

SUBMITTED VIA FIRST-CLASS MAIL

August 8, 2007

Bonneville Power Administration
Public Affairs Office- DKC-7
PO Box 14428
Portland, OR 97293-4428

Re: Environmental review of UPC's proposed Cascade Wind Interconnection Project.

Dear Bonneville Power Administration:

I have submitted comments about the proposed UPC Cascade Wind Farm (UPC) to the Oregon Energy Facility Siting Council (EFSC) but I have learned recently the Bonneville Power Administration (BPA) does an independent analysis of the impact of the wind project and the impact of the interconnection to BPA transmission lines. Your letter of June 28, 2007 indicates that the deadline for public comments is August 10, 2007 and it is not clear whether there will be future opportunities to comment when the UPC application is completed. So I would like to comment at this time based on the UPC application dated April 2007. I hope the BPA extends this deadline for public comment until sometime after the UPC application is deemed complete by the EFSC and I have a better idea of UPC's intentions.

I am not as concerned about the facilities BPA proposes to install (substations, fences, lighting, etc) as I am the adverse impacts of the total wind project in a rural residential area near the Columbia Gorge National Scenic Area (NSA).

WIND PROJECT IMPACTS:

Public Health and Safety

I have some real concerns about safety during construction of the proposed wind farm with increased truck traffic on the steep, narrow roads. How will emergency vehicles get access if needed? I am a physician living on Martin Rd on Seven Mile Hill. Will I be able get to town to treat patients if needed?

But the greatest public health concern is the Noise created by the construction and operation of the turbines. Some residences are within ¼ mile of the turbines. Our own house is ¾ of a mile.

BPA needs to do their own evaluation of the Public Health Hazards of wind turbine facilities near residences. You cannot rely only on the application of the developer or the evaluation of the county planning departments. This is a highly technical area and if BPA does not have staff with the education and experience to evaluate the health risks of these energy projects then, I believe, you are obligated to contract with a recognized consultant. In the medical field I sometimes have to refer a patient to a specialist who has more training and experience in a particular field.

In the Record of Decision for the Big Horn Wind Energy Project, March 2005, BPA states on page 3 “Two residences are in the vicinity of the site, approximately ¼ mile to the west” and on page 14 it says “the nearest residence is more than 1,000 ft from any project facilities”. “Noise (is) from operation of the Wind Turbine Project due to aerodynamic noise of the turbine blades moving through the air, and from the gears and other machinery of the turbine”. “Because of the distance of the residences from the project, no impacts due to noise are expected”. This last statement in the ROD is incorrect and shows BPA has not properly evaluated the noise impact from 1.5 MW wind turbines similar to those that are being proposed.

A recent study of the UPC project, Mars Hill Wind Farm, in Maine measured noise levels of 50 dBA and higher at 800 to 1,200 feet from GE 1.5 MW turbines. These noise levels would violate the Oregon DEQ regulations of maximum 50 dBA at night and maximum 10 dBA increase over ambient sound levels. (Ref: 2). The excess wind turbine noise is a significant health hazard to the surrounding residences.

The application by UPC fails to address the known public health issues associated with construction and operation of a wind turbine generation facility near residential properties. Opinions on health hazards of wind powered generating turbines like those proposed by UPC are moving from the anecdotal domain to a deeper understanding of causality. However, it should be stated that many conclusions are disputed. There is however a significant and growing trend towards caution. This is particularly important in the case of the proposed facility on Seven Mile Hill because, to my knowledge, it is the first wind farm proposed in Oregon that is sited on land which is predominately surrounded by residential property owners. Seven Mile Hill is the Oregon test-site or guinea pig, if you will, which has major potential health consequences.

On Page X-2 of the application, UPC briefly mentions the effects of noise on people as in three categories: (1) annoyance, nuisance, dissatisfaction; (2) interference with speech, sleep, learning; and (3) physiological effects such as hearing loss. They go on to admit there is a wide variation in individual thresholds, which is certainly true. Dr. Pierpoint (Ref 3) estimates 20 – 30% of the population will be affected by noise from wind turbines, which means the majority of people will not. But that does not mean that the minority should not be protected from the health risks of wind turbine noise.

