Town Of Litchfield

James Entwistle
Supervisor
804 Cedarville Road
Ilion, NY 13357
315-894-8191
Jimbeth811@yahoo.com

Nicole Edwards
Town Clerk
1241 Albany Road
Clayville, NY 13322
315-737-0554
Litchfield.townclerk@gmail.com

Clifford Coffin
Highway Superintendent
804 Cedarville Road
Ilion, NY 13357
315-894-2935

June 13, 2012

Hon. Jaclyn A. Brilling
Secretary, New York State Public Service Commission
Three Empire State Plaza
Albany, New York 12223-1350

Re: Case 12-F-0036, In the Matter of the Rules and Regulations of the Board on Electric Generation Siting and the Environment, Contained in 16 NYCRR, Chapter X, Certification of Major Electric Generation Facilities

Dear Secretary Brilling:

Attached you will find an official resolution of the Town of Litchfield including our Town's commentary on the above Matter. To aid in interpretation of our comments, we include excerpts of the relevant sections of the Draft Regulations followed by our comments.

We request that this be entered into the record of this matter and considered by the Commission.

Submitted by authority of the Town Board,

Jonathan P. Knauth, PE
Councilman

Cc: James Entwistle, Supervisor
Nicole Edwards, Town Clerk

The Town Board of the Town of Litchfield by Resolution June 12, 2012 does hereby make the following comments regarding the Article 10 Draft Regulations under Matter number 11-01425; Case No. 12-F-0036

1000.2 (x); (ak)

> (ak) Revision: An amendment of an application or Certificate proposing or authorizing a change in the major electric generating facility likely to result in any significant increase in any environmental impact of such facility or a substantial change in the location of all or a portion of such facility as determined by the Board; not including the shifting of a wind turbine to a new location within a 500 foot radius of the original location provided such change does not significantly increase impacts on sensitive resources or decrease compliance with setback and similar requirements.

We note that the FAA considers micro adjustment or micro siting to mean moving the wind turbine from 100 to 500 feet from its originally filed location, thus any reposition of a turbine outside of a 100 foot circle will require FAA review. A 500 foot move will likely also require reconsideration of visual and noise impacts, particularly if such a move also entails a change in elevation. We recommend that "within 500 foot radius of the" be revised to "no more than a 100 foot radius from the".

Reference:
https://oeaaa.faa.gov/oeaaa/external/searchAction.jsp?action=showWindTurbineFAQs

1001.8 Exhibit 8 (a)(1)

> (a) The following analyses that shall be developed using GEMAPS, PROMOD or a similar computer-based modeling tool:
> (1) estimated statewide levels of SO_2, NO_x and CO_2 emissions, both with, and without the proposed facility;

We would anticipate that for non-dispatchable generation sources such as wind, an analysis of the impact on statewide levels of emissions would consider impacts to efficiency of existing sources due to the volatility and unpredictable nature of the proposed generation source. For example, GE Energy noted in its landmark 2005 report that "The results indicate that energy consumers benefit from greater load payment reductions, but non-wind generators suffer due to inefficient operation of committed units." In some real world scenarios, it has been found that wind power's volatility has led to increases in system emissions (Bentek Energy LLC, 2010; 2011). We would expect that any claims of reduction of emissions of other producers be based on empirical analysis of systems with a similar generation mix. Since production volatility is a key input parameter for figuring emission impact, meteorological data must be provided. We therefore oppose any effort to shield meteorological data from disclosure, it is essential to predicting cost/benefit of the new generation source.

(2) estimated minimum, maximum, and average annual spot prices representative of all NYISO Zones within the New York Control Area, both with and without the proposed facility;

We have attempted to correlate location based market prices to output of existing wind farms but have not been able to do so due to a lack of publicly available generation data of adequate resolution. If any change in market price is claimed, such claims should be accompanied by sufficient data so that the public may evaluate the veracity of such projections.

(3) an estimated capacity factor for the facility;

If grid supplied power is required for operation, the capacity factor should reflect this fact. For example, during the summer and winter peaks, a non-dispatchable power source that is not operating may result in a new, large load. Thus, capacity during the summer and winter peak periods should be estimated net of grid-supplied power. In the case of wind, a 10% effective capacity is typical (GE Energy, 2005), however if there is a significant standby load (for example for heating), and this load is applied during the winter or summer peak, the capacity could in fact be negative. The probability of such an event should be evaluated. At a minimum, the applicant should provide figures showing the power consumption of the facility as well as meteorological data (in the case of wind) so that the effective capacity may be evaluated.

