Biemer, Andrew

From: Barbara Berwick <wheesht56@gmail.com>
Sent: Monday, May 1, 2023 9:58 PM
To: SEC: Admin
Subject: AWE soundstudy- from an abutter

May 1, 2023

Dear Members of the Subcommittee;

As all of you know, my husband and I are abutters of the AWE turbines. I filed an initial complaint with the Antrim selectmen shortly after the turbines went into operation. They sent me to AWE. AWE told me they were in compliance. End of story. I contact Pam Munroe and asked what the protocol was. She informed me that, indeed, there was supposed to be some protocol, but they hadn't done anything about it yet. You can read the rest of the story, except I wish to note, that I NEVER filed another complaint, because absolutely nothing was done about my intial complaint, nor about any of the many incidents I filed with Pam. Pam asked me to monitor and send her reports when it was very loud, and I did, even recording the decibel readings with my cellphone. Again, Nothing was ever done about my initial complaint. NOTHING! We were asked if we would allow AWE to do another of their required sound studies on the property and we said, YES, so long as the protocols that we were promised during the hearings were followed. Well, they came, set up and did sound their sound study, and out of over 2 weeks of monitoring came up with an hour or maybe it was two of usable data out of 15 days! I actually rushed home from work to meet these men, and asked if they would provide me with the protocols they would be following. They assured me they would, but never did. Why do suppose that was? Turns out they did NOT follow the protocols were were promised

My neighbor who is caring for his elderly father 24/7, Mr. Shelly Ivey at one time during the summer called the Antrim Police Department to file a noise complaint report. The Antrim police refused to send a policeman out to even hear the noise that Mr. Ivey was complaining about,telling him that Antrim doesn't have a sound limit law. Another neighbor Josh and Amanda Buco filed a complaint and they did agree (without stipulating that the sound study be done according to the standards we were promised) to allowing testing done of their property. Their kids were afraid to go to sleep because of the noise the turbines were making. Someone came out and did a short test and said all was fine. The conditions were not at all the same. Amanda sat in her car while her young family was at the beach for hours (and I mean hours) in order to participate in one AWE committee meeting and she told you that the conditions were not at all the same. Most of that committee was spent on you guys discussing how to write and document things legally. At the very end, we who sat through that whole thing were allowed a few brief minutes to speak. Easy to see that the idea is to discourage participation. It's easy to do, make is almost impossible to participate. We have lives and jobs and cannot attend these endless meetings during the middle of the workday, especially when we get treated like riff-raff.

The reason the subcommittee has not had any complaints recently is that first, those of us, like myself, who has filed a complaint, have had absolutely nothing done. Our name has been dragged through the mud, like we are some kind of maggots. For what? For daring to point out the truth. My almost deaf husband has been woken from a sound sleep by the turbines! The sound is often horrendous, at most other times it is not bad, but when it is bad, it is usually very bad. What is the point of filing a complaint? Nothing was ever done even about the very first complaint. NOTHING Right now, AWE can come anytime, and set up a meter, and record for a month and then decide what data they want to use, filter out all the rest, average the whole thing over an hour and make it totally meaningless. Most citizens have NO IDEA how to file a complaint, obviously the police don't know what to do, the selectmen have no process set up (one selectmen is personally in the pockets of AWE) . Most people don't understand anything about this subcommittee. They have no idea what was promised, and don't even know there is anything they can do. Others follow everything quietly in the

background. What do they see? Do they see a committee that cares at all about trying to protect the people who lived here before the turbines infiltrated our area. NO, They see a committee that spends HOURS discussing protocols to make sure they cover themselves legally, but doesn't do a thing about a single complaint. We NEVER REFUSED TO ALLOW SOUND TESTING ON OUR PROPERTY. What we did was ask that the protocols that we were told would be in place during the hearings be following. NOT THE INDUSTRY STANDARD, but the protocols our state had made to protect us. When we were last asked if we would allow testing, we asked that we discuss the protocols that would be used first. That idea was totally dismissed. So, by saying that we insist that the protocols that we were promised be followed, that somehow equates to refusing to allow testing? Isn't that interesting? Doesn't it make you wonder, even a little, what the results would show? I can so remember the counsel for the public saying how she knew we would be negatively impacted but was "comforted" by all the protections that were put in place for us. Obviously, it was all a lie, there is not one protection, not one of those that was promised has been fufilled. To accept a sound report that allows averaging when the law says, "shall not exceed", and to allow a sound report that allows so much of the data to be removed is an obvious bias towards the industry and against the normal people who are truly impacted.

As for the lights, do you care? If you care, just put a post on the Hillsborough, Antrim or any local town's social media page and ask the people there if the lights are on EVERY night or not. You will get honest answers. Yes, they are on. Aynyone, everyone will tell you, or maybe, just get in your car and drive down RT 9 in the evening. You won't have to ask anyone. You will see for yourself. Do it any night unless the entire area is covered with clouds. Why is the evidence of whether they are on or not all in the hands of the accused? "No, your honor, on my word, the lights are not on, you can trust me!" Do you really accept just their word and their records and totally discredit everyone else? I guess that is a foolish question. After all these years, I know the answer. Still, here I am, hoping against all hope that there is someone honest on the committee. Saturday, someone backed into my car while it was sitting empty in a Market Basket parking lot. That man left me a note with his name, phone, and insurance policy number. So, I know there are still some honest people in the world. Here's hoping that there are some on your committee that care enough about the citizens to require real sound testing, a real means for people to file complaints and not just rubberstamp everything AWE says.

Sincerely,
Barbara Berwick
72 Reed Carr Rd
Antrim, NH 03440

BY ELECTRONIC MAIL

May 1, 2023

Jonathan Evans, Presiding Officer
Subcommittee, New Hampshire Site Evaluation Committee
21 Fruit Street, Suite 10
Concord, New Hampshire 03301

Re: Docket No. 2021-02: HMMH Antrim Wind Compliance Monitoring Report

Dear Mr. Evans and honorable subcommittee members:

Thank you for the opportunity to comment on the HMMH technical report that summarizes the sound compliance monitoring conducted at the Antrim Wind facility.

SUMMARY OF REVIEW

It appears HMMH misunderstood the objective for the sound survey, which was complaint investigation and validation. There was no apparent effort by HMMH to adhere to the requirements of NH Site 301.14(f)(2) or NH Site 301.18(i). Monitoring locations were changed, removed, and added throughout the measurement periods. In most cases the monitors were situated a mile or more from any of the turbines, which exceeds the distances at which complaints were filed. At one location (NHDOT) HMMH determined that the measurements provided limited or no value due to contamination from other sound sources yet retained the results in the report without explanation. During most of the measurement periods, the turbines were operating well below their generating capacity.

HMMH makes several claims in its report that are contradicted by its own data.

HMMH wrongly states in its conclusion that no L_{eq}(*5-minute*) or L_{eq}(*elapsed time*) measurements matched or exceeded the 40 dBA nighttime limit. This limit was exceeded at the Reed Carr Road monitor on June 9. HMMH's also incorrectly claims the turbines were operating and audible during all reported measurement periods. There were clearly two periods on June 30 when the turbines were not operating. Measurements during these periods show the continuous background level (L_{90}) of around 26 dBA. This level is consistent with testimony and field measurements by Antrim Wind's expert, Robert O'Neal, who reported the L_{90} at the project site as low as in the mid-teens.[1] HMMH measurements after transient sound levels were removed clearly show the turbines were producing sound levels that were dominant i.e. at least 10 dB over the L_{90} (see also ANSI/ASA S12.9-2013/Part 3 at 3.6 and 6.9)

When evaluated in the context of a post-construction sound compliance test, HMMH's report provides useful information about the sound emitted from the Antrim facility. HMMH's data show that the turbines are producing sound levels that materially exceed Antrim Wind's 2016 preconstruction predictions and do so under less than worst case conditions. Notably, the Reed Carr Road and Salmon Brook Road monitor

[1] Antrim Wind Energy Project Sound Level Assessment Report, 2/17/2016. https://www.nhsec.nh.gov/projects/2015-02/application/documents/2015-02_2016-02-19_att09_updated_noise_rpt.pdf

locations show decibel readings over 41 dBA and 39 dBA respectively, when these locations were predicted to have maximum worst-case operational levels of 34-35 dBA.[2]

HMMH's conclusion that its monitoring shows consistent compliance with the NH SEC noise limit is not supported by its own data.

NH SEC NOISE STANDARD

The subcommittee was tasked, in part, with recommending to the full NH Site Evaluation Committee the "appropriate methodologies for measurement and analysis of sound" as it pertained to wind turbine noise. After an investigation into the existing rules and after hearing from interested parties, the subcommittee's written recommendation[3] was filed with, and unanimously adopted[4] by the full Committee on March 9, 2022. The language adopted by the Committee is as follows:

- The Noise Limit in Site 301.14(f)(2)(a) limits Antrim Wind's sound emissions to the greater of (i) 40 dBA at night/45 dBA during the day, or (ii) 5 dBA above background levels (measured using the L90 statistic). Thus, Antrim Wind's sound emissions may go above 40 dBA night/45 dBA day if the background sound levels are sufficiently loud (i.e., greater that 35 dBA at night, or 40 dBA during the day).
- Measurements of Antrim Wind's sound emissions and background sound shall be conducted according to the ANSI Standard.
- Antrim Wind's sound emissions shall be measured using LAeq over the time period required by the relevant ANSI Standard. That is at least five minutes for accelerated measurements and a longer period if ANSI's basic procedure is utilized, as reasonably determined by the professional conducting the study.

