

**Biemer, Andrew**

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**From:** drfred@myfairpoint.net  
**Sent:** Wednesday, April 26, 2023 3:11 PM  
**To:** SEC: Admin  
**Cc:** Lisa Linowes; Lori Lerner; Larry Goodman; Snow Star Farm; Barbara Berwick; Bob Copeland  
**Subject:** Docket 2021-02 Antrim Wind

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admin@sec.nh.gov Re:  
Docket 2021-02 HMMH Report 26 APRIL 2023

The sound levels perceived by the neighbors to the AWE facility are almost completely determined by the weather on the turbines, plus the weather in the neighborhood surrounding the facility.

Briefly, the wind at the turbines determines the loudness of the noise generated by the turbines, and the weather between the turbines and the neighbors determines whether these noises go up into the air above the turbines and out into space, or down and into neighbors homes. Most of the time, most of the turbine noise goes out and up. But specific weather, especially at night, reverses this process and traps the turbine noise in the lower neighborhoods surrounding the turbines.

**THE WEATHER DETERMINES THE INCIDENCES  
OF 40 Db EXCEEDANCES AT THE NEIGHBORS!!**

Sound experts (HMMH, Inc) were hired to analyze the sounds from the Antrim Wind Facility to determine whether the AWE turbines exceeded the agreed nighttime maximum sound level of 40 Db. This expert company tested at some sites in the neighborhood surrounding the AWE turbines. Any sound expert would know that the likelihood of excessive (40 Db plus) could ONLY occur (if they ever occurred) in certain well-known weather situations. HMMH selected three weather situations, not one of which was likely to produce an excessively loud sound. HMMH measured the turbine sounds at the neighbors. Not surprisingly HMMH found no exceedances. They used these results to conclude that "This demonstrates the Antrim Wind Facility's compliance in accordance with the SEC Subcommittee's findings".

Explained at length at the end of this letter are the weather situations during which such exceedances are most likely. The three that HMMH selected were very UNLIKELY to produce sound exceedances! This peculiar selection of monitoring dates suggests that HMMH knew the weather situations which might produce exceedances, and selected their dates to avoid any such exceedances.

One might note that RSA 162-H specifies that any checking of the turbine sound levels following a neighbor's complaint must be done under the SAME METEOROLOGICAL CONDITIONS as occurred at the time of the complaint. That sentence was in RSA 162-H for a reason, a very good reason.

Might this subcommittee draw the conclusion that HMMH knows/knew that under certain nighttime weather conditions they would exceed the 40Db limit, that they have exceeded this limit in the past, and that they know when, and how frequently, these weather conditions have occurred in the past months and years??

In addition, the SEC committees, beginning with the original committee in 2012 chaired by Mr. Scott, turned a blind eye to my repeated assertions that this knowledge, and that the procedures to verify them, were well accepted.

In summary, HMMH's selection of times to measure the turbine noise levels in the report supports the exact opposite of the sentence quoted earlier, namely that there were, and are continuing, exceedances of the 40 Db nighttime sound limits. There is no need for any further testing. HMMH have verified by their selection of dates on which to monitor the noise, that 40 Db turbine noise exceedances have occurred in the past, and will occur often in the future.

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Primer on the Broadcast of Sound from Elevated Turbines to Lower Neighbors

The sound level as heard by a lower neighbor from an elevated wind turbine is dependent on two factors, two WEATHER factors: the wind speed driving the blades of the elevated turbines, and the weather in the air mass surrounding the turbine and its neighbors. The wind speed determines the speed of the turbine blades and hence their level of noise generation, with higher winds causing the blades to rotate faster, and increasing their sound levels. These turbine sounds then go out in all directions, up, down and sideways, including into the air of the surrounding neighborhood. In most weather situations, and especially in daytime, half or more of this sound goes up and out into the free air above both the turbines and the neighbors, with the rest going out to the neighbors and bouncing off the hills, and the ground, and with some noise being absorbed by the ground and plant growth, or reflected by frozen ground and/or ice.



In the daytime the sun warms the ground and the warm ground warms the air, from the bottom up, resulting in a temperature structure with the air temperature warmest at the ground, but cooling with increasing altitude. At night, the ground cools faster than the air immediately above, with the most cooling near the ground. (In the daytime, the air closest to the ground is the warmest, while at night the air closest to the ground is the coldest, and the air above is warmer). The nighttime temperature structure is "inverted", compared to the temperature structure in the daytime sunshine.

None of this would matter, except that the speed of sound changes with the air temperature, with warmer air allowing faster sound speeds. In the daytime, this speed difference results in the sounds from the elevated turbines curving outward and upward, away from their lower neighbors. At night, this effect is inverted, with the sound waves being curved downward, toward the lower neighbors. This inverted nighttime temperature structure sends louder noise to the neighbors, and this increase in noise can be substantial when the temperature is substantially inverted. The severity of the temperature inversion can be a major factor in determining the loudness of the turbine noises heard by its neighbors. A strong temperature inversion can produce sound levels many decibels louder than those on a night with little temperature inversion..

## CONCLUSIONS

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### HMMH

chose to make sound measurements at times with little or no temperature inversion. Therefore, The HMMH assertion that the sound measurements in their report of 6 April 2023 "demonstrates the Antrim Wind facility's compliance in accordance with the SEC subcommittee's findings" really demonstrates that HMMH is not competent to measure, or interpret their measurements for sound exceedances..

It is long past time for the SEC Members, and specifically the Public Members, to require that sound measurements be taken to check for exceedances, that is, taken in weather situations which are likely to produce such exceedances.

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