

BEFORE THE MCLEAN COUNTY ZONING BOARD OF APPEALS

IN THE MATTER OF:)
)
 A TEXT AMENDMENT OF REGULATION) ZA-16-01
 FOR WIND POWER GENERATION FACILITIES)
 IN THE MCLEAN COUNTY ZONING ORDINANCE)

AFFIDAVIT OF PAUL D. SCHOMER, Ph.D, P.E.

STATE OF ILLINOIS)
) SS
 COUNTY OF McLean)

The undersigned, being first duly sworn upon oath, states as follows:

1. I am the President of Schomer & Associates, Inc. I am a Board Certified Member of the Institute of Noise Control Engineering, and Standards Director Emeritus of the Acoustical Society of America.

2. Introduction

This letter briefly summarizes the independent, unbiased data as to appropriate sound levels for rural, residential areas and estimates the length of a corresponding setback distance. It is important to note that the following four sources, evaluated herein, are independent of those community and industry members in favor of, or in opposition to, wind farm development.

3. Noise level (dB(A)) Criterion

As stated there are four pieces of evidence. The first piece of evidence, compiled in 2011, comes from the Minnesota Department of Commerce (Figure 1). It shows the noise criterion in rural areas for the countries or parts of countries indicated. All but three of the jurisdictions are at 40 dB(A) or lower as their criterion, and the average of all the lower limits is 37.3 dB(A).

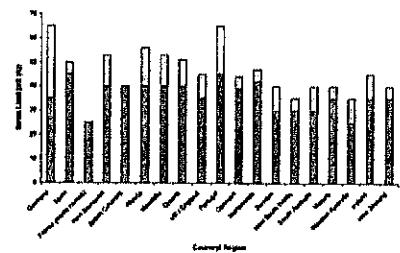


Figure 1: Country Noise Limits at Residences

The second source of independent evidence is based on the ANSI 12.9 Part 4 standard which pegs the DNL in quiet, rural areas to be 45 dB(A) for all noise sources, not only wind turbines. DNL is a measure that represents the total sound on the average day with a 10 dB nighttime penalty. At 45 DNL, the

ZA-16-01
 Obj. Ex. 4
 from Glennon

nighttime levels range from 35-39 dB(A). The average is 37 dB(A). Arguing for numbers above the ANSI document amount to saying the turbines are less bothersome and annoying than everyday road traffic.

The third piece of evidence comes from the Health Canada study which has been generally praised by the wind farm industry. This report shows that the annoyance percentage at [30-35) dB(A) is 1% and at [35-40) dB(A) is 10%. Recommendations from federal agencies for annoyance percentages are in about the 6-7% range. To equate this to how other noise sources are treated, wind farms should have an annoyance percentage of about 6%. All evidence we know suggests that as sound level increases, annoyance increases. That is, as the noise emitted from wind turbines increases, the annoyance towards the wind turbine noise increases. That being the case, 6% annoyed occurs at less than 40 dB(A) and greater than 35 dB(A). So the criterion must be in the range of 36-39 dB(A) with an average value of 37.5 dB(A).

The fourth piece of evidence is derived from four, foreign government sponsored surveys. These four were chosen by Michaud et al. (2016b) because they were the only research designs which permitted an estimate of the percent annoyed vs. DNL. Michaud et al. computed the Community Tolerance Level (CTL) for each of these surveys. CTL is decibel number representing how tolerant a community is of a particular noise source such as aircraft, road traffic, factories, or wind turbines. Being a single number representation, one can easily compare one community to another for differing noise sources. The comparison is the difference in CTL value for each community. The average CTL value of these four surveys is 62. This corresponds to an A-weighted DNL of 42 for 6% annoyed. A DNL of 42 corresponds to a continuous limit of 36 dB(A).