A central aspect of the adopted methodology is that the time interval, *t*, over which equivalent sound levels (L_{eq}) are determined is not fixed in the rule. Rather, the time interval is determined by the individual conducting the test, with a minimum interval of 5-minutes.

DISCUSSION

1. **HMMH methodology.** It appears HMMH generally followed ANSI/ASA S12.9-2013/Part 3 in positioning its monitors and collecting sound data including audio recordings of the acoustic environment. The report omits the latitude and longitude of the monitor sites and provides no photographic evidence of the monitor locations relative to the turbines. Table 4 which lists the approximate distances between the noise monitoring locations and each turbine is useful, but there is no way to validate whether the monitors have a direct line-of-sight to any of the turbines.

   According to the report, HMMH followed the ANSI-prescribed procedure for excluding transient background sounds and isolating the sound under test. There is no information to suggest HMMH made a priori assumptions about the characteristics of the turbine noise or inappropriately excluded

[2] *Id*
[3] Subcommittee's Recommendation to the Site Evaluation Committee Concerning Charge 1, 8/23/2021 at 1.
[4] Draft Minutes of March 9, 2022 Public Meeting in SEC 2021-02 at 3.

turbine-only sound data from its data collection or analysis.[5] Filtering for high-frequency biogenic sounds including birds, insects, and frogs was inconsistently applied, even at the same monitor locations. Such filtering should have been applied consistently across all data.

HMMH states that its data analysis included processing of 1-second and 0.1-second data streams but does not clarify which data set was used to compute the $L_{eq}(t)$ results. One-tenth second data is prescribed in both ANSI and NH Site 301.18(e)(6).

Consistent with the NH rule, HMMH reported various L_{eq} values including L_{eq}(*5-minute)* and L_{eq}(*elapsed time*).

2. **HMMH study does not comply with NH Site 301.18(i).** The objective of the HMMH field study was to investigate and validate noise complaints arising from turbine operations.[6] Validation of noise complaints is specifically covered under NH Site 301.18(i) which requires "*field studies be conducted under the same meteorological conditions as occurred at the time of the alleged exceedance that is the subject of the complaint.*" [Emphasis added] HMMH conducted a general post-construction noise monitoring survey without regard for the existing complaints. The report includes several pages of hub-height wind speed and direction but there is no point where HMMH identifies the meteorological conditions that it assumed incited the complaints or whether those conditions occurred at any time during the monitoring periods.

3. **HMMH monitor locations do not comply with NH Site 301.14(f)(2).** HMMH states that the selected monitor sites were "near homes in the vicinity of the wind farm … at locations representative of the affected residential areas."[7] This statement does not satisfy the plain language of NH Site 301.14(f)(2).

   NH Site 301.14(f)(2) establishes the turbine noise limit that cannot be exceeded when measured "*on property that is used in whole or in part for permanent or temporary residential purposes, at a location between the nearest building on the property used for such purposes and the closest wind turbine.*" [Emphasis added] None of the locations selected by HMMH meet this requirement.

   Each of the complaints filed with the NH SEC involves homes situated well under 1 mile from the nearest turbine.[8] In all cases one or more turbines were within the direct line-of-sight of the nearest residential building on the property.

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[5] This contrasts with Acentech's seasonal sound surveys where substantial turbine sound data were excluded in violation of ANSI/ASA S12.9-2013/Part 3. See *Acentech Post Construction Sound Monitoring Report – Winter 2020* at 19.

[6] NH SEC Order Appointing the Committee April 2, 2021 at 2.

[7] Report at 2

[8] HMMH discarded sound data collected at the NHDOT facility as not useful and replaced it with the Loverens Mill Road site. No noise complaints have been filed from Loverens Mill Road or other properties on the North side of the highly trafficked Route 9. Monitoring at Loverens Mill Road provides no useful information for the purposes of complaint validation.

Address	Approx. distance to nearest turbine
362 Keene Road	2,770 feet
72 Reed Carr Road	3,670 feet
80 Reed Carr Road	3,800 feet
88 Reed Carr Road	3,800 feet
156 Salmon Brook Road	3,800 feet

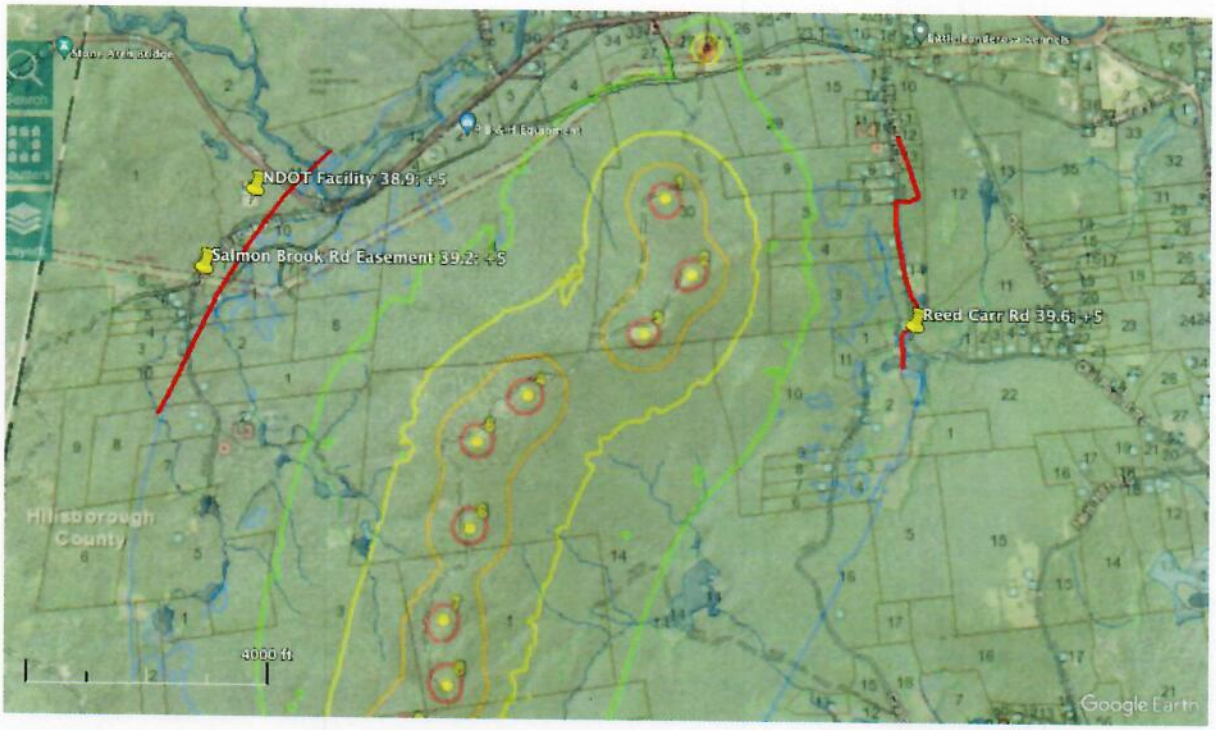
Table 3 of the report shows that HMMH's monitor locations were placed well over 4,000 feet from each of the turbines and in most cases well over a mile with just two exceptions: the Reed Carr Road monitor near turbine #02 and the Craig Road site near turbine #03. As previously stated, the report provides no photographic evidence of the monitor locations and no information indicating a line-of-sight between the monitor and any of the turbines.

Since noise attenuates with distance, data collected at the HMMH-selected monitor locations could not represent the conditions experienced by the complaints.

4. **HMMH data show turbines exceeded predicted levels.** HMMH's field measurements at Reed Carr Road and Salmon Brook Road show sound levels over 41 dBA and 39 dBA L_{eq}(*5-minute*) respectively. Despite increased averaging in the L_{eq}(*elapsed time*) levels, HMMH still recorded turbine noise around 39 dBA. *Significantly, these actual measurements represent a material increase over what the facility's sound model predicted for worst-case conditions at the same locations.*[9]

   The worst-case sound levels (dBA) predicted for Antrim Wind are shown in the attached image taken from the 2016 sound assessment report. The bright green contour represents the predicted 40 dBA limit meaning that turbine sounds outside the green contour are expected to be lower than 40 decibels at all times. The blue contour represents the predicted 35 dBA mark.

[9] Antrim Wind Energy Project Sound Level Assessment Report, 2/17/2016 at 7-6. https://www.nhsec.nh.gov/projects/2015-02/application/documents/2015-02_2016-02-19_att09_updated_noise_rpt.pdf



Credit Robert W. Rand, Member ASA, INCE (Member Emeritus), Rand Acoustics, LLC.