Summary of Findings:

The application from UPC Oregon Wind, LLC is technically inadequate with regard to current knowledge of noise, shadow flicker and health. The application has ignored guidelines by World Health Organization (Ref: 1), French National Academy of Medicine and new research in Europe, England, Australia and other countries.

- Audible noise produced by wind turbines has a thumping, pulsing character, especially at night, when it is louder because of lower background noise and cooling of land and air. It has been documented to be disturbing to residents 1.2 to 1.5 miles away. UPC proposes to place turbines as close as one quarter mile away from homes.

- The symptoms related to excess wind turbine audible noise include:
 1. Sleep problems
 2. Headaches, especially migraines
 3. Dizziness
 4. Emotional problems
 5. Problems with concentration and learning
 6. Tinnitus (ringing in ears)
- Chronic sleep disturbance is the most common symptom. The pulsing character of the noise is more disturbing than constant noise at the same level. Sleep disturbance contributes to a variety of health problems, for example: increased blood pressure, chronic myofascial (muscle) pain, depression, sleep deprivation and well-known contribution to automobile accidents.
- Not all people are sensitive to the noise but about 20 – 30% are reporting symptoms, especially those with migraine disorder, older people with age related problems associated with inner ear dysfunction and children with disabilities and related behavior problems..
- Industrial sized wind turbines produce low-frequency noise. A disease called Vibroacoustic Disease (VAD) is caused by long-term exposure to low-frequency noise. Most of this research has taken place outside the U.S.
- The health hazards of visual shadow flicker on adjacent property owners is not addressed in the application. This is a particular problem for people with a family history of migraines or motion sickness.

Nina Pierpont, MD, PhD --- Ref: 3

Dr Pierpont is the leading physician in the U.S. who is studying, testifying and publishing about the health hazards of wind turbines. The statements on the next few pages were excerpted from her publication titled “Wind Turbine Syndrome: Noise, shadow flicker, and health” August 1, 2006.

- For people to understand each other easily when talking, environmental noise levels should be 35 dB or less. For vulnerable groups (hearing impaired, elderly, children in the process of reading and language acquisition, foreign language speakers, and children with developmental disabilities) even lower background levels are needed. When noise interferes with speech comprehension, problems with concentration, fatigue, uncertainty, lack of self-confidence, irritation, misunderstandings, decreased work capacity, problems in human relations, and a number of stress reactions arise.
- Effects of noise-induced sleep disturbance include fatigue, depressed mood or well-being, decreased performance, and increased use of sedatives or sleeping pills. Measured physiologic effects of noise during sleep are increased blood pressure and heart rate, changes in breathing pattern, and cardiac arrhythmias. Certain types of nighttime noise are especially bothersome,

including noise which has impulses rather than being continuous, noise combined with physical vibration, noise with low-frequency components, and sources in environments with low ambient background noise. Children, the elderly, and people with preexisting illnesses, especially depression, are especially vulnerable to sleep disturbance.

- Noise has an adverse effect on performance over and above its effects on speech comprehension. The most strongly affected cognitive areas are reading, attention, problem solving, and memory. Children in school are adversely affected by noise, and it is the uncontrollability of noise, rather than its intensity, which is most critical. The effort to tune out the noise comes at the price of increased levels of stress hormones and elevation of resting blood pressure. The adverse effects are larger in children with lower school achievement.

- What is commonly referred to as noise “annoyance” is in fact a range of negative emotions, documented in people exposed to community noise, including anger, disappointment, dissatisfaction, withdrawal, helplessness, depression, anxiety, distraction, agitation, and exhaustion. The percentage of highly annoyed people in a population starts to increase at 42 dB, and the percentage of moderately annoyed at 37 dB.