All four of these references are clearly unbiased. They all come out with similar answers using three different analysis methods: attitudinal survey, review of world-wide regulatory levels, and standards. The world-wide regulatory levels yield an average value of 37.3 dB(A). The Health Canada study yields an estimate between 36-39 dB(A). The ANSI standard yields an estimate of 35 to 39 dB(A) with a midpoint of 37 dB(A). The day-night limit suggested by the four foreign surveys is 36 dB(A). We do not know of any other sources containing independent data. Thus, the single number noise criterion for wind turbines should be between 37 and 38 dB(A).

4. Distance criterion

A CTL level is calculated from pairs of data, each of which relates a noise level to an annoyance percentage. For most noise sources (airports, roadways, factories, etc.), as distance from the source increases in a stated direction, noise level decreases. Wind farms do not have this simple picture. They are more a set of randomly located houses overlaid by unevenly distributed wind turbines. That is, the wind turbines are not evenly spaced in a given area. There is no specific decrease of sound with distance within the area of a wind farm. The level can increase or decrease along any line going through the wind farm. This means that the notion of a setback distance can only be estimated statistically. We can say 1%, 10%, or 50% will be below a certain level, but not which homes or their specific levels.

Because the relationship between distance and noise level is not simple for wind farms, we instead relate distance to a level of annoyance. As noted above, a 6-7% annoyance is the criterion used for many noise sources. In these calculations, we use 6-7% as a target and adjust the setback distance until we reach this 6-7% annoyance figure. Based on this analysis, we recommend a distance setback of 3000 feet.

5. Illinois Pollution Control Board regulations

I was part of a group of four faculty that did drafting and defense of the noise rules of the IPCB, so I have firsthand knowledge as to the intent of the regulations. The regulations were written with a goal of providing reasonably stringent, but clearly understandable noise rules for industry and commerce so that

they would not be subject to the vagaries of a nuisance rule. So the intent was to protect the population of Illinois from excessive noise and these rules were fairly strict, i.e. quite protective. Wind farms were never contemplated in 1968 when these rules were promulgated. These rules are inappropriate for use with wind farms. They are anything but protective of the citizenry; So use of them in conjunction with wind farm noise must be deprecated.

6. Conclusions

The authors recommend a noise level limit of 37-38 dB(A). As with many other sources, the authors note that a noise level (dB(A)) limit is preferable to a distance setback when determining criteria for wind farm development. That said, based on the analysis described herein, the authors believe that 3000 feet is an adequate distance setback.

References

Minnesota Department of Commerce, Energy Facility Permitting. (2011). International Review of Policies and Recommendations for Wind Turbine Setbacks from Residences: Setbacks, Noise, Shadow Flicker, and Other Concerns. Retrieved from http://mn.gov/commerce/energyfacilities/documents/International_Review_of_Wind_Policies_and_Recommendations.pdf

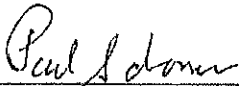
"Exposure to wind turbine noise: Perceptual responses and reported health effects." Michaud, David S., Feder, Katya, Keith, Stephen E., Voicescu, Sonia A., Marro, L., Than, J., Guay, M., Denning, A., McGuire, D., Bower, T., Lavigne, E., Murray, Brian J., Weiss, Shelly K., van den Berg, F., The Journal of the Acoustical Society of America, 139, 1443-1454 (2016), DOI:<http://dx.doi.org/10.1121/1.4942391>

"Personal and situational variables associated with wind turbine noise annoyance." Michaud, David S., Keith, Stephen E., Feder, Katya, Voicescu, Sonia A., Marro, L., Than, J., Guay, M., Bower, T., Denning, A., Lavigne, E., Whelan, C., Janssen, S. A., Leroux, T., and van den Berg, Frits., The Journal of the Acoustical Society of America, 139, 1455-1466 (2016), DOI:<http://dx.doi.org/10.1121/1.4942390>

ANSI (2005). "American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound – Part 4: Noise Assessment and Prediction of Long-term Community Response." Acoustical Society of America. Melville, NY.

FURTHER AFFIANT SAYETH NAUGHT

DATED this 28th day of September, 2016



Paul Schomer, Ph.D., P.E.

SUBSCRIBED and SWORN to before me this 28th day of September, 2016



Notary Public