Comparing HMMH's field measurements at Reed Carr Road and Salmon Brook Road to the worst-case predicted values shows that the preconstruction model underpredicted project sound levels by as much as 5 dB.

In effect, the blue contour line more accurately represents the 40 dBA sound level meaning homes *inside the blue contour* are likely experiencing levels over 40 dBA. This point is captured visually in the figure above where the red lines are overlayed on the original blue contour. Hub-height wind speeds and turbine output levels during these measurement periods show that the project was not operating under worst-case conditions.

5. **HMMH data show turbines producing low power.** The Antrim facility is composed of nine Siemens SWT-3.2-113, with a nameplate capacity of 3.2 megawatts each. This information is important in understanding whether the turbines were generating at levels that could cause offending sound emissions during any of the measurement periods.

   HMMH asserts that the Antrim turbines were operating during all reported measurement periods and "were audible during all reported (non-excluded) periods."[10] This statement is not supported by HMMH's data. HMMH's Tables 19 and 20 show that in the mid-day and early evening periods of June 30, hub-height wind speeds were at or below the turbine cut-in speed and the turbines were largely not generating. This is further reflected by the low decibel readings during these periods which were in the mid-20 dBA range.

[10] Report at 4

Table 20 also shows that 70% of the time the turbines were operating at less than half power (1600 kilowatts). This is confirmed by the hub-height wind speeds posted in Table 19.

For the July 1 monitoring period where HMMH states the turbines were generating at a high level but causing relatively low period average L_{eq} sound levels,[11] HMMH omits that many of the turbines were still operating at low power levels. For example, at Salmon Brook Road, the L_{eq}(*5-minute*) levels reported in Table 15 correspond to the period when turbines T1, T3, T4, T6, and T9 were operating at, or well under 50% output. Similarly, at Craig Road the L_{eq}(*5-minute*) levels reported in Table 17 correspond to the period when turbines T3, T6, and T9 operated at, or well under 50% output.

6. **Monitoring on private property**. The subcommittee's August 31, 2022 quarterly report states that "[c]omplainants have not provided access to their properties for the Subcommittee's independent expert, HMMH, to conduct sound measurements."[12] HMMH repeats this claim in its report.[13] These statements misrepresent the record. Any attempt to blame neighbors to the Antrim turbines for problems with the HMMH study would be misplaced.

   In their written response to the subcommittee's quarterly report, Barbara Berwick and Janice Longgood stated their express desire for sound testing to be done on their properties. As part of that testing process, they asked to be fully informed about the method that HMMH would follow and to have an opportunity to ask and get answers to specific questions.[14] The subcommittee refused their simple request leaving Ms. Berwick and Ms. Longgood uncomfortable about granting access.

CONCLUSION

HMMH generally followed the ANSI standard in measuring and processing turbine-only sound levels but failed to comply with NH Site 301.14(f)(2) or 301.18(i). Nonetheless, when HMMH's measurements were evaluated in the context of a post-construction sound compliance test, they showed that the turbines were producing much louder sound levels on Reed Carr Road and Salmon Brook Road than predicted. Most of the noise complaints filed with the state are by homeowners on these two roads.

The louder sound measurements were taken when the turbines were producing below worst-case levels.[15] It stands to reason that the facility at higher power outputs is exceeding the night noise limit at multiple residential properties closer to the turbines than where HMMH measured.

Contrary to HMMH's conclusion that Antrim Wind is compliant with the NH SEC sound limit, ***HMMH's own data clearly demonstrate that the facility is exceeding the nighttime noise limit*** *and potentially the daytime limit.*

Given the seriousness of this matter, the impact of this study on all parties, and the significant time and cost allocated to date, I trust the subcommittee will take the issues raised in this letter seriously and act

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[11] Report at 5

[12] https://www.nhsec.nh.gov/projects/2021-02/documents/2021-02_letter2goldner.pdf

[13] *Id.* at 1

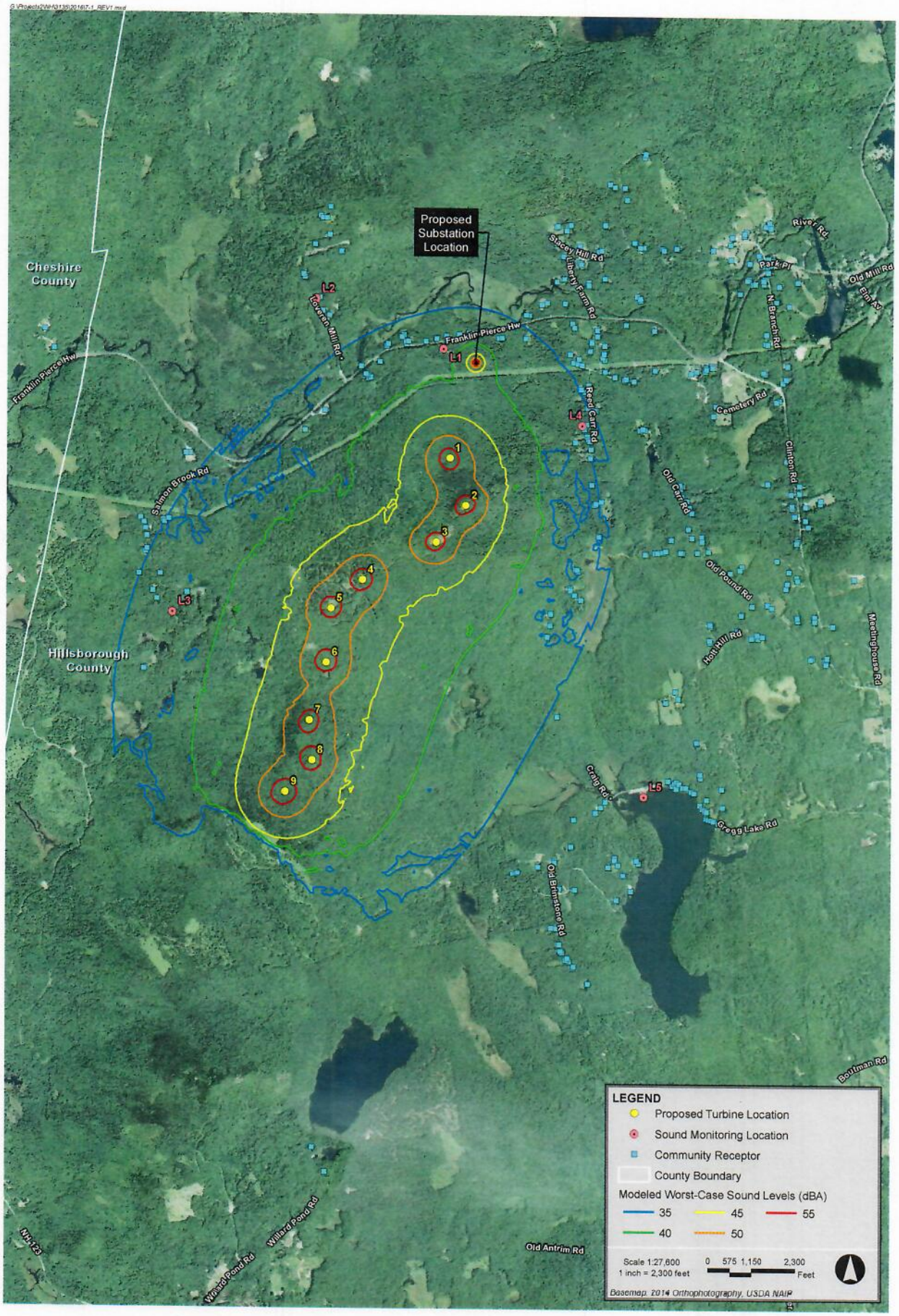
[14] Ms. Berwick's and Ms. Longgood's letter includes the full email thread with the subcommittee on this matter. https://www.nhsec.nh.gov/projects/2021-02/documents/2021-02_public_comment_berwick_longgood.pdf

[15] Antrim Wind Energy Project Sound Level Assessment Report, 2/17/2016 at 7-3.

expeditiously to resolve the pending complaints. I will be present at the May 15 meeting. If you have any questions in the interim, I welcome hearing from you at lisa@linowes.com or by phone at (603)838-6588.

Respectfully,

Lisa Linowes
286 Parker Hill Road
Lyman, NH 03585
603-838-6588



Antrim Wind **Antrim, New Hampshire**

Epsilon

Figure 7-1
Modeled Worst-Case Sound Levels (dBA)

Critique, Comments, and Weather:
a review of the Rand and HMMH sound studies

Prolog (and submission notes)

To: Andrew Biemer, Administrator Site Evaluation Committee
From: Eric (Ric) Werme
Date: 2023 May 1
Ref: Docket No. 2021-02, Investigation of Complaints Regarding Antrim Wind Energy Facility

Please add this document to the docket. It is relevant to the Public Meeting to be held on May 15th.

