²

CSA did collect sufficient valid data, with the exception of Site C for the fall campaign. If there were insufficient data, it could be worthwhile to conduct additional investigation of data excluded due to wind direction, as WindAction advocates. Yet that was not the case here. Otherwise, the Department notes that the Protocol only calls for a ground-level wind vane at one-site.²³ The Protocol neither requires Deerfield to provide hub-height wind direction data, nor requires those conducting the monitoring program to collect hub-height wind direction data. CSA further notes that following the methodology advocated by WindAction (*i.e.*, including noise measurement data for both upwind and downwind conditions) would likely reduce the overall calculated sound level.

Dated at Montpelier, Vermont, this 13th day of December, 2019.

VERMONT DEPARTMENT OF PUBLIC SERVICE

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²² WindAction Comments at 5.

²³ See Protocol § 2.4.