Participants in noise studies are selected from the general population and are usually adults. Vulnerable groups of people are underrepresented in studies, and if included, would show stronger effects at lower levels of noise. Vulnerable groups include the elderly, people who are sick or have chronic medical conditions, people with depression or other forms of mental illness, babies and young children in general, children with developmental disabilities, children dealing with complex cognitive tasks such as reading acquisition, and people who are blind or hearing impaired. These people may be less able to cope with the impacts of noise exposure and at greater risk for harmful effects than is documented in studies. Attention needs to be paid to them when developing noise setbacks requirements, just as laws for air pollution set ambient air quality standards to protect the most sensitive individuals.

There are additional symptoms reported by neighbors of industrial wind turbine installations. Amanda Harry, MD, a British physician, found near a 16-turbine installation in 2003 that 13 out of 14 people surveyed reported an increase in headaches, and 10 reported sleep problems and anxiety. Other symptoms included migraine, nausea, dizziness, palpitations, stress, and depression. Dr. Harry’s study is in preparation for publication.

Not everyone near turbines has these symptoms. This does not mean people are making them up; it means there are differences among people in susceptibility. These differences are known as risk factors. Defining risk factors and the proportion of people who get symptoms is the role of epidemiologic studies, which are in progress.

Chronic sleep disturbance is the most common symptom. Exhaustion, mood problems, and problems with concentration and learning are natural outcomes of poor sleep.

Sensitivity to low frequency noise is a potential risk factor. Some people sense low-frequency noise as pressure in the ears rather than heard as sound, or experience a feeling or vibration in the chest or throat.. Neighbors of industrial wind turbines describe the distressing sensation of

having to breathe in sync with a rhythmic pulsation from the turbines which is not necessarily audible, especially at night when trying to sleep.

Preexisting migraine disorder is emerging as a risk factor for sensitivity to Wind Turbine Syndrome. Migraine is not just a bad headache, but rather a complex neurologic phenomenon that affects the visual, hearing, and balance systems and at times motor control and consciousness itself. Many people with migraine have increased sensitivity to noise and to motion – they get carsick as youngsters, seasick, or very sick on carnival rides. Migraine-associated vertigo (which is the spinning type of dizziness, often with nausea) is a described medical entity. Migraine occurs in 12% of Americans. It is a common, familial, inherited condition.

Older people are may also be at increased risk for effects because of age-related problems with the function of the inner ear or the nerves and parts of the brain which receive signals from the inner ear. Many healthy people age 57 to 91 have such problems: 5% have chronic dizziness, and 24% tinnitus (ringing in the ears). Older people often sleep less soundly and are more likely to have their sleep disturbed by noise.

People with a previous history of noise-induced hearing loss may also be at risk for effects since, when people damage their hearing through too much exposure to loud machine noise or music, the balance organs in the inner ear may also be damaged. This damage accounts for the Tullio phenomenon, in which exposure to a loud noise causes loss of balance in people with noise-induced hearing loss.

Dizziness (specifically vertigo) and anxiety are neurologically linked phenomena, so the anxiety and depression seen in association with other symptoms near wind installations are not necessarily an emotional response to symptoms, but may be a neurologically linked response to the balance disturbances themselves. Sleep deprivation also causes anxiety and depression.

The world's leading researchers in the health effects of low-frequency noise exposure are Nuno Castelo Branco, MD (Head of the Scientific Board, Center for Human Performance, Alverca, Portugal, and Principal Investigator for the Vibroacoustic Disease Project supported by the Portuguese Ministry of Science and Technology) and Mariana Alvez-Pereira (a biomedical engineer at the New University of Lisbon).

This international research group, centered in Portugal and including physicians from Poland, Russia, and the United States, has published extensively on the effects of low-frequency noise on parts of the body other than the ears, particularly on the cardiovascular, pulmonary, and neurologic systems. The research, ongoing since the late 1980's, includes clinical, pathological, and experimental (animal model) investigations. The entity these physicians and PhD's describe, called Vibroacoustic Disease (VAD), includes fibrosis (laying down of additional fibrous thickening in the form of collagen) in the cardiovascular and pulmonary systems and seizures and cognitive changes in the brain. The disease is caused by long-term exposure to low-frequency noise (less than 500 Hz), most of which cannot be heard.