Introduction

This document is my response to the 2022 sound compliance study conducted in June 2022. It extends Dr. Fred Ward's comments on the weather conditions on the study dates and also on the non-compliance periods described by Rand Acoustics in a May 14, 2021 submission. These analyses are the last five pages of this document. My focus is on whether there was a nighttime temperature inversion. Equally important is the effect of wind shear – the change of wind speed with altitude. I go into more detail below.

Overall, neither Rand nor HMMH describe the weather conditions well. This is more than a bit disturbing, as the subcommittee has mandated that studies be done in conditions similar to when complaints were made. On the other hand, I have not come across a log of complaints, but I suspect they also do a poor job of describing conditions. While most people have little more than a thermometer for quantitative information, their wind information is typically more qualitative. Of course, the information is for a single point at ground level.

I live some 20 miles from the Antrim Wind Energy, and do have continuous, typical weather data from a weather station at my home in Sutton Mills. One can infer from how it changes over time to quite a bit about the atmosphere and cloud cover. My analyses are largely based on conditions at home, weather maps from soon after the observations, and information gleaned from the reports. I'm fairly pleased with the results and I think they will stand up to scrutiny from professional meteorologists. I hope the SEC will take them seriously.

Refraction we can see

We are familiar with refraction in liquids like water and solids like glass or diamonds. Cut diamonds and glass prisms are optimized to show off the difference in refraction with different colors of light. That's not our concern, we are simply interested in how sound bends as it passes through the atmosphere. The refraction we see with water allows us to see the boundary of water at a pond, in a glass, etc.

These have pronounced effects at the boundary, they don't really show up internally. In gases we see the effect of light bending through a length of the medium, e.g. the watery mirage from an asphalt road in hot summer sun or the distortion of the sun or full moon near the horizon. Sound does very similar things, except we can't perceive the effects directly.

Sound refraction due to temperature gradients

Normally air temperature decreases with height – during a clear day the peak of Mount Washington is some 30 F° cooler than in the Merrimack River valley near sea level. The speed of sound varies with temperature, the molecules in warm air move faster than in cold air, and their velocity is what propagates sound waves. As sound moves horizontally, it bends in the direction of the colder air. i.e. it refracts upward and away from the surface.

During clear nights, the air gets colder. Actually, the Earth's surface cools by radiating heat and that cools the air next to the surface. The cold, denser air flows downhill, ultimately pooling in valleys. If there isn't much wind, it undercuts air above the surface an we have an inversion – warm air floating above chilled air. Now sound moving horizontally is refracted downward and begins to propagate in a ring instead of a sphere. Instead of weakening with the square of the distance (the "inverse square law"), sound weakens with just distance and carries much further than during the day.

This is the effect Fred Ward pointed out, and its why I focus on temperature inversions in my analyses.

Sound refraction due to wind shear

Wind shear is a change in wind velocity with distance, for us it's with height, vertical wind shear. The change in the speed of sound doesn't change quickly with temperature. However, it's speed is relative the air that it's in – the speed of sound is about 760 miles per hour. Wind speed tends to increase with height – friction from trees buildings, etc slow wind down near the surface, and temperature inversions get involved too. When wind turbines have enough wind to run, any sound they generate is going faster downwind than upwind. Sound going downwind can go faster than sound near the surface – and that results in refraction toward the ground! Sound going upwind is slower than sound at ground level, so it refracts upward.

The net result of this is that wind turbine sound complaints will almost always be from places downwind of the turbines.

Refraction drawings

Here are a couple images from a blog post titled The Effect of Wind and Temperature Gradients on Sound Waves. I hoped to find a more sciency presentation I saw in the past that is very good, but this will do okay.

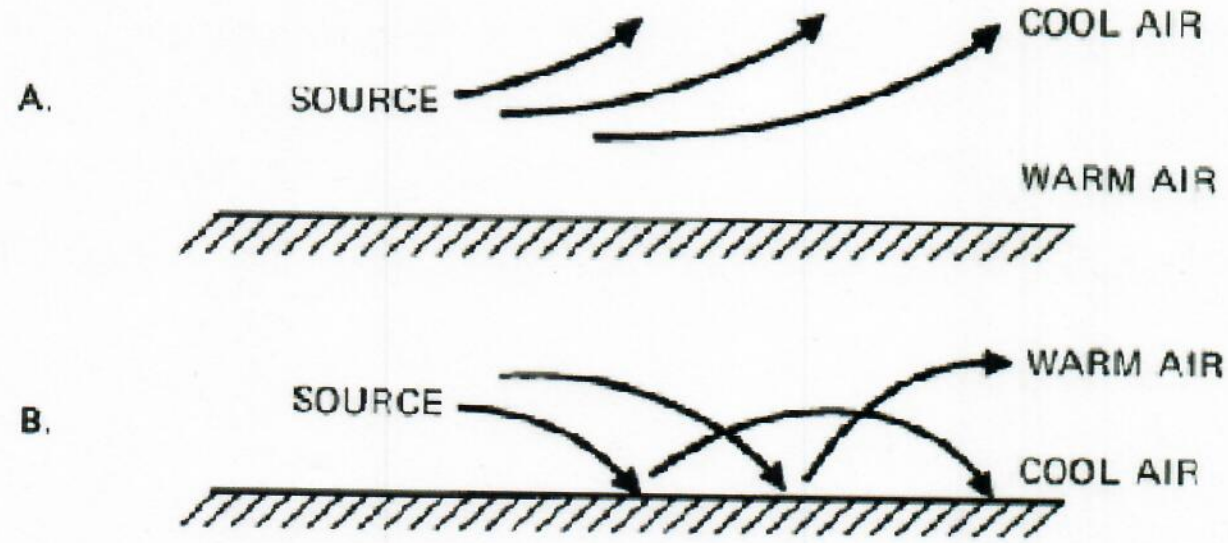


Illustration 1: Refraction due to temperature gradient

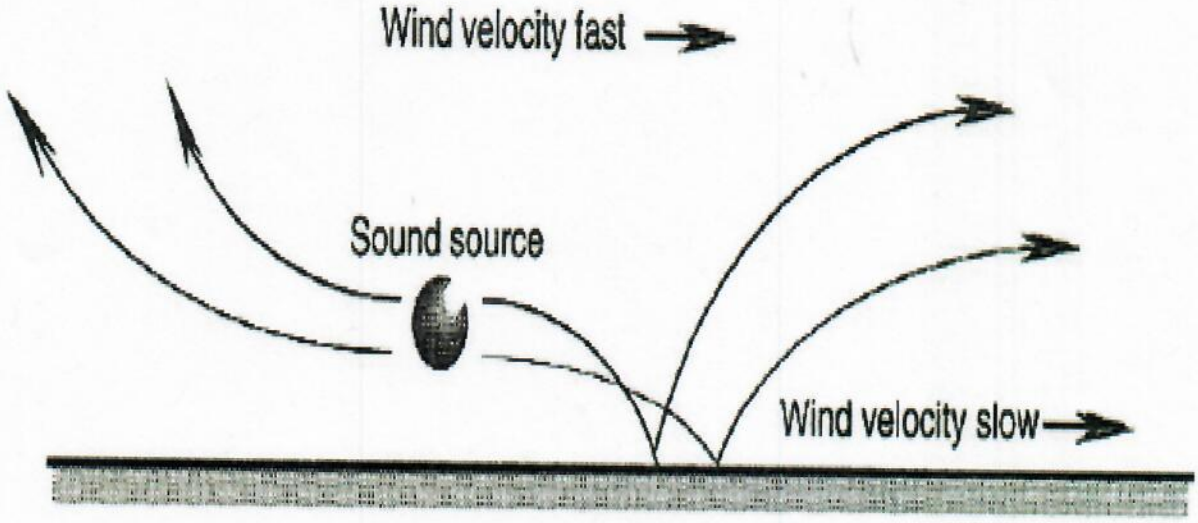


Illustration 2: Refraction due to wind shear

My Analyses

This is a good point to skip ahead and review my analyses. Then return below for my conclusions.

Conclusions

I don't know what HMMH was contracted to do, and some issues make no sense. For example, HMMH wanted to do long term recording, some of neighbors wanted long term recording, yet the report says "access to private property was not available." The investigations were supposed to be

done during weather conditions similar to when the complaints were filed, but I haven't found the complaints to analyze. One of the study sites was a NHDOT maintenance facility. It was chosen because they could leave instruments there unattended for long sessions. However, sessions in the afternoon and evening were dominated by traffic noise from Rt 9, and the site was upwind of the turbines anyway. I assume that no noise complaints have been filed by NHDOT.

All three recording sessions were on Thursday and Friday, the last one "was chosen for forecast low wind conditions in the study area" after having problems with wind noise on microphones on the second visit. None of the visits were on days conducive to strong temperature inversion development.

