

The following is a transcript of the presentation given by Robert Rand at the 9-12-17 Special Joint Meeting of the Brown County (Wisconsin) Human Services Committee and the Brown County Board of Health regarding wind turbine health concerns (Note: Time notation is keyed to the meeting video found at: <https://www.youtube.com/watch?v=8bpc-pYMu48>)

Transcript of Presentation by Robert Rand, ASA, INCE

00:04:54

Thank you so much, Boards, for the opportunity to talk with you, and talk a little bit about the testing we did back in 2012. I've got a few notes that I have with me. I'm not doing a PowerPoint. I just want to talk with you directly and give you an idea who I am, what my experience has been, and what we found at Shirley and other sites where we've done infrasound and noise testing of large industrial wind turbines. I believe I had several pieces of paper I asked to be distributed, different papers for the Boards to read. I hope they got them and read them.

I got one of these [Robert Rand holds up a sign like those being worn by numerous Shirley Wind residents in the audience. It reads: "I AM THE EVIDENCE"]. I actually got sick during the testing in 2012, at the three homes that we tested in December of 2012. Of the four teams that looked at the acoustic emissions and imissions, that means the noise coming into the homes, I was the one that got sick. I'm prone to motion sickness. As a sailor I've had to deal with that on the Maine coast 00:06:53. The other investigators do not get motion sickness and they didn't get sick.

My background - I've been working in acoustics since 1980, about 37 years. I worked for ten years at Stone & Webster 00:07:10 Engineering Corporation. Stone & Webster exists no longer, but during that time I designed power plants. I worked in the Noise and Vibration Group and we designed to prevent complaints. This was back in the eighties and early nineties, and at that time the utilities were very interested in avoiding lawsuits and preventing complaints. It was good for their bottom line. It seems to have changed since then. I was also a silencer specialist and I was in charge of all specifications worldwide for about two years, a little more than two years. So I got very familiar with specifications, including specs for steel, silencers, lagging, all the standard things that you do at power plants.

Now there's something, this is the one point that I really wanted to make with you guys tonight as a professional in noise consulting for power plants. All forms of power generation make noise of one form or another. Even solar makes noise because they have transformers and those emit tones. The difference between all forms of power generation and wind turbines is that every other form of power generation has multiple forms of noise control that can be applied to prevent complaints, things like enclosing equipment in buildings, putting insulation on ductwork, silencers in ductwork, which is

like mufflers on a car. You can orient buildings so that noisy pieces of equipment are shielded from the closest neighbors. There are lots of things you can do, but with wind turbines, there's only one reliable noise control option, and that's distance. Once they are in place, if there's a complaint, then the only reliable noise control option is to shut the turbines down.

Let me repeat that. When you're designing a facility, a wind turbine facility, the only reliable noise control option available to the planners is sufficient distance to prevent complaints. Once they're installed, if there are complaints, the only reliable noise control option is shutdown. This was proved very recently in Falmouth, Massachusetts. After seven years of lawsuits, where people were grieved and even the town itself had taken complaints and affidavits from multiple homes and made an appeal to the State, which did not respond, Judge Moriarty ruled on June 21st that the only option available to ameliorate the nuisance condition which was established at 40 dB(A) in that town, was to shut the turbines down. If there had been any other option, everyone would have exercised it, but that's the only one.

In Shirley we were asked to come in and look at the acoustic emissions and sound coming into the homes, at three homes, to see if there was noise coming into the homes, and in fact there was. We found a unique signature which is found only from wind turbines because of their size, which is a barometric pressure oscillation that occurs at the blade pass rate. So, there are three big blades and they go sweeping around, and every time a blade goes around it emits a barometric pressure change, a little wobble in the air pressure. We found that that wobble was present outside the homes and inside the homes, and it was pretty much the same level no matter where you were in the home, even the cellar. A little bit less in the cellar, but pretty much the same as the rest of the home.

Now, why is that important? It's an international standard, 9996. 9996 links motion sickness to perceived or actual pressure oscillations in the range of .1 to 1 Hz. And what is that? That means the pressure oscillation coming in slower than one per second and faster than once every ten seconds. Now, ISO 9996 generally refers to vibration, but what Paul Schomer showed in his paper to the Acoustical Society of America in 2015 is that that force that is impinged on the inner ear by the acoustic oscillations that we measured at Shirley is the same force that was found in Navy trials for motion sickness on boats, from the boat moving. So, what we now have is a link between motion sickness and the air pressure oscillations that are created by the wind turbines.

We also measured audible noise levels that exceeded a number of important benchmarks. We found noise levels that exceeded levels that would be associated in American National Standards Institute, ANSI, parts 4 and 5, for compatibility in quiet rural environments. We found noise levels that exceeded World Health Organization

2009 levels that would be associated to sleep disturbance. So, we have a general agreement in all our measurements that this is a very serious health condition that's present at Shirley. And, the same kinds of conditions that we find at Shirley are also present for other large turbine facilities where they are located too close to neighbors, including Falmouth which we measured in 2011. I looked at Vader Piet down in Aruba in 2012 before I went to Shirley, and also out in Hardscrabble, New York, we're finding the same thing happening over and over again. When they're too close to people, the noise levels are too high and they're creating pressure oscillations which are consistent with motion sickness. So that's pretty much what I wanted to tell you. Thanks very much.