Comments on the NH Sec Meeting of 2023 June 7

relative to Antrim Wind complaints and subcommittee order

Prolog (and submission notes)

To: Andrew Biemer, Administrator Site Evaluation Committee
From: Eric (Ric) Werme
Date: 2023 June 9
Ref: Docket No. 2021-02, Investigation of Complaints Regarding Antrim Wind Energy Facility

Please add this document to the docket for the subcommittee or the full committee, as appropriate, and distribute it to members of both groups.

Introduction

I attended the June 7th meeting and provided oral testimony during the early part of the meeting. I kept my comments general, as I did not expect the committee to inquire more deeply into the issues than did the subcommittee in their May 15th meeting. In the deliberation, committee members directed some questions to Fred Ward and Carl Hansen that I believe I could have answered more clearly. While it is unlikely my answers would have changed the final vote, the same issues will come up when complaints after 2021 are investigated. Therefore I feel compelled to add my answers to the committee's questions.

Two noise studies

Both the committee and subcommittee focused on the sound study executed by Harris Miller Miller & Harrison, Inc. (HMMH). I found the earlier study by Rand Acoustics was much more compelling and interesting as it recorded two significant exceedances that woke up residents after midnight and would have qualified as Complaints.

Weather conditions

I wrote an analysis to compare weather conditions of those two events and the three partial days covered by the HMMH report, see https://www.nhsec.nh.gov/projects/2021-02/documents/2021-02_comments_werme_5-2-2023.pdf . My study looked at weather maps for the days involved and temperature traces at my home in Sutton. While some 25 miles from Antrim, the traces show formation of temperature inversions, wind, and sky cover, items that would be similar to those days in Antrim.

I found that conditions were very similar during both events in the Rand report – clear skies, radiational cooling, temperature inversions, and a high pressure system just to the east that brought all that – and wind strong enough to power the turbines. The three days in the HMMH report had only some of that. The post-midnight conditions of the third day came closest, but the wind direction was all wrong and would not have triggered complaints.

Temperature inversions and wind shear

Fred Ward stated that temperature inversions are important in these matters, but quickly related it to how the speed of sound varies with temperature. Both statements are accurate, but the latter becomes a physics lecture. I would have referred to similar effects that we have all seen and accept like the squashed appearance of the sun as it sets and the mirage/illusion of water flowing over a distant road surface on sunny summer afternoons. These show refraction of light – sound also experiences refraction.

The important parts that apply to wind turbine sound can be summarized as two phenomena that were in play in both Rand Acoustics events.

1. Cold air at ground level at night bends sound toward the ground. During the day air is warmer at ground level than above, e.g. Mt Washington is colder than in the valley. That temperature profile bends sound upward. I believe it was Public Member Jim Jalbert who mentioned that he hears coyote activity from miles away at night but doesn't hear them during the day. This is the explanation.
2. As wind blows over a ridge line, there is often “vertical wind shear” - wind near the ground is slowed by friction with terrain, trees, etc. Further up, wind flows faster. At night, air in valleys can be still, an effect of cold, dense air near ground. This pattern leads to sound bending downward downwind of the ridge, and sound bending upward upwind of the ridge. When there are wind turbines along a ridge, people down wind of them will hear them much better.

I go into more detail (but not much more!) in my analysis above. It has some drawings that I think you will find helpful.

One further comment

Given that these phenomena mesh so well with the weather maps for the days Rand highlighted I am very confident that my analysis is accurate. I'm gratified that the full committee is interested in investigating some of the post 2021 complaints (and documentation like what Rich Block did for the ADLS issue).

One thing that was not part of deliberation is almost at the end of the subcommittee's order:

> 34. First, the Subcommittee recommends a uniform complaint form that must be submitted to begin any investigation. Because many of the complaints in this matter were supported by nothing other than subjective complaints the Subcommittee suggest[s] the Complaint form encourage complainants to submit objective evidence to substantiate the complaint if any exist. The Subcommittee also believes the Complaint form shall advise Complainants their Complaint may be dismissed or rejected if the Complainant does not provide access to their property for complaint validation purposes.

They do not explain what is “objective evidence”. They ignored Rand Acoustics, my analysis, and Block's study. They may consider those post 2021 Complaints. I disagree, these are all as worthy of consideration as the HMMH report. Personally, I think these are better than the HMMH report.