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August 11, 2020

Pamela G. Monroe, Administrator  
New Hampshire Site Evaluation Committee  
21 South Fruit Street, Suite 10  
Concord, NH 03301-2429

**Re: Docket No. 2015-02, Antrim Wind Energy LLC  
Sound Monitoring Protocol**

Dear Ms. Monroe:

As you are aware, Ms. Lisa Linowes filed a letter, dated May 21, 2020, regarding the Post-Construction Sound Monitoring Report for Winter 2020 (“Winter 2020 Sound Report”) in which she alleged, among other things, that Antrim Level LLC’s (“Antrim Level”) sound expert, Acentech, averaged data in hourly increments in a manner not supported by the Site Evaluation Committee’s (“SEC”) rules. Antrim Wind responded to Ms. Linowes’ unfounded allegation in a letter dated July 17, 2020. Attachment A is an excerpt from that letter and Attachment B is an excerpt from Acentech’s related response, which demonstrate that Ms. Linowes is incorrect.

On July 29, 2020, Ms. Linowes made comments at the SEC’s Public Meeting in which she renewed her argument about the Winter 2020 Sound Report and also alleged that the Cavanaugh Tocci protocol for evaluating and validating post-construction noise complaints similarly did not comply with SEC rules. Ms. Linowes began her comments by saying: “I moderated the stakeholder group that proposed the SEC rules on Health and Safety and I drafted NH Site 301.18 for Sound Study Methodology. NH Site 301.18 was adopted by the Committee as drafted with minor amendments. Our stakeholder effort included input from 4 acousticians.”

Ms. Linowes appears to believe that Site 301.18 is her rule, not the SEC’s, and that the SEC should accommodate her purported intent, even when the plain language of the rule is contrary to her views and, if her proposed construction were adopted, it would irreconcilably conflict with other parts of the rules and impose burdens impossible for any wind project to achieve.<sup>1</sup> As the putative author of the rule, Ms. Linowes appears to believe she has some special credibility, but her standing is no different from any other individual who participated in the

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<sup>1</sup> Ms. Linowes, who lives over 100 miles from Antrim, is an ardent opponent of all wind projects and has fought this project since its inception. It is therefore not surprising she would advocate for an interpretation of the rules that would make compliance virtually impossible.

rulemaking process, or for that matter any other individual. Ms. Linowes' participation in the rulemaking is akin to the role of a legislator who voted in committee to adopt a piece of legislation, in that when a court interprets a statute it looks to the language of the statute but does not bow to the argued intent of any particular legislator in interpreting the statute.

Ms. Linowes argues that a 1-hour compliance interval is contrary to SEC rules. Comment Letter at Para 5. In support of that errant assertion, she cites to Site 301.18 (e) (6) for the proposition that a timeframe of 1/8 second is required. *Id.* at 6. In fact, that is not what the rule requires nor does the rule even deal with the compliance interval. Rather, the rule directs the person conducting sound measurements to set the recording device to capture data at 1/8 second intervals.<sup>2</sup> In essence, the device grabs data every 1/8 second and then the data is aggregated for purposes of determining compliance over the selected interval. However, there is nothing about this portion of the rule that in any way dictates the overall compliance interval. In that respect, Ms. Linowes just fundamentally misconstrues the rule.

In fact, if the rule were interpreted as Ms. Linowes advocates, it would conflict with Site 301.18 (g) inasmuch as LAeq is not defined in the SEC's rules but relies on ANSI standards, which do not specify a particular time frame, but refer to 1 hour as a common duration, which was pointed out previously by Acentech. Moreover, measuring facility compliance at 1/8 second intervals would be a pointless exercise because every extraneous sound (cracking branches, wind gusts, truck brakes, etc.) that would otherwise be averaged out over a normal compliance interval would be interpreted as a non-compliance event.

Unsurprisingly, there are no SEC projects in New Hampshire that have ever used a compliance interval of 1/8 second. Nor is Antrim Wind aware of a single jurisdiction that has adopted a regulation with such an unworkably short compliance interval. Rather, the SEC rules, like so many jurisdictions, provide a framework for measuring various aspects of compliance but, with respect to technical aspects, they refer to one nighttime hour in Site 301.18(e)(1) and also to ANSI S12.9-2013 part 3, which in turn refers to 1 hour for the common basic measurement duration. The compliance interval must also be compatible with the prescriptions imposed for the pre-project sound modeling study, including the methodology and standards imposed in Site 301.18 (c) (1) and (2), which clearly preclude a compliance interval on the order of 1/8 second.

