



To: Jean Vissering
From: Rich Letty (KMC)
Date: September 18, 2009
Subject: Peer Review of the Noise Impact Study for the Georgia Mountain Community Wind Project

I have completed my review of the *Noise Impact Study for the Georgia Mountain Community Wind Turbine Project* prepared by the Resource Systems Group (RSG). The noise study appears to be relatively complete and thorough. My findings are as follows:

Noise Measurements

Continuous noise measurements were obtained over a four-day period at each of three measurement locations to adequately establish the existing daytime and nighttime background noise levels in the area. The measured noise metrics included hourly Leq, L90, L50, and L10 noise levels.

Noise Criteria

Although there are no Vermont State statutes or regulations that establish quantitative noise standards that would apply to this project, RSG evaluated a number of Federal and international standards and guidelines that establish noise limits that are used to protect the public health and welfare with an adequate margin of safety. RSG selected the noise limits established by the United Nation's World Health Organization (WHO) published in their *Guidelines for Community Noise* (1999) that uses the most current research on the health impacts of noise to develop guideline sound levels for communities. The WHO guidelines suggest a daytime noise level of 55 dBA Leq₍₁₆₎ (an average sound level over a 16-hour day), to protect against serious annoyance and 50 dBA Leq₍₁₆₎ to protect against moderate annoyance. During nighttime hours, the WHO recommends a noise limit of 45 dBA Leq₍₈₎ (an average sound level over an 8-hour period). Although these noise levels are more conservative (lower) than other Federal Standards like the Environmental Protection Agency (EPA), they may be more appropriate for a more rural area like Vermont.

Noise Modeling Results

Noise levels generated by the proposed installation of five wind turbines on the top of Georgia Mountain were obtained using the Cadna A acoustical model. This is an accepted European acoustical model used by many noise consultants to evaluate outdoor sound propagation for various projects. This model takes into account source sound power levels, surface reflections and absorption, atmospheric

absorption, geometric divergence, meteorological conditions, and the effects from walls, barriers, berms, and terrain. The calculated noise levels from the wind turbines are expected to be 40 dBA at the nearest residential receptor located approximately 3,700 feet away. These levels would be below the 45 dBA nighttime noise criterion used in this study to evaluate impact. The study also indicates that the Georgia Performance Standard of 70 dBA would also be met.

Site Visit

On July 30, 2009, I participated in a site visit conducted by the Public Service Board and attended by local residents that could be impacted by the project. This site visit took us to a number of locations where Georgia Mountain and the proposed wind turbines would be visible, including several of the nearest residences that would be impacted by the noise from the wind turbines.

Overall Comments and Recommendations

The noise study does not address the issue of audibility. For example, the calculated noise level from the wind turbines is 40 dBA at the nearest residential receptor located on Georgia Mountain Road (the Wimble Brothers Organic Dairy Farm). However, the daytime ambient background L90 sound level measured at this same location (north measurement site) is 29 dBA, and the measured nighttime L90 sound level is 25 dBA. Although the predicted noise levels from the wind turbines are below the nighttime noise criterion of 45 dBA, it is well above the measured L90 noise levels at this location. As a result, the noise levels from the wind turbines would be audible when outdoors at this location. The issue of audibility also applies for the nearest residential receptors on Westford Road (the south measurement site) where the measured L90 noise levels are 33 dBA during the day and 26 dBA during the night. At this location, the predicted noise level from the wind turbines is 35 dBA along Westford Road and 38 dBA at the nearest residential receptor at the end of Ted Road. As a result, the noise levels from the wind turbines would be audible when outdoors at these locations.

However, when indoors, the wind turbine noise levels would be reduced by 15 dBA with the windows open, and by 25 dBA with the windows closed. In addition, indoor noise from television, music, air conditioning, and other indoor activities should make the wind turbines inaudible when indoors, except at night when the house is quiet and the windows are open.

The measured L90 noise levels west of Georgia Mountain along North Road are somewhat higher at 40 dBA during the day and 41 dBA at night. These higher noise levels are due to the higher local traffic volumes on North Road. The predicted noise levels from the wind turbines are expected to range from 35 to 38 dBA at the residential receptors along North Road. Because the predicted noise levels from the wind turbines are below the measured L90 sound levels, the wind turbines are expected to be inaudible in this area.

These results indicate that the wind turbines would be audible (outdoors) at the nearest residential receptors on Georgia Mountain Road and Westford Road. However, a more detailed assessment of the audibility issue, including a graphic showing the areas where the wind turbines could be audible, should be provided in the noise study report submitted by the project sponsor's noise consultant.

The wind turbine Sound Power Levels shown in Table 5 of the Noise Study are different from the noise levels shown in Appendix B for the Cadna A noise model input data. This issue should be resolved.