The Rand Acoustics survey was done from a single site, the source of several complaints, at least according to the report and filings by the owner and neighbors. Long term monitoring led to at least a couple examples of significant noise exceedance, though possibly not by the long sampling period specified by the SEC for the HMMH study. (This is an extremely contentious point and the long sampling period greatly favors Antrim Wind Energy. It ignores how people hear sound, especially brief sounds like hammer impacts or wind turbine blade passes. It is discussed in other filings an hearings, it's not entirely clear to me how, when, or why it was adopted.) The cases highlighted in the report are examined below, and both occurred late at night when there was likely a strong inversion.

It appears neither study targeted particular weather conditions, but the 22 day recording session allowed recording in conditions of past complaints and two complaints logged during the session.

All in all, the Rand Acoustics study is far more informative and covers far more time at a known problem site. Of course, the HMMH report is far more valuable to Antrim Wind Energy and I am confident it will be presented as the better report to the SEC subcommittee.

References, with comments

This section is not as complete as I planned, I thought I had more time to finish this document.

https://www.nhsec.nh.gov/projects/2021-02/documents/2021-02_sound_study_hmmh_4-10-2023.pdf
This is the HMMH (Harris Miller Miller & Hanson Inc.) report, the subject of the upcoming hearing on may 15th.

https://www.nhsec.nh.gov/projects/2021-02/public_comments/2021-02_2021-05-14_sound_monitoring_report.pdf
This is the Rand Acoustics report from 2021 May 5. Apparently there is an earlier one that predates the formation of the study committee but I haven't gone looking for it.

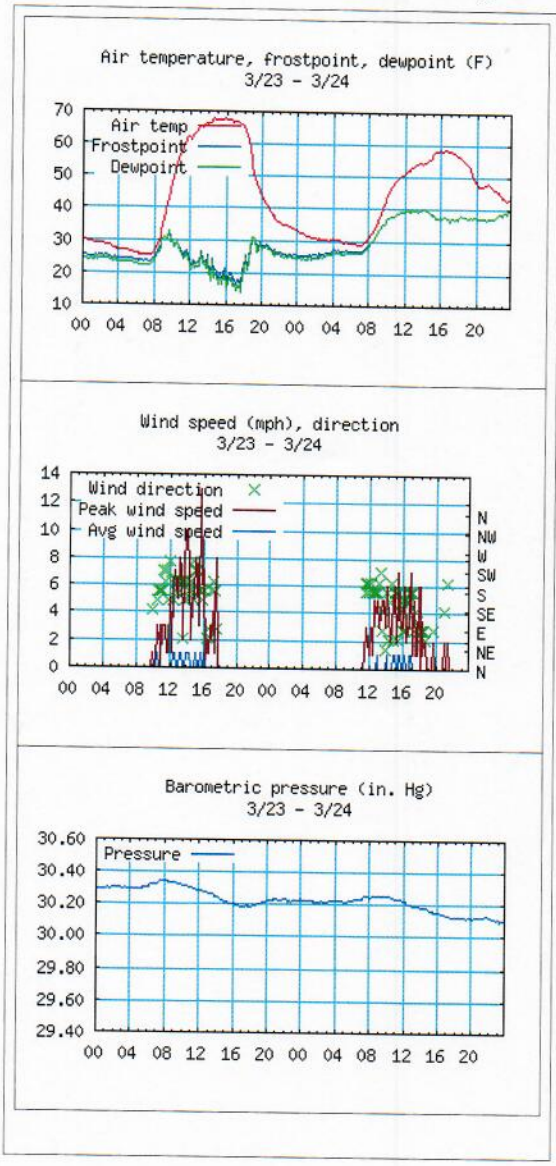
https://www.nhsec.nh.gov/projects/2021-02/documents/2021-02_comment_drward_4-27-2023.pdf
This is Fred Ward's response to the HMMR. It appears to be saved as a graphical image and cannot be directly used to copy and paste passages. (This document extends much of what Ward had to say.)

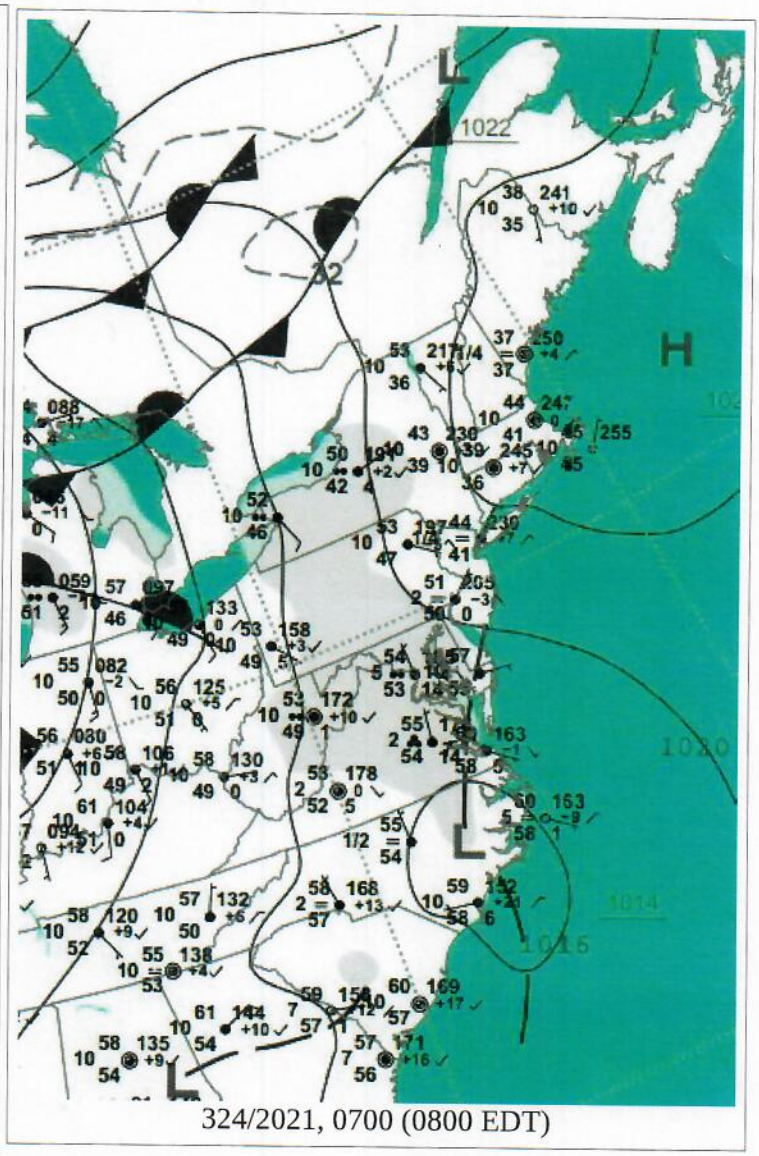
https://www.nhsec.nh.gov/projects/2021-02/documents/2021-02_public_comment_berwick_longgood.pdf
This was filed in September 2022 by Antrim Wind Energy neighbors Barbara Berwick and Janice

Longgood to make it very clear that they offered and wanted HMMH to do monitoring from their properties, or at least the Berwick property, where Rand Acoustics did their monitoring. They include SEC statements that the SEC wanted to do monitoring there. Neither they nor I understand how the discussion resulted in HMMH thinking that access was denied. This is a major factor contributing to the poor quality of the HMMH report.

Most concerning to me is this statement from Jonathan Evans : "Again, we are trying to avoid having anyone besides the homeowner[,] our expert[,] and myself in these conversations." This presents a very unbalanced meeting – two professionals who have rejected the Rand Acoustics report and raises fears that they may want to pressure the homeowner into committing to support a study designed to refute Rand. Note that the Rand Report is online in the "Public Comments" section of the Docket yet criticism of it is posted in the Docket's home page!