As for Ms. Linowes' proposed technical session, the Committee rightly determined not to schedule such an event. Ms. Linowes' continuing campaign to push her personal point of view in a restricted setting was highlighted by her transparent attempt to limit participation to an approved list of her own choosing, excluding reputable experts such as Cavanaugh Tocci, Epsilon, and

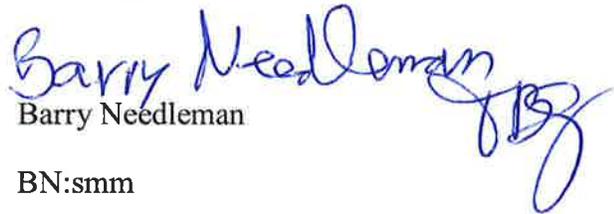
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<sup>2</sup> By way of background, in lay terms, this portion of the rule is simply telling the technical expert how to set their sound device much like someone sets the shutter on a camera. In this case, the SEC elected to require a more sensitive setting of 1/8 second (fast response) rather than a less sensitive, slower, but also typical setting of one second (slow response).

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Acentech. Finally, a technical session is unnecessary because Cavanaugh Tocci, the independent third-party expert approved by the Committee, has correctly applied the SEC's rules.

Sincerely,

  
Barry Needleman

BN:smm

# ATTACHMENT A

## Excerpt of TransAlta's July 17, 2020 Letter

### 2. Compliance assessment metric

Ms. Linowes also argues that Acentech averaged data in hourly increments in a manner not supported by the SEC rules. She is mistaken on this count as well.

#### 2.1. Type of metric for the sound levels

Site 301.14(f)(2) defines the limit in terms of A-weighted equivalent sound levels, generally denoted as  $LA_{eq}$  or A-weighted Leq. A-weighted equivalent sound level is not properly defined in the SEC Rules. It is however defined in the ANSI S12.9-2013 Part 3<sup>2</sup>, a standard referred to in the SEC Rules, which "*major applications of this Standard include: [...] Measurement of source emissions as equivalent-continuous sound pressure level (LEQ).*" The standard defines equivalent-continuous sound pressure level (LEQ) as follows:

*"Square root of the time average of the integral of the squared sound pressure over a specified time."* (emphasis added)

The compliance assessment metric is therefore clearly  $LA_{eq}$  as per the SEC Rules.

#### 2.2. Time average/specified time for the A-weighted equivalent sound levels

To use the  $LA_{eq}$  it is important to identify the *specified time*. Justification for a 1-hour time average/specified time are summarized below.

##### 2.2.1. Minimum measurement duration per Site 301.18(e)(1)

Site 301.18(e)(1) indicates that "*[...] measurements shall include at least one nighttime hour where turbines are operating at full sound power with winds less than 3 meters per second at the microphone*" (emphasis added).

##### 2.2.2. ANSI S12.9-2013 part 3 recommendation

ANSI S12.9-2013 part 3 does not have a strict requirement on the specified time, but recommends/refers to 1 hour:

- Note from the introduction: "*As an example, one hour (1 h) is used as the basic measurement duration in 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.*"
- From introduction of section 6.7 (*Basic procedure for measurement of equivalent-continuous sound pressure level*): "*The basic data collection procedure requires measurement of the continuous background sound for 10 min or more and measurement of the sound with the source(s) in operation for the basic measurement period (e.g., 1 h)*"

Based on the quotes above, a time average/specified time below 10 minutes would be an incompatibility with ANSI S12.9-2013 part 3, a standard referred to in the SEC Rules. Further, the

<sup>2</sup> ANSI S12.9-2013 Part 3, *American National Standard – Quantities and Procedures for Description and Measurement of Environmental Sound – Part 3: Short-term Measurements with an Observer Present*, American National Standards Institute, January 15, 2013

# ATTACHMENT A

## Excerpt of TransAlta's July 17, 2020 Letter

standard recognize that 1 hour is a commonly used period, which aligns as well with Site 301.18(e)(1) reproduced above.

### 2.2.3. Compatibility with the pre-construction predictive sound modeling requirements

Additionally, the post-construction compliance assessment metric must be compatible with the one imposed for the pre-construction predictive sound modeling as prescribed in the SEC Rules.