(8) estimated effects of the proposed facility on the energy dispatch of existing must-run resources, defined for this purpose as existing wind, hydroelectric and nuclear facilities, as well as co-generation facilities to the extent they are obligated to output their available energy because of their steam hosts.

While we take a neutral stance on this point, we note an inconsistency between the characterizations of wind as a "must run" resource with the NYISO 2010 report which states that wind may be "dispatched down" to maintain system security, a practice which has been in place since 2009.

1001.4 Exhibit 4: Land Use

Exhibit 4 shall contain:

(a) A map showing existing land uses within the study area.

(b) A map of any existing overhead and underground major facilities for electric, gas or telecommunications transmission within the study area.

(c) Except for wind power facilities, a map of all properties upon which any component of the major electric generating facility or the related facilities would be located, and all properties adjoining such properties, that shows the current land use, tax parcel number and owner of record of each property, and any proposed land use plans for any of these parcels. For wind power facilities, a map of all properties upon which any component of the major electric generating facility or the related facilities would be located, and all properties within 2,000 feet of such properties, that shows the current land use, tax parcel number and owner of record of each property, and any proposed land use plans for any of these parcels.

(d) A map of existing zoning districts, and proposed zoning districts within the study area, including a description of the permitted and the prohibited uses within each zone.

(e) A statement as to whether the municipality has an adopted comprehensive plan and whether the proposed land use is consistent with such comprehensive plan. If the municipality's comprehensive plan is posted on a website, the exhibit shall contain the address of the internet site where the plan is posted.

(f) A map of all publicly known proposed land uses within the study area, gleaned from interviews with state and local planning

(g) Maps showing designated coastal areas, inland waterways and local waterfront revitalization program areas; groundwater management zones; designated agricultural districts; flood-prone areas; and critical environmental areas designated pursuant to the State Environmental Quality Review Act.

(h) Maps showing recreational and other land uses within the study area that might be affected by the sight, sound or odor of the construction or operation of the facility, interconnections and related facilities, including Wild, Scenic and Recreational River Corridors, open space, and any known archaeological, geologic, historical or scenic area, park, designated wilderness, forest preserve lands, scenic vistas specifically indentified in the Adirondack Park State Land Master Plan, conservation easement lands, scenic byways designated by the federal or state governments, nature preserves, designated trails, and public-access fishing areas; major communication and utility uses and infrastructure; and institutional, community and municipal uses and facilities; including a summary describing the nature of the probable environmental impact of facility and interconnection construction and operation on such uses, including an identification of how such impact is avoided or, if unavoidable, minimized or mitigated. Given the provisions of §304 of the National Historic Preservation Act, 9 NYCRR §427.8, and §15 of the Public Service Law, information about the location, character, or ownership of a cultural resource shall not be disclosed to the public, and shall only be disclosed to the parties to a proceeding pursuant to an appropriate protective order if a determination is made that disclosure may:
(1) cause a significant invasion of privacy;
(2) risk harm to the affected cultural resource; or
(3) impede the use of a traditional religious site by practitioners.

(i) A qualitative assessment of the compatibility of the facility and any interconnection, including any off-site staging and storage areas, with existing, proposed and allowed land uses, and local and regional land use plans, within a 1-mile radius of the facility site and any interconnection route. The qualitative assessment shall include an evaluation of the short- and long-term effects of facility-generated noise, odor, traffic and visual impacts on the use and enjoyment of those areas for the current and planned uses. The assessment shall identify the nearby land uses of particular concern to the community, and shall address the land use impacts of the facility on residential areas, schools, civic facilities, recreational facilities, and commercial areas.

(j) A qualitative assessment of the compatibility of above-ground interconnections and related facilities with existing, potential, and proposed land uses within the study area.

(k) A qualitative assessment of the compatibility of underground interconnections and related facilities with existing, potential, and proposed land uses within 300 feet from the centerline of such interconnections or related facilities.

(l) For projects at locations within designated coastal areas, or in direct proximity of designated inland waterways, provide an analysis of conformance with relevant provisions of the Coastal Zone Management Act, and proposed or adopted plans for inland waterways and local waterfront revitalization areas.