Shadow flicker: When turning with the sun behind them, turbine blades cast moving shadows across the landscape and houses, creating as a strobe effect within houses which can be difficult to block out. Some people get dizzy, lose their balance, or become nauseated when they see the movement of shadows or the movement of the huge blades themselves. As with car or sea sickness, such symptoms occur when the three organs of position and movement perception (the inner ear, eyes, and stretch receptors in muscles and joints) do not agree with each other: the eyes perceive movement while the ears and stretch receptors do not. People with a personal or family history of migraine, or migraine-associated phenomena such as car sickness or vertigo, are more susceptible to these effects. The strobe effect also has the potential, like other flashing lights, to trigger seizures in people with epilepsy.

In Lincoln Township, WI, two years after installation of 22 industrial wind turbines, 33% of residents 800 ft to ¼ mile from the turbines found shadows from the blades to be a problem, 40% ¼ to ½ mile away, 18% ½ to 1 mile away, and 3% 1 to 2 miles away.

(Ref: 3, Pierpont)

Barbara J Frey and Peter J. Hadden: “Noise Radiation from Wind Turbines Installed Near Homes: Effects on Health, February 2007 (Ref: 4)

This 137 page paper by Frey and Hadden is one of the most comprehensive reviews of research articles concerning acoustics of wind turbines and noise. See www.windturbineoisehealthhumanrights.com.

After presenting voluminous evidence, the authors recommend at least 2km (1.25 miles) of setback from people's homes for turbines up to 2MW installed capacity, and even larger setbacks for any turbines over 2MW.

Following is the report's abstract:

Wind turbines are large industrial structures that create obtrusive environmental noise pollution when built too close to dwellings. This annotated review of evidence and research by experts considers the impact of industrial-scale wind turbines suffered by those living nearby. First, the paper includes the comments by some of the families affected by wind turbines, as well as coverage in news media internationally. The experiences described put a human face to the science of acoustics.

Second, the paper reviews research articles within the field of acoustics concerning the acoustic properties of wind turbines and noise. The acoustic characteristics of wind turbines are complex and in combination produce acoustic radiation. Next, the paper reviews the health effects that may result from the acoustic radiation caused by wind turbines, as well as the health effects from

noise, because the symptoms parallel one another. Primarily, the consequent health response includes sleep deprivation and the problems that ensue as a result. In addition, this paper reviews articles that report research about the body's response not only to the audible noise, but also to the inaudible components of noise that can adversely affect the body's physiology. Research points to a causal link between unwanted sound and sleep deprivation and stress, i.e., whole body physiologic responses.

These injuries are considered in the context of Human Rights, where it is contended that the environmental noise pollution destroys a person's effective enjoyment of right to respect for home and private life, a violation of Article 8 of the European Court of Human rights Act. Furthermore, the paper considers the consequent devaluation of a dwelling as a measure of part of the damage that arises when wind turbines are sited too close to a dwelling, causing acoustic radiation and consequent adverse health responses.

The review concludes that a safe buffer zone of at least 2km should exist between family dwellings and industrial wind turbines of up to 2MW installed capacity, with greater separation for a wind turbine greater than 2MW installed capacity.

(Ref 4 , Frey and Hadden)

National Wind Watch, Press Release April 2, 2007 Excerpts as follows: (Ref: 5)

Noise created by commercial-scale wind turbines has become a major concern around the world as wind power development continues to proliferate. Although the industry claims that modern turbines are quieter -- even as they grow ever larger -- complaints are increasing from people who live near new projects.