Per Site 301.18(c)(1), the predictive sound modeling must “[b]e conducted in accordance with the standards and specifications of ISO 9613-2 [...]” ISO 9613-2<sup>3</sup> requires sound emission data for the modeling, preferably from measurements. For wind turbines, the common measurement protocol used is the one defined in IEC 61400-11<sup>4</sup>, another standard referred to in the SEC Rules. The calculations required by IEC 61400-11 are complex, but important aspects regarding time average/specified time are as follows:

- Per section 7.2.2 “at least 180 measurements shall be made overall for both total noise and background noise covering corresponding wind speed ranges” and “at least 10 measurements shall be made in each [hub-height 0.5 m/s] wind speed bin for both total noise and background noise.”
- Per section 7.2.3: “The equivalent continuous A-weighted sound pressure level of the noise from the wind turbine shall be measured at the reference position. Each measurement shall be integrated over a period of 10s.”
- Ultimately, the overall minimum duration of measurement would be 1800 seconds (180 x 10s) and a minimum of 100 seconds (10 x 10s) for each hub-height 0.5 m/s wind speed bins. The standard defines a complex calculation algorithm to get the apparent sound power level at each 10 m height 1 m/s wind speed bin for the wind turbine under test, which corresponds to a series of *integral of the squared sound pressure*.
- In reality, for most wind speed bins, a dataset for a specific wind turbine contains more measurements than the bare minimum required by IEC 61400-11 (to assure the minimum measurement number is reached for all wind speed bins, the more frequent wind speed bins will inevitably have more measurements). For the AWE's turbine platform (Siemens SWT-3.2-113 2A, Rev. 0), Siemens Gamesa Renewable Energy has confirmed that the total noise measurement duration for each hub-height 0.5 m/s wind speed bins varies from 150 to 1060 seconds and the overall duration is 9330 seconds.

Based on the IEC 61400-11 elements and context summarized above, a time average/specified time below 1800 seconds (30 minutes) would lead to an incompatibility between the prescription imposed for the pre-construction predictive sound modeling and the compliance assessment metric for the post-construction sound monitoring.

In conclusion, the compliance assessment metric of 1-hour LA<sub>eq</sub> aligns with Site 301.14(f)(2) and 301.18(e)(1) as well as the standards SEC Rules refers to and the standard industry practices.

<sup>3</sup>ISO 9613-2:1996, *Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method calculation*, International Organization for Standardization, December 15, 1996.

<sup>4</sup>IEC 61400-11, *International Standard - Wind Turbines – Part 11: Acoustic Noise Measurement Techniques*, Edition 3.0, International Electrotechnical Commission, 2012-11.

## ATTACHMENT B

### Excerpt of Acentech's July 16, 2020 Letter

Donald & Shirley Mason  
8 Windchime Drive  
Bow, NH 03304

**1. A comment has questioned the use of 1-hour LAeq for assessment of project compliance.**

- a. We have reviewed NHSEC Site Rule 301.14(f)(2) and this code refers to the A-weighted equivalent sound levels (Leq or LAeq) as the metric used to define the sound limit/standard for wind energy systems. Additionally, NHSEC Site Rule 301.18(e)(1) indicates that *"measurements shall include at least one nighttime hour where turbines are operating at full sound power with winds less than 3 meters per second at the microphone"*.
- b. We have also reviewed ANSI S12.9-2013 Parts 2 and 3 and there are no requirements for measuring or reporting of data in 0.125 second sampling periods.
- c. The NHSEC Site Rule 301.18(e)(6) states that *"All sound measurements during post-construction monitoring shall be taken at 0.125-second intervals measuring both fast response and Leq metrics"*. The measurements performed in the context of the winter 2020 post construction sound monitoring used fast response which corresponds to a 0.125-second time weighting. The short sample intervals were used to establish the 1-hour LAeq, as detailed in ANSI S12.9-2013 Part 3. Section 6.7.2 of this document notes that *"small blocks of time are used so that if a transient background sound occurs during a block, then only a small part of the total measurement period is lost."* This was important for analysis at monitoring Location 1, where there were frequent car and truck sounds at all hours.
- d. In regards to averaging hourly conditions, for each hour that is presented for compliance assessment the turbine operational data was inspected to insure that all 10-minute sub-periods within the hour met the stated conditions for greatest sound (full sound power emission from the turbine, downwind condition).