(m) Aerial photographs of all properties within the study area of such scale and detail to enable discrimination and identification or all natural and cultural features.

(n) Overlays on aerial photographs which clearly identify the facility site and any interconnection route, the limits of proposed clearing or other changes to the topography, vegetation or man-made structures, and the location of access and maintenance routes.

(o) All aerial photographs shall reflect the current situation. All aerial photographs shall indicate the photographer and the date photographs were taken.

(p) A description of community character in the area of the proposed facility, an analysis of impacts of facility construction and operation on community character, and identification of avoidance or mitigation measures that will minimize adverse impacts on community character. For the purposes of this paragraph, community character includes defining features and interactions of the natural, built and social environment, and how those features are used and appreciated in the community.

We believe that the foregoing section is well crafted and comprehensive.

1001.6 Exhibit 6: Wind Power Facilities

If the Applicant's proposal is for a wind power facility, Exhibit 6 shall contain:

(a) A statement of all setback requirements and/or setback recommendations for turbines from roads, occupied structures (dwellings, commercial, industrial, and institutional), barns and unoccupied structures, areas of public gathering, and electric transmission

lines, explaining the rationale for the setback distances for each type, as required or recommended by:
(1) the manufacturer's specifications;

(2) the Applicant; and

(3) any local ordinance or law.

(b) A detailed explanation of the degree to which the Applicant has accommodated in the facility layout the required and/or recommended turbine setbacks required to be stated in subdivision (a) of this section.

Several project proponents have asked for preemptive relief from local laws providing substantive requirements for siting of wind turbines such as setbacks and noise restrictions. We strongly urge the PSC to respect local laws to avoid unnecessary and costly litigation. We noted that one project proponent suggested that 1000-1500 feet setbacks have worked well in areas such as the Hardscrabble Wind Farm however several residents living in proximity to this particular wind farm have addressed the Litchfield Town Board with a very different story of their experiences, testimony which is also reflected in local and even national news reports. We note that in one of the earliest wind farms, Palm Springs, CA, a 1200 foot setback was established and this or similar arbitrary setbacks have persisted in local laws ever since. However, what is not often recognized is that in Palm Springs, the turbine size was quite small (225 feet) and 1200 feet is in effect an 8 rotor diameter setback – a distance that has not proved adequate to make the wind farm compatible with residential uses.

Where a locality does not provide for adequate substantive requirements for setbacks, we suggest that the PSC consider for example the UK "best practices" guideline which prescribes setbacks from residences of 10 rotor diameters. There are many examples of more restrictive setbacks based on low frequency sound, for example 2 km, and so there is certainly precedent and technical justification for very cautionary setbacks. The Town of Litchfield's approach is to provide a more "middle of the road" setback reflecting the UK best practices guidance (amongst other considerations) while addressing noise standards based on a permissible increase over day-evening-night background sound. Litchfield's approach is quite flexible and reasonable in that it does not rely on rigid numeric distances or absolute noise values but rather adjusts the setback and noise based on the physical size of the turbine and ambient sound environment. If applied to the Palm Springs turbines, a 10 rotor diameter setback would have equated to 1500 feet. Such a setback may have been adequate for a 225 foot tall turbine however it is completely inadequate for a nearly 500 foot turbine. Clearly a flexible approach to setbacks is needed and the Town of Litchfield has enacted such an approach into law. In fact, it must be recognized that since turbine size has steadily increased over time, any numerical setback value that does not take into consideration the size of the turbine is arbitrary. Despite diligent search, we have found no engineering or scientific rationale for arbitrary setbacks such as 1000-1500 feet often promoted by the wind industry.

Any rational basis for setbacks should include the following considerations:

- Shadow Flicker. Adverse health effects from wind turbine noise can be exacerbated by the rotating blades and shadows from the wind turbines. As wind turbine blades rotate in front of a rising or setting sun, they cast a strobe-like flicker that cannot be avoided by occupants. Shadow flicker can cause some people to become dizzy, nauseated or lose their balance when they see the movement of the shadow. Shadow flicker from wind turbines at greater than 3 Hz poses a potential risk of inducing photosensitive seizures. While turbines are generally designed to avoid shadow flicker of this frequency, higher frequencies can be generated if the shadow from two or more turbines are combined. Recent research has indicated that the risk of seizures does not decrease appreciably until the viewing distance exceeds 100 times the height of the hub, a distance typically more than 4 km. (See Harding, et. al. (2008)). Smedley, et al. (2010) however concluded that the risk of seizures diminished when the observer was greater than 1.2 times the turbine height and looking directly into the sun *but noted that eye closure is a natural immediate protective action when exposed to flicker*, and so has the unfortunate consequence of exacerbating its adverse effect in this context. Considering that an observer might close the eyes, Smedley ,et al. found that “For the scenarios considered, we find the risk is negligible at a distance more than about nine times the maximum height reached by the turbine blade, a distance similar to that in guidance from the United Kingdom planning authorities.” Further, the National Wind Coordinating Committee (1998) recommends a setback of 10 rotor diameters to avoid shadow flicker on occupied structures. The Wind Turbine Handbook notes a typical setback is 10 rotor diameters (Burton, 2001) “but such a setback is likely necessary to protect from the impact of noise, shadow flicker and visual domination.” (See also: Cummings (2008); UK Noise Association (2006); and Pierpont (2006a and 2006b)). . We note that for typical turbine configurations, 9 turbine heights is about 25% greater distance than 10 rotor diameters. Additionally, if placed too close to a road, the movement of the wind turbine blades and resulting shadow flicker can distract drivers and lead to accidents. (See National Research Council (2007), pg. 161
- Blade fragmentation. Wind turbines present risks of physical hazards of collapse, blade fragmentation and blade throw which must be considered in establishing setback distances. The California Department of Energy funded a study of the risk of blade throw and fragmentation as an aid in determining setback distances (see Larwood and van Dam, 2006). The researchers used a physics based model which predicted blade fragmentation distances based on the rotor speed but excluded aerodynamic effects such as a blade or fragment being carried by the wind. Since the model did not include the

effect of debris being carried by the wind, it may understate throw distances. For example, one catastrophic failure of a wind turbine in Denmark was featured on the Discovery Channel television show *Destroyed in Seconds.* In that event, blade fragments were thrown a distance equivalent to 11.6 rotor diameters. In the Larwood and van Dam study, the researchers concluded that the risk of a blade throw or fragmentation event ranged from 2% to 0.1% per turbine per year. The Town Board makes note of two blade fragmentation events and one tower collapse event at the wind energy facility in the Town of Fenner through 2009, resulting in a catastrophic failure rate of 1.9% per turbine per year through 2009.

- Noise. It is noted that The New York State Department of Environmental Conservation document *Assessing and Mitigating Noise Impacts (2001)* teaches that sound levels that are 0-5dB above ambient are "unnoticed to tolerable" whereas noise increases over 5dB are considered "intrusive". This document further states: "Appropriate receptor locations may be either at the property line of the parcel on which the facility is located or at the location of use or inhabitance on adjacent property". And "The most conservative approach uses the property line". Low frequency vibrations or infrasound may cause health impacts even if inaudible. Recent field testing in Falmouth, MA indicated that in a home located 1,300 feet from one turbine and 1,700 feet from another, excessive infrasound was present inside the home while not measurable outside the home (See Ambrose and Rand (2011)). Previous studies of infrasound from wind turbines have shown levels to be low in outdoor testing, while others have effectively measured infrasound outdoors near turbines when the atmosphere is stable, for example at night (See van den Berg (2006)). In the Ambrose and Rand study, testing indicated that infrasound was magnified (10dB gain) by a whole-house cavity response and was likened to "living in a drum". The investigators were surprised to experience the same adverse health symptoms described by residents of the house and those near other large industrial wind turbine sites. The onset of adverse health effects was swift, within twenty minutes, and persisted for some time after leaving the study area. Ambrose and Rand correlated their symptoms to turbine operation and infrasound measurements and found that infrasound pulsations at levels sufficient to stimulate the ear's outer hair cells (OHC) and thus cause vestibular dysfunction (see Dr. Salt, 2011) were present when the turbines were operating. Dysfunctions in the vestibular system can cause disequilibrium, nausea, vertigo, anxiety, and panic attacks, which have been reported near a number of industrial wind turbine facilities. Similar adverse health symptoms have been associated with noise complaints such as "sick building syndrome", correlated by field study to low-frequency pulsations emanating from ventilation systems. (See Burt, (1996); Shwartz (2008)) That is, adverse health effects from low frequency noise exposure in buildings have been studied and confirmed by the acoustics profession. Ambrose and Rand conclude that their study underscores the need for more effective and precautionary setback distances for industrial wind turbines. Very recent antidotal evidence from Waterloo, South Australia provides an alarming picture of the suspected impact of infrasound at distances of several kilometers. (See http://www.todaytonightadelaide.com.au/?page=Story&StoryID=1394) It is critical that testing use both the dB(A) and dB(C) weightings. (See also Kamperman & James; WHO 1999; Bajdek Noise-Con 2007; Pedersen and Waye 2008).