Rand Report: 3/24/21 0000-0100





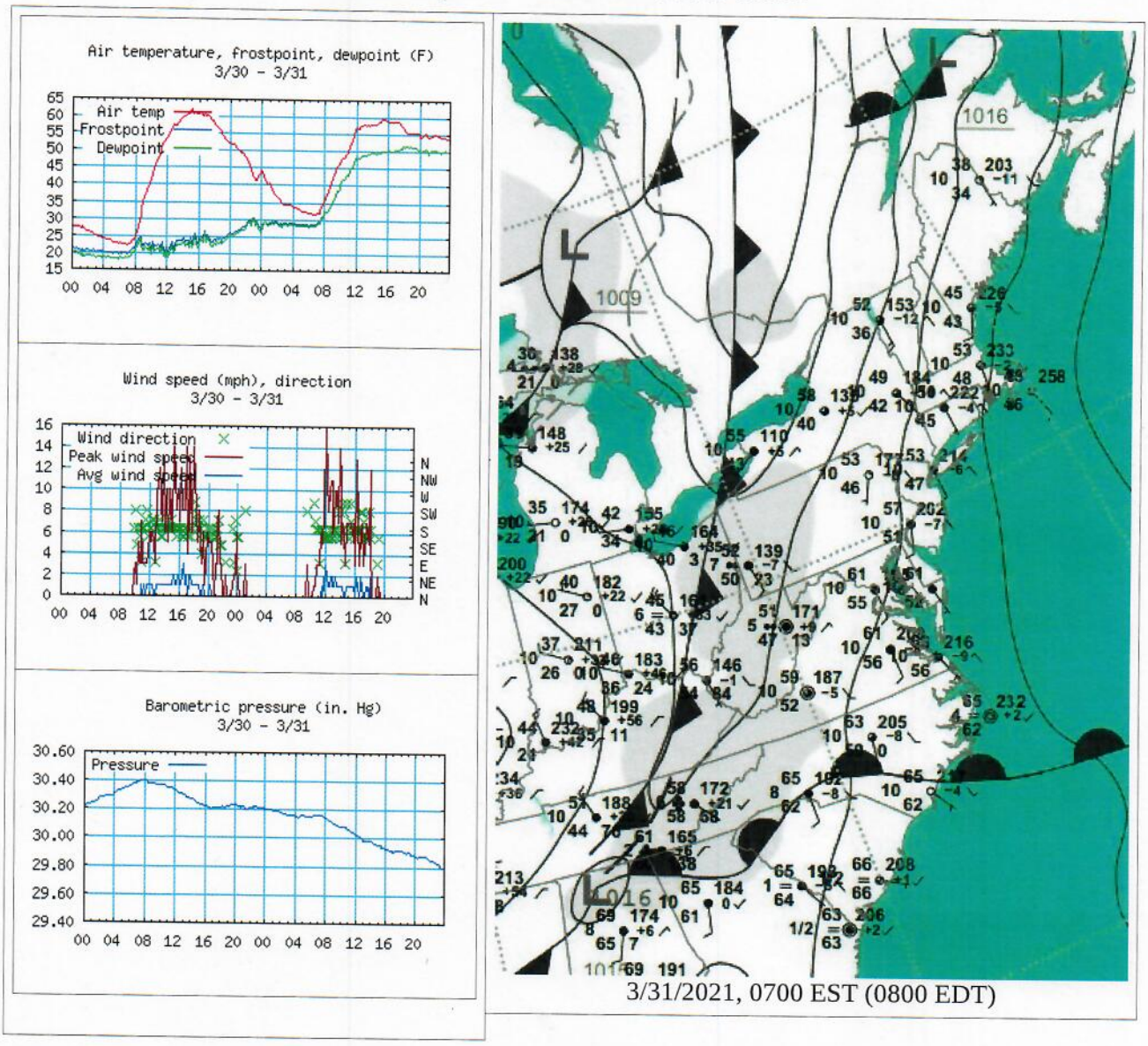
324/2021, 0700 (0800 EDT)

This is a near perfect example of a nighttime temperature inversion. The fast temperature rise in the morning of the 23rd shows the warmth of full sunlight destroying the previous inversion. As mixing occurs in the atmosphere, the rise slows and reaches an afternoon cap. The falling dew point shows the air mass is still dry despite the air flow from the south. As the sun's heating fades near sunset, convection and mixing slows. Radiational cooling quickly chills the surface air. As the inversion sets up, surface wind stops and the dew point rises as moisture evaporates from the ground. By midnight the inversion is firmly in place.

The slow temperature rise the next morning says the sky is cloud covered, but heating does break down the inversion and moister air shows a new air mass is moving in.

See weather maps at Daily Weather Maps March 22, 2021 - March 28, 2021.

Rand Report: 3/31/21 0300-0301

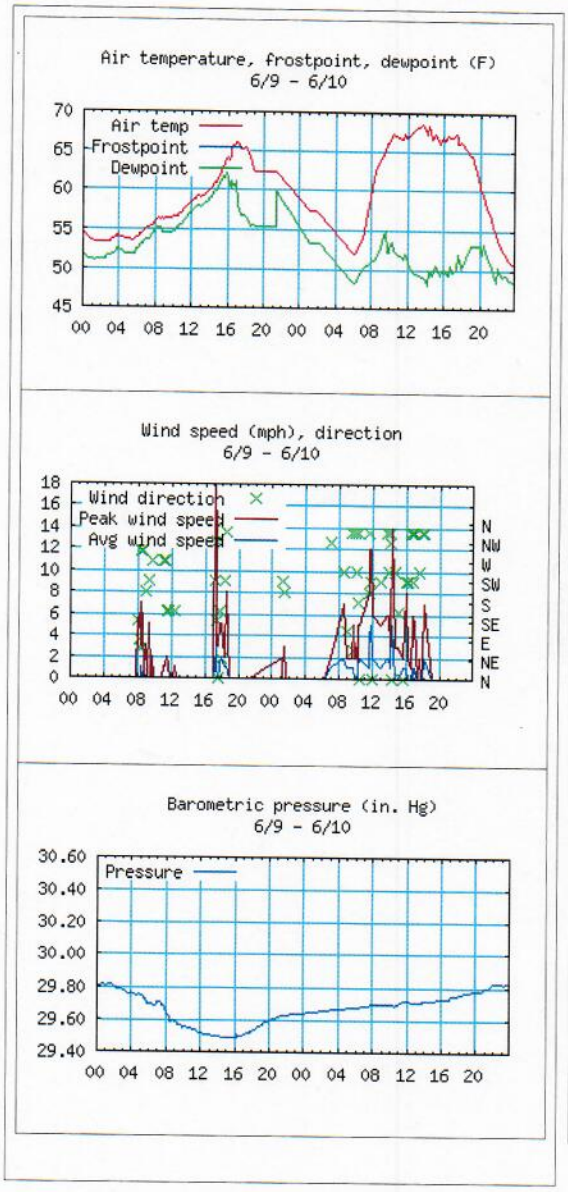


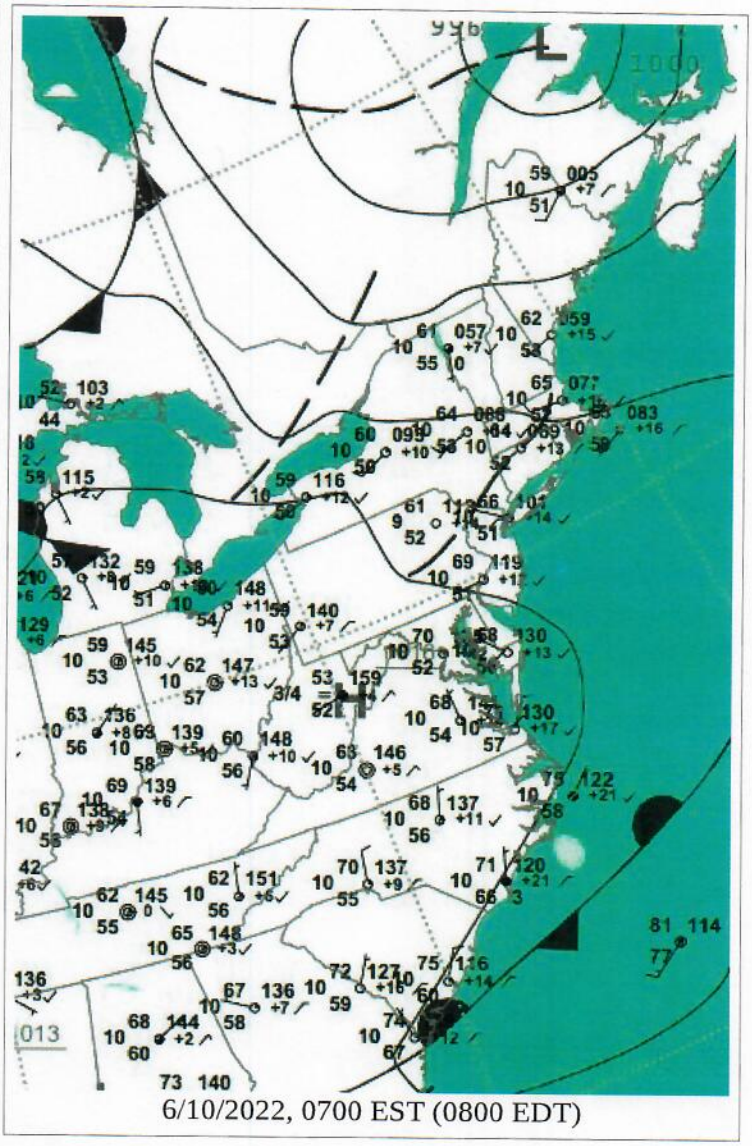
This shows another nighttime temperature inversion, but less pronounced than the 3/24 event. The morning temperature rise on the 30th shows the near-full sunlight destroying the previous inversion. I suspect the sky had a layer of cirrus clouds that reflected some sunlight. The rising dew point shows that a new air mass is working its way in. As the sun's heating fades near sunset, this time radiational cooling more slowly chills the surface air. The blip at midnight coincides with a little wind that briefly disrupts cooling. Eventually the inversion is strong and thick enough to prevent wind from reaching the surface.

