Bureau d'audiences publiques sur l'environnement

QUEBEC, CANADA

TESTIMONY BY NINA PIERPONT, MD, PHD

APRIL 5, 2011

My name is Nina Pierpont. I am a pediatrician in New York State and your neighbor.

My MD is from Johns Hopkins University.

I have a PhD in ecology and population biology from Princeton University and a bachelors degree in biology from Yale University.

I am a board-certified pediatrician and a Fellow of the American Academy of Pediatrics.

I practice pediatrics and behavioral medicine (children & adults) in Malone, NY.

I am the author of the book *Wind Turbine Syndrome, a report on a natural experiment*, published in November 2009.

Thank you for inviting me to testify today.

Wind turbine syndrome is a uniform collection of signs and symptoms experienced by a significant proportion of people living near large wind turbines.

The symptoms include sleeplessness, headaches, nausea, dizziness, tinnitus, ear pressure and pain, eye pressure and pain; episodes of panic and alarm awakening people from sleep with physical symptoms of an adrenalin surge, like pounding heart, the feeling they can't breathe, and hyper-alertness that keeps them from going back to sleep; frequent night-time urination and enuresis in children (bed-wetting); and problems with thinking and performance including difficulty reading, loss of short-term memory and concentration, and deficits in spatial memory and problem-solving.

The signs or physical findings include elevated blood pressure. This has been documented by Dr. Sarah Laurie in Australia.

This collection of symptoms, including the cognitive problems, is well known to ear, nose, and throat doctors who specialize in inner ear balance problems. It is also well known to physicists who have worked with low-frequency noise and infrasound in military, naval, and space program settings.

The association of environmental noise with learning problems in children and with blood pressure elevation and increased cardiovascular risk is well known to many scientists who have studied the effects of noise in large European epidemiologic studies. These associations are well know to the World Health Organization, which has published extensive guidance on community noise and night noise in the last 12 years. Recently the WHO published the study titled *Burden of disease from environmental noise: quantification of healthy life years lost in Europe* with regard to traffic, airport, rail, and industrial noise. I was interested to see that among the 69 scientists who produced this report, 10 were from Quebec. There were only 5 from the entire United States, and none from English Canada. You have particular strength and interest in the field of community noise here in Quebec.

Though this and other studies of the health effects of noise do not specify low-frequency noise, the low frequencies are an important but unmeasured part of each of these noise sources: think of the deep rumble of airplanes or of heavy trucks. The low frequencies are unmeasured because community noise studies all use A-weighted measures of noise loudness, which filter out the low frequencies.

In wind turbine noise, the audible component is quieter and the low-frequency or infrasonic components make up more of the noise. The sound at both higher and infrasonic frequencies pulsates or beats, which increases its disturbing quality. This is called amplitude modulation. It applies to both the audible and the infrasound components of wind turbine syndrome noise, as Richard James, a noise engineer in the US, has discovered.

Wind turbine noise is much more disturbing at low A-weighted noise levels than other types of community noise, as documented by Dr. Eja Pedersen in Sweden. Using her own studies of wind turbines and published research on other noise sources, she shows in her 2004 paper that 15% of the population is highly annoyed at the noise from trains at 70 decibels, at the noise from road traffic at 63 decibels, at the noise from airplanes at 57 decibels, and at the noise from wind turbines at 38 decibels. There are several potential reasons why wind turbine noise is so much more disturbing than other types of community noise. One is that it is continuous and is often louder at night. Another is that it is pulsatile. A third is that these A-weighted noise measurements filter out the significant low-frequency or infrasonic component of the noise.

This filtering is justified by the assumption, based on 80-year-old research, that if you can't hear a sound, then it is too weak to have any other physiologic effect on the body. However, experimental studies in the United States and elsewhere are producing new evidence on the physiological effects of infrasound and low frequency noise on the inner ear, showing that infrasound is actually registered by the cochlea. Signals are sent from the cochlea to the brain in response to infrasound, but the actual *hearing* of these signals is suppressed. This research, by Dr. Alec Salt at the Washington University School of Medicine, and others, has up-ended the 80-year-old assumption to which the wind industry clings like a barnacle in denying the health effects of living close to wind turbines.

Not everyone is affected. My study focused specifically on the question of who is affected and who is not affected while living close to wind turbines, based on age and risk factors in the medical history.

Risk factors include:

1. Migraine disorder. Headaches, also a range of other neurologic phenomena. 12% of population (18% of females, 6% of males).
2. Motion sensitivity.
3. Inner ear damage from previous industrial noise exposure or from chemotherapy.
4. Age 50 or above.
5. Young children were also affected.
6. Least affected age group appears to be late teens though 30's in the absence of other risk factors.
7. Mental health disorders were not a risk factor in my study, and no one had previous panic episodes. Even a tough cowboy and welder from Missouri, who raises horses, had panic episodes in the presence of turbines.

Even based only on the population prevalence of migraine, without factoring in age of the population or the other risk factors, you can expect 350 affected people in the vicinity of the Saint-Valentin wind installation, out of a population of about 2900.

Recommendation: Setback 2 km in moist rolling northern hemisphere environments, for turbines up to about 2 MW; for larger turbines, longer setbacks will be needed.