While the wind itself may mask some of the noise under some atmospheric conditions, the deep unnatural thumping as the giant blades pass their supporting tower is particularly intrusive. Testimony from hundreds of turbine neighbors confirms this, most recently from Maine, Massachusetts, New York, Pennsylvania, Illinois, Wisconsin, Texas, Canada, the U.K., and New Zealand. Reports can be found at www.wind-watch.org/news and www.wind-watch.org/documents.

The noise is especially intrusive because wind energy facilities are often built in rural areas where the ambient sound level may be quite low, especially at night. On the logarithmic decibel (dB) scale, an increase of 10 dB is perceived as a doubling of the noise level. An increase of 6 dB is considered to be a serious community issue. Since a quiet night in the country is typically around 25 dB, the common claim by wind developers of 45 dB at the nearest home would be perceived as a noise four times louder than normal. And because it is intermittent and directional,

those affected assert that one can never get used to it. The disruption of sleep alone presents serious health and human rights issues.

The problem is worse than the industry admits. Frits van den Berg, a physicist at the University of Groningen in The Netherlands, studied noise levels around a German facility of 17 turbines. In a paper published in the November 2004 *Journal of Sound and Vibration*, he found that at night, because the surface air is often more still than the air at the height of the blades, the noise from the turbines is 15 to 18 dB higher than during the day and carries farther. He noted that residents 1.9 kilometers (6,200 feet or 1.2 miles) away expressed strong annoyance with noise from the facility.

The French National Academy of Medicine has called for a halt of all large-scale wind development within 1.5 kilometers of any residence, because the sounds emitted by the blades constitute a permanent risk for people exposed to them. The U.K. Noise Association studied the issue and agreed with the recommendation of a 1-mile setback.

In the U.S., the National Wind Coordinating Committee could not avoid the conclusion that "those affected by noise generated by wind turbines live within a few miles of a large wind power plant or within several thousand feet of a small plant or individual turbine. Although the noise at these distances is not great, it nevertheless is sufficient to be heard indoors and may be especially disturbing in the middle of the night when traffic and household sounds are diminished."

(Ref 5. National Wind Watch)

Conclusion: Public Health Issues

As was mentioned at the beginning of this section on Public Health, medical opinions on this topic are changing rapidly based on new research---much of it in the international arena. The 2nd International Conference on Wind Turbine Noise is to be held in Lyon France on September 20-22, 2007. A current list of the papers offered (See Ref 6 , WTN) shows several related to health hazards of wind turbines, including: aerodynamic modulation, low frequency vibration, sleep deprivation, health impacts, prediction of noise versus experimental measurements, wind profiles in complex terrain, measurement of background noise and problems of wind turbine noise.

I strongly recommend that the "expedited review" status granted to this project be withdrawn so that a comprehensive review of the health risks can be evaluated. Remember, this is the first large wind turbine generation facility proposed to be sited in a residential zoned area. Certainly the Public Health issues require a careful analysis of this project, above and beyond that normally required for the conventional wind farm in a remote agricultural area with low population density. Remember, the burden of proof is upon UPC demonstrate that their proposed wind turbine generation facility on Seven Mill Hill is not going to cause harm.

References:

1. World Health Organization, "Guidelines for Community Noise", 1999
2. Department of Environmental Quality, "Division 35 - "Noise Control Regulations", current as of April 2007. (1)(b)(B)(iii)(II)
3. Pierpont, Nina "Wind Turbine Syndrome: Noise, shadow flicker and health, August 1, 2006, p6, then p. 3, 4, 5, 6, and 8.
4. Frey, BJ and Hadden, PJ, "Noise Radiation from Wind Turbine Installed near Homes: Effects on Health", February 2007, p44, 45, 58, 61, 79, 85, and 105
5. National Wind Watch, "Noise Complaints on Rise with New Industrial Wind Power Project", Press Release April 2, 2007.
6. 2nd International Wind Turbine Noise Conference 2007, list of papers offered, google group: "Wind Turbine Noise Conference 2007", May 18, 2007

Thank you for this opportunity to comment.

Sincerely,

Frances M. Yuhas, MD