- Ice Throw. Wind turbines accumulate and shed ice, 60% of which has been shown to be thrown beyond the rotor radius (see Cattin, et. al., 2007).
- Visual Domination. Visual domination is subjective but Burton et al. (2001) note that 10 rotor diameters is likely needed to avoid visual domination.
- Property value preservation. There is no agreed upon distance that would result in no impact on property values in the literature however we have spoken to many residents near the Hardscrabble and Maple Ridge wind farms who would sell their homes if they were able to find buyers but several were not able to find a real estate agent willing to list their home for sale. This seems to be the limitation of existing research into property value impact from wind turbines – in close proximity to turbines there are typically not enough sales to make a compelling statistical argument for property value impacts. For example, the often cited Berkley study concluded that in close proximity there was "Limited Impact" on property values but it lacked statistical significance due to the small number of transactions. If a property value guarantee were in place it would likely result in less resistance to new wind farms.

(d) Wind meteorological analyses demonstrating adequate wind conditions supporting the estimated capacity factor for the facility.

Several project proponents have claimed that meteorological data must be treated as a trade secret without providing any justification for this stance. It is understandable that during the prospecting phase – prior to meteorological tower construction and prior to securing lease agreements – that test data be treated as trade secrets however this protection should cease as soon as the prospecting phase of a project is complete – for example when the first public filing of an easement is made or a meteorological tower is erected. Meteorological towers cannot be hidden and so their data should not be afforded trade secret status. Such towers are tall and in good weather or icing conditions are visible for miles yet in poor weather are nearly invisible and present a hazard to low flying aircraft. Unlike telecommunications antennae, meteorological towers provide no benefit to the community in which they are sited yet impose a burden for the reasons stated. Nearly every wind project claims a capacity factor of nominally 30% yet the underlying data is never provided for the public or permitting boards to verify such claims, or to evaluate the capacity factor during the summer or winter peaks.

It is well established that stable atmosphere conditions (high wind shear) has an impact on turbine noise, particularly at greater distance due to atmospheric reflection. Meteorological data is an important parameter to consider when predicting the potential impact of noise. We urge the PSC to require that applicants for wind power projects provide such data.

1001.9 Exhibit 9: Alternatives

(5) environmental impacts, including an assessment of climate change impacts (whether proposed energy use contributes to global temperature increase);

There is growing analytical and empirical evidence that wind power facilities tend to increase surface temperatures on regional and local scales. We would anticipate that such analysis is beyond the abilities of an applicant and so suggest that the requirement for the evaluation of climate change impact be eliminated for the case of wind farms unless it also includes the impact of atmospheric drag and convection current changes. Since this would be unreasonably burdensome on an applicant, the requirement should be eliminated altogether.

1001.19 Exhibit 19: Noise and Vibration

Noise assessments must include C-weighted sound. While A- weighted sound levels can readily be calculated from a broad-spectrum sound database or one to which a C-weighted has been applied, the reverse is not true. DEC guidelines and guidelines from the World Health Organization each indicate that spectral imbalance from noise sources be evaluated when a new source of sound is introduced in an environment. The spectral imbalance is an effective screen for the presence of low frequency and infrasound without taking the step of measuring infrasound levels or specifying regulatory limits for infrasound. Further, many local laws were developed following the DEC and WHO guidelines and include standards for C-weighted sound levels so it is imperative that these data be provided. The wind industry often claims that modern turbines do not produced low frequency sound and cite opinions that such popular notions are due to an outdated turbine configuration that is no longer used (blade downwind vs. upwind). Research from Van DeBerg and Rand indicates that low frequency sound is present, can be measured and has a deleterious effect on human health. In fact Rand observes that infrasound is commonly measured and controlled in the HVAC industry yet this body of knowledge has not been applied to the wind industry. C-weighted sound is not infrasound, however it is well established that C-weighted sound can be a cost-effective predictor of low-frequency sound problems.