Several things in the morning show that a dome of high pressure is moving away – the weaker temperature climb shows clouds are in place, the increase in dew point shows that moist air is moving in, the declining air pressure is showing that the high moves out and that low pressure is coming in. The slow temperature rise the next morning says the sky is cloud covered, but heating does break down the inversion and moister air shows a new air mass is moving in. Eventually, rain started on the evening of 4/1.

See weather maps at Daily Weather Maps March 29, 2021 - April 4, 2021.

HMMH – 6/9/2022





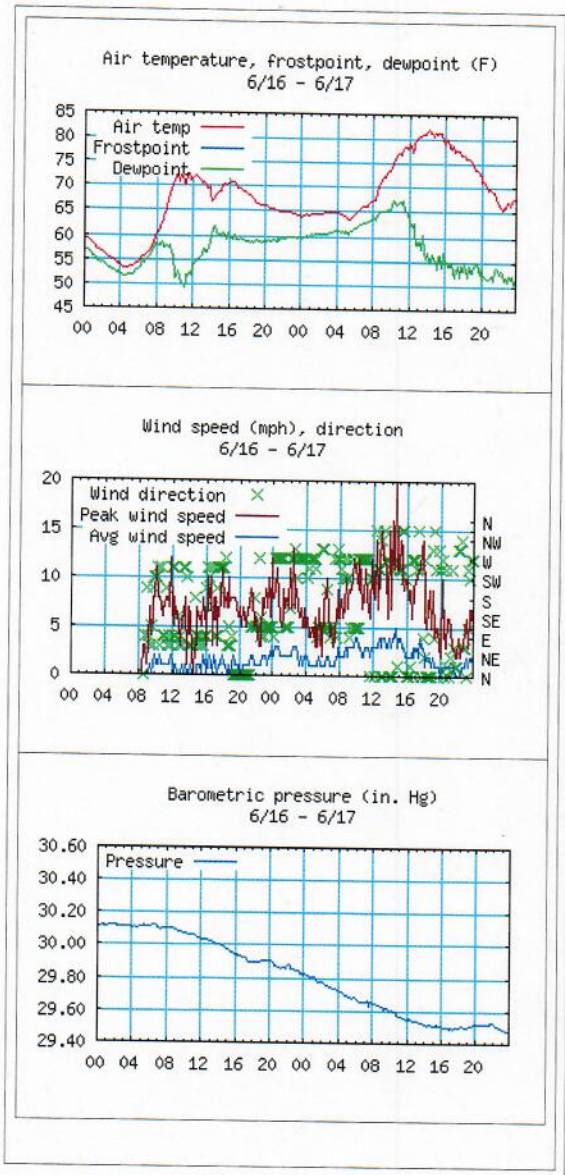
6/10/2022, 0700 EST (0800 EDT)

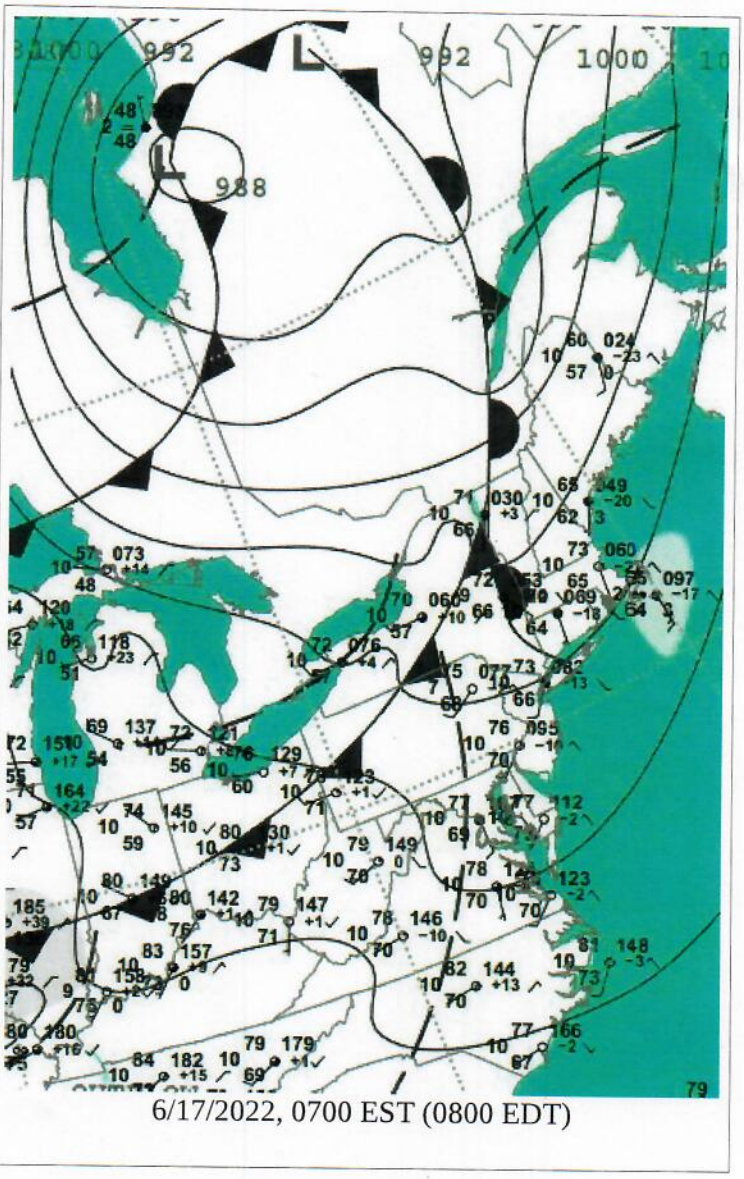
The jagged traces on the graphs are due to poor weather station reception at home while upgrading from an old and tired Davis VP to a VP2.

The barograph trace shows a frontal passage in the afternoon of the 9th before HMMH monitoring started. There had been rain in the morning, after the front the dew point fell but likely increased as the evening inversion formed. Cool and drier air would have come in after the front, and the inversion must have been rather weak given that the ground temperature fell only some 13 F°. The weather data does show some wind at 0200, another indicator of a weak inversion. Clouds likely moved out overnight and allowed the fast temperature climb after dawn.

See weather maps at Daily Weather Maps June 6, 2022 - June 12, 2022.

HMMH – 6/16/2022





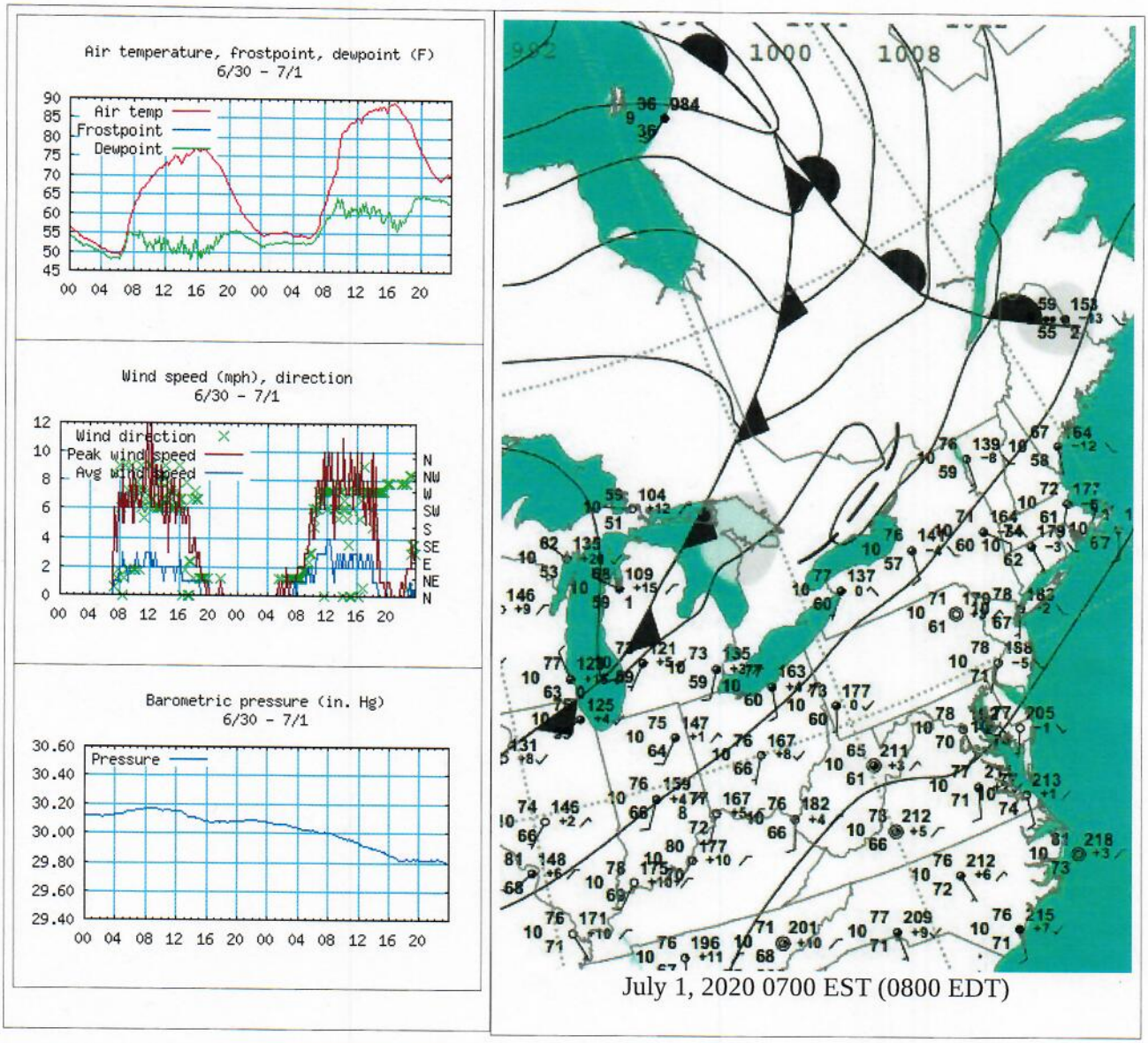
6/17/2022, 0700 EST (0800 EDT)

A long serial port cable allowed me to place the weather station console where it could reliably receive information from the outdoor sensors.

