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July 29, 2021

**VIA ELECTRONIC MAIL**

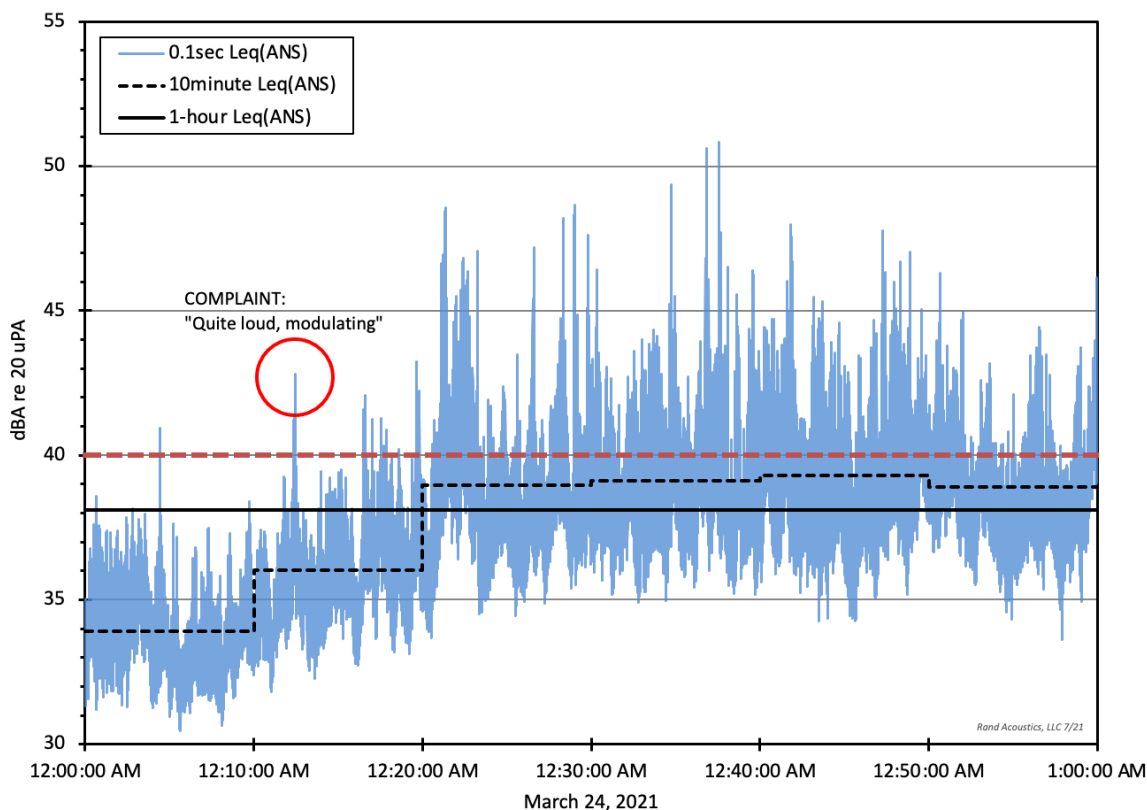
Jonathan Evans, Presiding Officer (via email)  
New Hampshire Site Evaluation Committee  
21 Fruit Street, Suite 10  
Concord, New Hampshire 03301

Re: Averaging Period Impacts Compliance Assessment  
Docket No. 2021-02, Antrim Wind Energy Facility

Dear Mr. Evans and Committee Members:

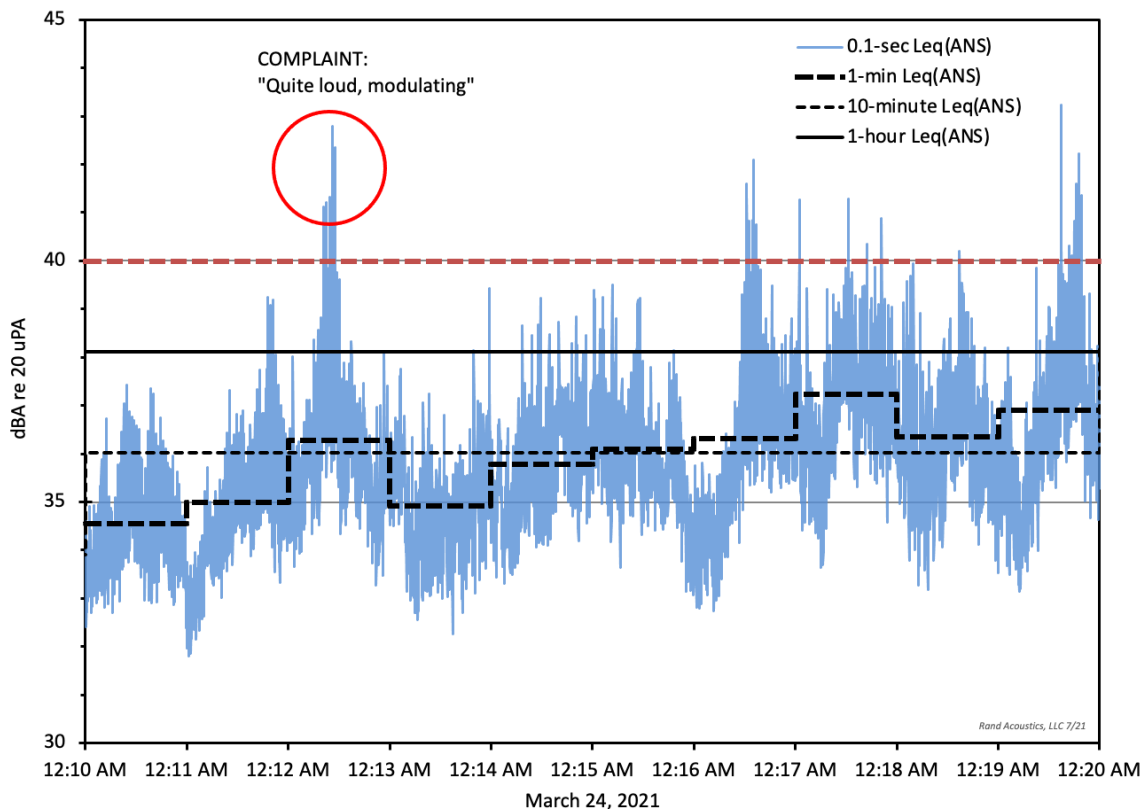
This letter is intended to support the State's role regulating excessive noise emissions by providing a better understanding of the pitfalls of long-term averaging.

The primary complaint at Antrim since facility startup is sleep disruption. I trust all agree that sleep disruption is a serious matter that must be prevented [RSA 162-H:16(IV)(c)]. Testing in March 2021 by Rand Acoustics found facility noise levels at the Berwicks (3670 ft) exceeded the 40-dBA "shall not exceed" night noise limit during complaints. See the chart below (0.1-second Leq in blue, ANSI S12.9 Part 3, 3.6 dominant sound; ANS-weighted).



Between Midnight and 1 a.m., the turbines were highly audible in recordings and dominating, with ANSI 0.1-second Leq levels frequently exceeding the "shall not exceed" night noise limit, reaching 50 dBA. Yet the 1-hour and 10-minute Leq levels averaged out just under the regulatory night noise limit. Long averaging time periods hide the sleep disruption problem.

Let's look at the 1-minute Leq over a 10-minute period. Would 1-minute Leq averaging periods be short enough to inform regulators about dominant facility noise disrupting sleep? Answer: No. See chart below (1-minute Leq shown with heavy dashed line).



As shown in the figure above for 12:10 to 12:20 a.m., 1-minute Leq averaging hides the dominant "loud", "modulating" wind turbine whooshes and whumps provoking sleep disruption and complaints. The short-term 0.1-second Leq levels (ANSI S12.9 Part 3, 3.6 dominant sound) exceed the NH SEC night limit of 40 dBA, reaching 43 dBA, 7 dB higher than the 1-minute Leq and 10-minute Leq values. But the 1-minute Leq barely budges from the 10-minute Leq, and stays below the regulatory limit.

Dominant noise causing complaints and disrupting sleep is hidden by averaging. This is a mathematical fact.

Regulators looking at tables of 1-minute Leq values would be unable to understand neighbor complaints. *Regulators would not be able to regulate.*

## Conclusions

The turbines are highly fluctuating, non-steady whoosh-whump noise sources with dominant sound levels ranging many decibels above long-term Leq.

Facility wind turbine fluctuating, dominating noise levels *are loud enough to exceed the night noise limit* (0.1-second Leq, ANSI S12.9 Part 3, 3.6 dominant sound) and *disrupt sleep*, even when long-term average Leq levels are just below the night noise limit.

Long-term Leqs hide dominating noise levels that exceed the NH SEC Rule, disrupt sleep and provoke complaints.

Regulatory oversight using long-term Leq would sanction nuisance and sleep disruption from excessive, non-steady, fluctuating, dominant wind turbine noise at night. If State regulators were required to utilize long-term average Leq values such as 1-minute, 10-minute or 1-hour Leq to assess compliance during complaints and sleep disruption,

- 1) they would have no way to know why neighbors are complaining,
- 2) they would lack representative data for regulatory actions to protect sleep disruption,
- 3) from (1) and (2) they would end up sanctioning public harm by inaction, contravening the requirements to prevent impacts on health in RSA 162-H:16(IV)(c).

Thank you for your consideration of this letter. If you have any questions, please contact me.

Respectfully Submitted,



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