



12 July 2001

Michael L. S. Bergey
Bergey Windpower Co., Inc.
2001 Priestley Ave.
Norman, OK 73069

RE: Wind Turbine Noise Output Evaluation

Dear Mr. Bergey:

Per your request, on the afternoon of 9 July 2001, accompanied by John Stalcup, your representative in Glen Ellen, California, we traveled to a Bergey installation located in Solano County at Ledgewood Creek Vineyard to measure the sound pressure level generated by the Bergey Model BWC Excel 10kW Class Wind Turbine.

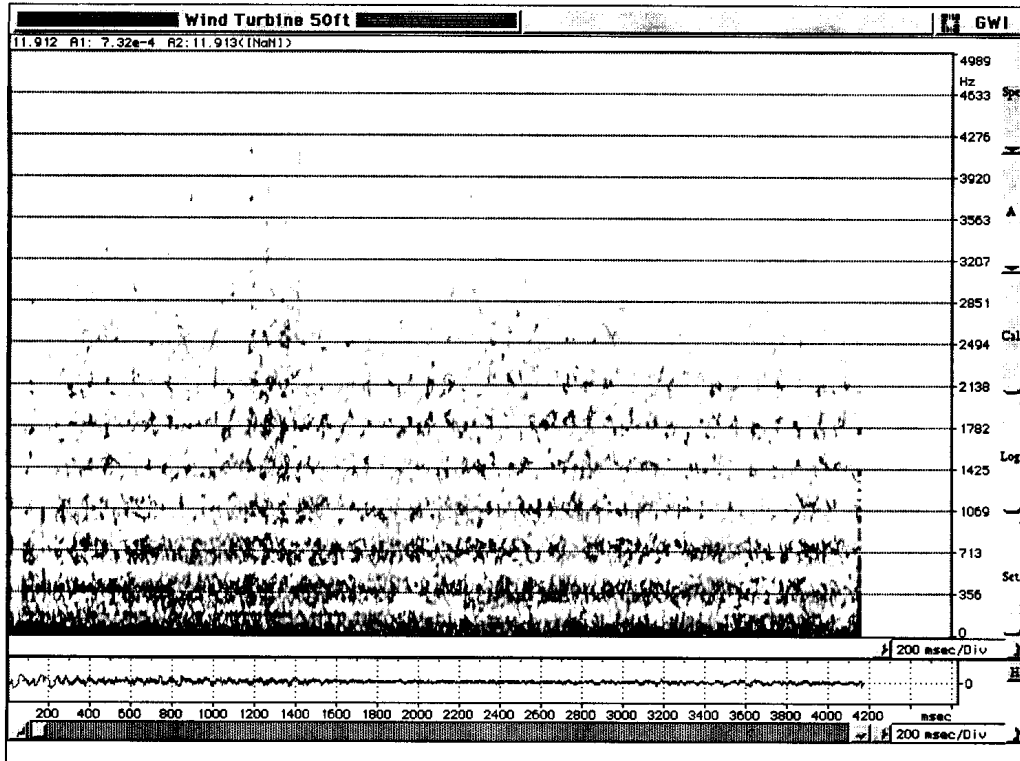
The wind during the time of measurement was gusting between 19 and 24 mph generally from a SE direction. It was mutually decided once on site to sample at distances of 20, 50, 100, 150, and 200 feet, respectively. The temperature was in the mid-70s with mostly clear skies. The sound pressure meter was a calibrated Rion Integrating Sound Level Meter, Model NL-06, Ser. # 00892560, featuring a NH 19, 1/2 inch capsule and windscreen. The meter was set to measure dBA sound pressure levels (SPL) each 200ms over a period of 20 seconds time with the average expressed in the chart below. We measured only from a downwind position since the SPL upwind and to the sides was measurably less. As the measurement was made in a vineyard at ground level, the SPL generated by the BWC Wind Turbine was often masked by the rustling of nearby grape leaves and vines, which by this time of year had fully matured (with the exception of the grapes).

We also attempted to record the samples using an M-S system consisting of a Sennheiser MKH 30 and a MKH 40 pair of mics, with Aerco pre-amp and a Sony PCM M1 DAT (digital audio tape) recorder. Despite the usual high wind effect attenuation precautions we took, this operation was not generally successful because of the unusually high gusts obviating collection of consistently useful data during this test. We were, however, able to obtain brief moments of sound spectrum data that might be helpful and are included with this evaluation report.

The following SPL measurements were made in relationship to the tower:

<u>Distance</u>	<u>Wind Turbine "on"</u>	<u>Wind Turbine "off"</u>
20 ft.	50.1dBA	45.7dBA
50 ft.	49.3dBA	45.8dBA
100 ft.	46.9dBA	48.1dBA
150 ft.	44.2dBA	44.4dBA
200 ft.	44.1dBA	44.3dBA

Sound spectrum data (below) reflects a sample of recorded sound taken at 50 feet. As the spectrogram shows, the sound output generated by the turbine during wind gusts of between 19 and 24 mph is similar in character to that of ocean waves, a stream, and wind effect in tall grasses or blowing through trees densely foliated with leaves and is a common element in acoustics not generally known to cause discomfort or stress in any culture.

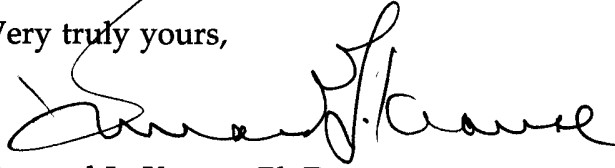


Bergey Wind Turbine spectrogram recorded 7/9/01 at Ledgewood Creek Vineyard from a distance of 50 feet downwind. This 8 second sample (time on the "x" axis/frequency to 5kHz on the "y" axis) demonstrates acoustic characteristics common to natural sounds such as waves, leaves and grasses rustling as a result of wind, and stream sounds.

