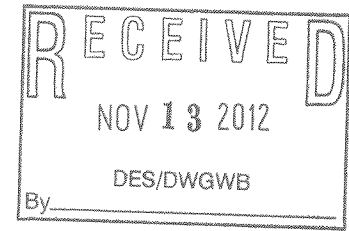


***Dr. Fred Ward*** Meteorological Consultant

8 November 2012

Ms. Jane Murray, Secretary  
NH Site Evaluation Committee  
Dept. of Environmental Services  
29 Hazen Drive, Box 95  
Concord, NH 03302-0095



Dear Ms. Murray:

Sound Measurement

Individual responses to sound will always be somewhat confusing because we all hear differently. However, the "weather" makes a substantial contribution to this confusion, because sound propagation is materially affected by the weather, in particular by the stability of the atmosphere, the difference in temperature between the ground and a higher level. An outstanding issue in this proceeding is whether there is a relationship between atmospheric stability and the noise levels from the turbines, and in particular whether the times of maximum noise occur when the atmospheric stability will assist in spreading this noise far and wide. If such a relationship exists, then the discussion of turbine noise must of necessity focus on the times of maximum noise and maximum stability, and particularly on the times when both are at a maximum. Noise measurements made at other times are irrelevant.

The current restricted access to the wind and temperature data preclude any definitive judgments on this issue, but some material submitted by the applicant suggests that the times of highest winds (maximum sound), the times of maximum wind shear (a major noise factor), the times of maximum atmospheric stability (maximum sound carrier), minimum ambient noise (minimum masking of sound), and sleep time, all seem to occur at more or less the same time, the middle of the night into the early morning.

The coincidence of these factors means that the question of noise levels, and their likely effect on surrounding residents needs to be addressed at the times when these factors coincide. "Average" winds, "average" wind shears, and "average" stability do not answer the question, they are irrelevant. The meteorological, operational and noise information needs to be obtained and analyzed at the times when these factors coincide, and these times only. The use by the appellant of average wind, stability, time-of-day, etc. totally obscures this very important potential connection. A competent analysis of the sound levels from these turbines requires the analysis of individual meteorological and operational data, the hour-by-hour, and possibly minute-by-minute, data.

Beside this vital issue, there are questions as to the quality and reliability of some of the appellant's meteorological data. There is a very interesting statement in the V-BAR document of 4 September 2012 regarding the Lidar wind data (used to "top off" the wind data from their meteorological tower). It states "We then extrapolate wind speeds up to the hub height of the wind turbine." The Glossary of Meteorology, the official word of the American Meteorological Society, defines "extrapolation" as "The extension of a relationship between two or more variables BEYOND the range covered by knowledge". I am not an expert on Lidar, but that seems to sum up the accuracy of the wind data being used by the sponsors for many purposes, including the winds above the met tower level, and the wind shear, and the temperature data.

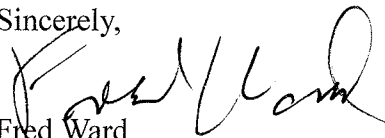
These "uncertainties" merely reinforce the conclusion that the data proffered by the appellant cannot be used to properly calculate the noise from their proposed turbines, and cannot claim that it is anywhere near acceptable levels for their neighbors. Many, many years ago, I was the commander of the weather detachment at Grenier Field, now known as Manchester/Boston regional Airport. The statement in the V-BAR report (noted above) noting the use of the Concord and Manchester airports for basic reference, shows that the appellant has not been judicious in either the selection, or in the analysis of meteorological data.

Turning to some comments made about the "greening" contribution from these giant structures, there was a series of articles in the Union Leader a year or two ago, about the total contribution of windmills to our energy supply, assuming EVERY suitable hill in New Hampshire was covered with windmills. The total contribution from these thousands of windmills was 3% of our total generating capacity. This meant that the sacrifice of EVERY viewpoint in New Hampshire to such "green" edifices would make a barely noticeable reduction in our other sources. Do we really want to trade the entirety of our obvious natural beauty for a tiny contribution to ??? Do we want to turn the tops of all our hills and mountains into imitations of Disneyland? A generation hence, which will be the more noticeable, a 3% reduction in "dirty" energy or the sight of behemoths on every hill in our State?

I am a conservationist, have been for a lifetime. My wife and I have worked very hard to conserve land both in our Town of Stoddard, and have worked with the Harris Center (who are stewards of many acres of our land), and the Audubon Society. Ruth is a land steward for SPNHF. We understand **real** conservation, not giant structures emitting loud sounds and covering the very viewpoints which, by their very existence, speak the CONSERVATION, and for which New Hampshire is famous.

I am a professional meteorologist; have a Bachelor, Master and Doctor degrees in Meteorology from MIT. I have published many scientific papers in peer-reviewed publications, founded a very successful company which supplies meteorological data to customers around the US and the world, and have been a forensic meteorologist for over 40 years, testifying in court and before various State and local Boards. I have testified as an expert witness in court dozens of times, in New Hampshire as well as other states, and in Federal Court. My testimony has often hinged on knowing and understanding the accuracy and suitability of various meteorological instruments. On a number of occasions, I have made wind measurements in the field.

Sincerely,



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