1001.29 Exhibit 29: Site Restoration and Decommissioning

Exhibit 29 shall contain:
(a) A statement of the performance criteria proposed for site restoration in the event the facility cannot be completed and for decommissioning of the facility, including a discussion of why the performance criteria are appropriate. Among other things, the statement shall address:

(1) safety and the removal of hazardous conditions;
(2) environmental impacts;
(3) aesthetics;
(4) salvage and recycling;
(5) potential future uses for the site; and
(6) the useful life of the facility
(b) A plan for the decommissioning and restoration of the facility site including how such decommissioning and restoration shall be funded and a schedule for the conduct of decommissioning and site restoration activities.

(c) For wind-powered generation facilities and other facilities to be located on lands owned by another, a description of all site restoration, decommissioning and guaranty/security agreements between the applicant and landowner, municipality, or other entity, including provisions for turbines, foundations, and electrical collection, transmission, and interconnection facilities.

Decommissioning of wind turbines which are at the end of their useful life is a potentially significant expense that might be borne by the landowner or the municipality. To mitigate this risk, a decommissioning plan and security facility to cover the cost of removal of the turbine and recovery of the site is required. The motivation for requiring such a security facility is to have sufficient resources to be able to contract for the removal of the wind farm in the event of the financial default of the wind company. Thus, it is necessary that such a decommissioning reserve cover the likely and reasonably foreseeable costs for removal of the turbines and reclamation of the site to its prior use (for example, agriculture) by a contractor rather than by the company itself. It is useful to consider what could happen when such security is not posted and there are no responsible parties with the resources or inclination necessary to undertake decommissioning. In the first "wind rush" of the late 1970's and early 1980's, thousands of turbines were erected and over time, many were abandoned. The second "wind rush" of the past decade has not yet resulted in any meaningful numbers of decommissioned turbines and thus the older data provides useful guidance as a first assessment of the potential scope of the problem. Paul Gipe, the author of many books on wind power estimated that the 1997 cost to decommission and remediate the 14,000 abandoned turbines in California was $100 million[1].

Decommissioning plans and accompanying financial security vehicles are intended to avoid the problems experienced following dereliction of the turbines of the first wind rush, thus it is imperative that the cost estimate accommodate normal variation in costs so that the

[1] See http://www.wind-works.org/articles/Removal.html or for a more recent discussion: http://www.americanthinker.com/2010/02/wind_energys_ghosts_1.html

decommissioning fund is adequate to protect the landowners and the public at large. It is important to understand that scrap value varies greatly on daily, weekly and yearly timescales, depending on economic conditions at the time; it cannot be estimated a year in advance let alone 20 or more years in advance. Thus, scrap value cannot be relied upon as a security vehicle and should not be allowed. Any remaining scrap value (figured according to its value at the point of sale and in a form acceptable to the recycler or component buyer), can serve as a hedge against unforeseen cost overruns and returned as a rebate to the turbine owners following decommissioning. Thus, we recommend that the following part of any decommissioning plan for wind power projects:

1. A fund sufficient to allow the locality to contract for the removal of the turbines and remediation of the site. Cost estimates that presume that the owner will perform the work and do not include reasonable and customary costs for project management, field engineering and contractor overhead and profit should not be allowed.
2. Scrap value should not be accepted as a security vehicle.

References:

GE Energy, "The Effects of Integrating Wind Power On Transmission System Planning, Reliability, and Operations", March 4, 2005

Bentek Energy LLC, "How less became more", 2010

Bentek Energy LLC, "The Wind Power Paradox", 2011

NYISO "Growing Wind", Final report of the NYISO 2010 Wind Generation Study, September 2010

http://www.palmsprings.com/services/wind.html

George Kamperman and Richard R. James, *Simple guidelines for siting wind turbines to prevent health risks*, The Institute of Noise Control Engineering of the USA, 117 Proceedings of NOISECON 2008 1122-1128, Dearborn, Michigan

World Health Organization, GUIDELINES FOR COMMUNITY NOISE (1999)

Jim Cummings, *AEI Special Report: Wind Farm Noise 2011: Science and Policy overview*, Acoustic Ecology Institute (Santa Fe, NM) 2011