Conclusion. At distances of 20 and 50 feet, respectively, the level of noise generated by the rotating blades of the turbine, was never in excess of 5dBA greater than the ambient noise (with the turbine shut down). As far as we could detect, there was no measurable noise from the turbine, itself, at any distance. From measurements in excess of 100 feet, the ambient sound of grape leaves tended to be louder in every case than the sound of the turbine blades.

The nature of the sound generated by the blades was the same class of *white* or *pitched* noise commonly experienced by humans in the natural world. No sound type emanating from the wind turbine at any level was present that would be considered objectionable within the classes of industrial sound commonly thought of as such.

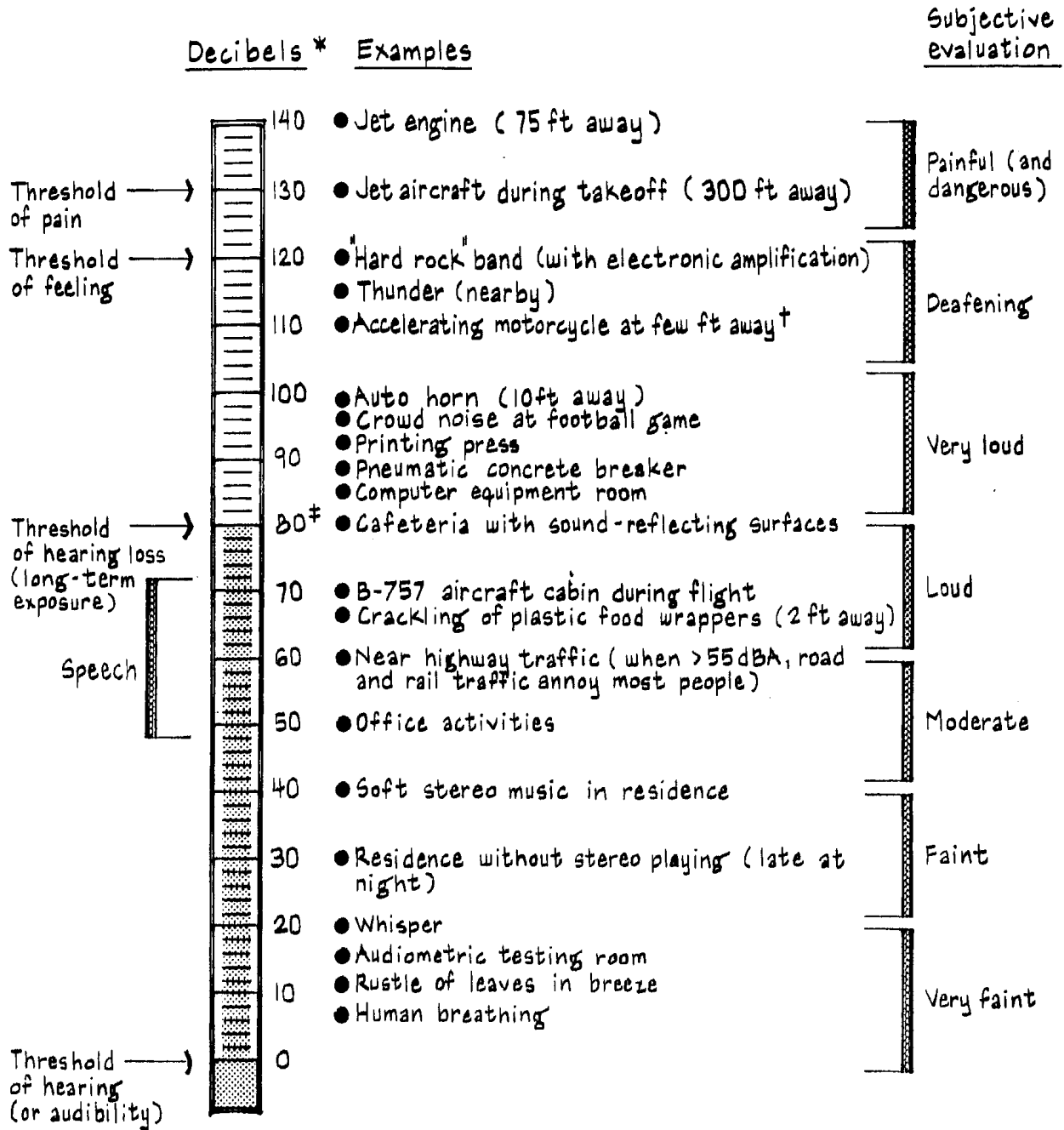
Very truly yours,

A handwritten signature in black ink, appearing to read "Bernard L. Krause". The signature is written in a cursive style with a large, looping initial "B".

Bernard L. Krause, Ph.D.
President
Wild Sanctuary, Inc.
BLK/er
CC: John Stalcup - AirSource

COMMON SOUNDS IN DECIBELS

Some common, easily recognized sounds are listed below in order of increasing sound levels in decibels. The sound levels shown for occupied rooms are only example activity levels and do *not* represent criteria for design. Note also that thresholds vary among individuals.



*dBA are weighted values measured by a sound level meter. See page 31 for details of electronic weighting networks which modify the sensitivity of meters.

†50 ft from a motorcycle can equal the noise level at less than 2000 ft from a jet aircraft.

‡Continuous exposure to sound energy above 80 dBA can be hazardous to health and can cause hearing loss for some persons.