HMMH data from the afternoon and evening of the 16th had too much wind noise to be usable. Everything above says that the weather was a complicated mess. Overnight wind prevented anything like an inversion to form, wind coming from the southwest or the east suggests that a back door cold front had reached me. HMMH did get two samples that were usable after midnight, both were from sites south of the wind project and not very interesting.

My remarkably low air pressure by the end of the 17th is from a very deep low pressure system near Hudson's Bay. These days were likely representative of no day from any of the noise complaints being investigated. See Daily Weather Maps June 13, 2022 - June 19, 2022.

HMMH – 6/30/2022



The 16th looks like it was a pretty nice day with comfortable temperatures and dry air. Overnight a warm front came through and daytime mixing brought down much warmer and humid air. In between the flat temperature from 0000 to 0600 says clouds and no good opportunity to develop a deep inversion. The wide spacing of isobars means light winds.

HMMH says the date was "chosen for forecast low wind conditions in the study area." They certainly got their wish in the afternoon and evening – wind speed at turbine nacelles was 3.5 and 3.3 m/sec and power generation per turbine was some 10% of full output. The wind picked up at night to respectable levels, but the direction at the nacelles averaged some 227° - southwest - and blew along the ridge instead of toward the monitoring sites.

In summary, it was a very good day to show compliance with with the noise standard.
See Daily Weather Maps June 27, 2022 - July 3, 2022.

Janice Duley Longgood
156 Salmon Brook Road
Antrim, NH 03440

Site Evaluation Committee
21 South Fruit Street
Concord, NH 03301

RE: Docket No. 2021-02

April 29, 2023

Public Comment of Janice Duley Longgood

I am responding to the HMMH report regarding the AWE complaints. I filed a complaint regarding excessive noise.

First and foremost, I would like to go on record that I did **NOT** refuse testing on my property. I requested to meet with the sound experts that were going to undertake the testing to understand the methodology. I planned to have an individual with me who understands the sound issues at this informal discussion. Mr. Evans was not in favor of this informal discussion with my guest in attendance. I did not hear anything further regarding a plan for the sound testing at my home/property.

I do not believe that the testing areas used on Salmon Brook Road were representative or an approximation of the impact of excessive noise at my home. As I understand the report, the testing instruments used to measure the sound on Salmon Brook Road were approximately a mile from the nearest turbine on the transmission line property, I live a half a mile up the road from the power lines closer to multiple turbines. I have four turbines closer than a mile to my home, my property is surrounded by the turbines. Data from the planning stages indicates the following distances from my residence to the turbines: Turbine 4, 4,669 feet, Turbine 5, 3843 feet, Turbine 6, 4119 feet and Turbine 7, 4667 feet.

Even at greater distances from the turbines than my home, the turbine sound recorded at the transmission line was just under the SEC's 40-decibel nighttime limit. Measurements taken closer to the turbines would have shown turbine noise levels over the limit. I continue to experience loud disruptive noise on an intermittent basis depending on the days and the weather.

I look forward to a resolution of this issue.

Janice Duley Longgood

Biemer, Andrew

From: Richard Block <snowstar@tds.net>
Sent: Friday, April 28, 2023 11:38 PM
To: SEC: Admin
Cc: Lisa Linowes; Lori Lerner; Larry Goodman; Barbara Berwick; Fred Ward; Dave Publicover
Subject: Docket 2021-02 Antrim Wind -- public comments

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April 28, 2023

Members of the Subcommittee;

Thank you for this opportunity to comment regarding compliance of Antrim Wind with the Certificate of Site and Facility With Conditions, issued by the Site Evaluation Committee on March 17, 2017.

It is my understanding that the conditions contained in the Certificate are binding upon Antrim Wind and failure to comply with any condition may be grounds for suspension or withdrawal of the Certificate.

I reside on 70 acres near the top of Loveren Mill Road, on the south side of Windsor Mountain. As such, my property is thus directly across from Tuttle Hill with a full view of the wind turbines. During the leaf-off seasons, I can see all nine turbines from my porch. With such a clear view, it is obvious to me when the turbine strobe lights are flashing.

Appendix VI of the Certificate, the Bird and Bat Conservation Strategy, states, on page 47 of that report, "AWE has reached an agreement with the Appalachian Mountain Club ("AMC") whereby AWE has agreed to install a radar activated lighting system that will control the FAA obstruction lighting. This system will only activate the nighttime FAA obstruction lights in the event that there is an aircraft flying at low altitude at night in close proximity to the Project, which will almost eliminate this nighttime light source."

The simple fact is that the radar activated system has virtually NEVER been in proper operation. From the initial deployment of the turbines in December of 2019, the strobe lights have flashed virtually EVERY night, all night. By mid-2021 I had reached a level of frustration that led me to start a nightly observation routine in which I kept "score" of whether the strobe lights were on or off, identified by date and time. I gave up recording the data at the end of that year when I realized that during the second half of 2021, I only observed ONE TIME when the lights were not flashing.

At the public meeting held by the subcommittee this past February 3rd, 2023, I testified to this, and, with renewed interest on my part as a result of this meeting, I made it a point to pay attention again to the flashing strobe lights on the ridge across from my house. It is easy for me to observe these lights through my office window, my living room picture window, or the sliding glass doors leading to my porch from my dining area, all north-facing windows. The fact remains that EVERY SINGLE NIGHT since that February meeting, the lights have flashed. No matter what time of night I look out one of those windows, the strobe lights are flashing in unison. As I sit here typing this in my office at 11:00 in the evening, I merely have to look to the right to see the flashing red lights out my window.

On the rare occasions that I travel west to Keene or east to Concord and return home after dark, I can count on seeing the coordinated strobing of AWE's lights from as far away as Sullivan or Henniker, both towns about 10 to 15 miles from

Tuttle Hill. No special equipment is needed to confirm these observations; any sighted person within a 10 to 15-mile radius needs only to look up at night to see the line of strobing red lights.

As a result of the agreement between AWE and the AMC, the SEC found that "SUBJECT TO THE CONDITIONS HEREIN, the Project will not have an unreasonable adverse effect on aesthetics..." Since AWE has NEVER complied with the terms of that agreement with the AMC, then this failure to observe the stipulations of the Certificate results in both an unreasonable impact on the aesthetics of the area and a clear and ongoing violation of the terms of their Certificate of Site and Facility.

Antrim Wind has had almost three and a half years to correct this problem. The SEC subcommittee has had over three years to enforce the obligations of AWE's Certificate. Neither has happened and the people of Antrim and the region continue to suffer the consequences. I close these comments with the closing paragraph of my letter about this same subject submitted to the Subcommittee on July 20th, 2021 (with still no resulting action taken by the SEC):

"The residents of Antrim deserve to experience the conditions promised to them in the Certificate of Operation issued to Antrim Wind by the Site Evaluation Committee. That document is not only a contract between the developer and the State, but also a contract between both those entities and the people of Antrim. Failure to enforce the terms of the Certificate is de facto a breach of that contract and the residents of Antrim deserve satisfaction."

Sincerely,

Richard Block
Loveren Mill Road
Antrim, New Hampshire

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Richard Block
Snow Star Farm
63 Loveren Mill Road
Antrim, New Hampshire 03440
603-588-2552
snowstar@tds.net

Biemer, Andrew

From: Thomas Boyle <tboyle123@aol.com>
Sent: Friday, April 28, 2023 12:19 PM
To: SEC: Admin
Subject: Site Evaluation Committee Docket No. 2021-02

Regarding the sound study by HMMH,Inc. of the Antrim Wind Farm,LLC. we're sound measurements made at the location of the affected residents at the time they complained of the noise being present? If so, what were the measured levels? If not, why not?

Thomas Boyle
173 Gregg Lake Rd
Antrim, NH. 03440