Christopher J. Bajdek, *Communicating the Noise Effects of Wind Farms to Stakeholders*, Proceedings of NOISE-CON 2007 (Reno, Nevada)

Frits van den Berg, *The sounds of high winds: the effect of atmospheric stability on wind turbine sound and microphone noise*, Diss., Univ. Groningen 2006

Eja Pedersen and Kerstin Persson Waye, *Wind turbines - low level noise sources interfering with restoration?,* 3(1) ENVIRONMENTAL RESEARCH LETTERS (2008)

National Wind Coordinating Committee (NWCC) Siting Subcommittee, PERMITTING OF WIND ENERGY FACILITIES: A HANDBOOK (Washington, DC, NWCC, 1998)

National Research Council, ENVIRONMENTAL IMPACTS OF WIND-ENERGY PROJECTS (National Academies Press, 2007)

Dr. Chantal Gueniot, *Wind turbines: The Academy cautious*, PANORAMA DU MÉDECIN, March 20, 2006, reporting on National Academy of Medicine in France, LE RETENTISSEMENT DU FONCTIONNEMENT DES ÉOLIENNES SUR LA SANTÉ DE L'HOMME ("Repercussions of wind turbine operations on human health")

UK Noise Association, LOCATION, LOCATION, LOCATION: AN INVESTIGATION INTO WIND FARMS AND NOISE (July 2006)

Harry, Amanda, M.D., *Wind Turbines, Noise and Health*, February 2007

Nina Pierpont, M.D., Ph.D., *Health Effects of Wind Turbine Noise*, March 2, 2006

Nina Pierpont, M.D., Ph.D., *Wind Turbine Syndrome: Noise, Shadow Flicker, and Health*, August 1, 2006

Barbara J. Frey and Peter J. Hadden, *Noise Radiation from Wind turbines Installed Near Homes: Effects on Health*, February 2007

T. Burton, D. Sharpe, N. Jenkins and E. Bossanyi, WIND ENERGY HANDBOOK (2001), West Sussex, England, John Wiley and Sons.

Smedley, A. Webb, A. Wilkins, Potential of wind turbines to elicit seizures under various meteorological conditions, Epilepsia, Vol. 51, Issue 7, pp. 1146-1151, July 2010

S. Ambrose and R. Rand, The Bruce McPherson Infrasound and Low Frequency Noise Study - *Adverse Health Effects Produced By Large Industrial Wind Turbines Confirmed,* December 14, 2011

Burt, T., Sick Building Syndrome: Acoustical Aspects, Indoor and Built Environment January 1996 vol. 5 no. 1, pp. 44-59.

Shwartz, S., Linking Noise and Vibration to Sick Building Syndrome in Office Buildings, EM Magazine, awma.org, March 2008

Salt, A., "Responses of the Inner Ear to Infrasound" - presentation to the Wind Turbine Noise Conference, Rome, April 11-14, 2011.

Department of the Environment, Northern Ireland, Best Practice Guidance to Planning Policy Statement 18 'Renewable Energy', August 2009, p. 24

New York State Department of Environmental Conservation, *Assessing and Mitigating Noise Impacts*, 2001

Cattin, et. al., "Wind turbine ice throw studies in the Swiss Alps", European Wind Energy Conference Milan, May 2007

Graham Harding, Pamela Harding and Arnold Wilkins, *Wind turbines, flicker, and photosensitive epilepsy: Characterizing the flashing that may precipitate seizures and optimizing guidelines to prevent them*, 49(6) EPILEPSIA (2008) 1095-1098.

NREL publication "New York 50 Meter Wind Power", 14-May-2009 3.1.1

Schomer, Paul D. et al., "Proposed 'Ai' –Weighting: a weighting to remove insect Noise from A-weighted field measurements," InterNoise 2010, Lisbon Portugal, 13-16 June 2010

Kaliski, Kenneth and Duncan, Eddie, "Propagation Modeling Parameters for Wind Power Projects", Sound & Vibration, pp. 12-15, December 2008

Larwood, Scott and Van Dam, C.P. (California Wind Energy Collaborative), 2006 *Permitting Setback Requirements for Wind Turbines in California*. California Energy Commission, PIER Renewable Technologies. CEC-500-2005-184

National Transportation Safety Board, Preliminary Report Aviation NTSB ID: WPR11LA094