STATE OF NEW HAMPSHIRE SITE EVALUATION COMMITTEE

RE: Application of Antrim Wind, LLC for Certificate)
of site and facility to construct up to 30 MW of wind electric)
generation in Antrim, New Hampshire and operate the same.)

PRE-FILED DIRECT TESTIMONY OF RICHARD BLOCK

Q: Please state your name and address.

A: Richard Block, 63 Loveren Mill Road, Antrim, New Hampshire 03440.

Q: What are your qualifications to speak to the application presently before the Site Evaluation Committee?

A: I have lived in Antrim since 1988. Our property consists of a house and farm on 230 south sloping acres, directly across from and in full view of Tuttle Hill. We estimate that at least five of the proposed wind turbines will dominate the view from our living room and kitchen windows. Since its erection, we have had a view of the meteorological ("met") tower. Over the 24 years we have lived here, I have served on the Antrim Conservation Commission, The Contoocook and North Branch Rivers Local Advisory Committee, and as a New Hampshire Coverts Cooperator. Since its creation as part of Antrim's 1989 revision to the Zoning Ordinance, my wife Loranne and I have been active proponents for and supporters of the Rural Conservation District ("RCD"), starting with our successful petition in 1990 to extend the District to the town line across the north side of Route 9. On two occasions, we were instrumental in fighting off proposals to create a prison in the North Branch region of Antrim. In 1999, the Society for the Protection of New Hampshire Forests named us as informal stewards for the Nature Conservancy's

Loveren Mill Cedar Swamp property and the Meadowsend Timberland forestry holding because of our historical, cultural, and environmental concerns for the region. During the last two years we have opposed the Antrim Wind Energy ("AWE") proposed siting of an industrial wind facility in the RCD, due to the zoning ordinance's specific prohibition of industrial activity and tall structures in this district. We were the primary appellants in several appeals of Planning Board and ZBA decisions about Antrim Wind Energy's applications and were also the plaintiffs in two Superior Court suits against the Town of Antrim challenging the permitting of the met tower.

Q: What is the purpose of this pre-filed testimony?

A: The purpose of this testimony is to provide the Site Evaluation Committee ("SEC") with detailed information about why I feel the application from AWE for an industrial wind facility on the Tuttle Hill/Willard Mountain ridgeline is absolutely inappropriate and why it would prove to be extremely detrimental to the quality of life of many residents of Antrim, why it would destroy valuable wildlife habitat and land of significant ecological import, and why it would fail to provide any significant positive impact on the energy needs of the area, the state or the nation.

Q: What are your qualifications to critique AWE's Visual Impact Assessment?

A: I have a degree in two- and three-dimensional design as well as technical theater including modeling and visualization of scenic and architectural designs. I also have a Master of Fine Arts from Bard College with a specialization in Intermedia and computer graphics. For over thirty years I have taught design, technical theater, and graphic communications on the college level and am Professor of Graphic Communications and Information Technology at Franklin Pierce University where I

teach courses involving digital photography and computer image manipulation using programs like Photoshop. In the past I have also worked as an art director and creative director in the advertising industry and as a cartographer for the State of Massachusetts.

Q: What do you see are the shortcomings in AWE's Visual Impact Assessment?

A: The projected Vegetated Viewshed Map (Figure 2) in the Visual Impact Assessment ("VIA") has no basis in reality. It relies solely upon a GIS database layer drawn from a national average rather than from local observation. Since the application of this layer is based on national forested cover data and satellite imagery rather than field study, it assumes a uniformly dense forest canopy of forty feet in height throughout the area. It does not take into account elevation changes or steep slope effects. It also assumes that this forty foot tree canopy (applied throughout the five-mile radius study area) is sufficiently dense so as not to allow any view of anything overhead or at any distance. The net result is a vegetated viewshed map which claims that AWE's 500-foot tall turbines would not even be visible if one were standing next to them. Upon questioning, John Guariglia, author of the Visual Impact Assessment Report, insisted that the denseness of the tree canopy will not lessen during winter months when the trees have lost their leaves. A simple ground check of the local area would have revealed that there are few areas in Antrim that are covered by a dense forty-foot tall tree canopy, that many places in the area are on hillsides or steep slopes and have extensive distant views, and that elevation variations can result in sparse tree cover of less than twenty or thirty feet where there even is tree cover. Had Mr. Guariglia ever visited Antrim during the winter he would have been able to observe that the views without leaf cover can extend for many miles more than during the summer months. The claim that the ten tallest free-standing structures in the state would not be visible from 95% of the five-mile radius study area is simply ludicrous.

The photographic simulations created for the VIA have many problems. First of all, the reliance on traditional "50mm" frames which purport to reproduce a "normal" field of vision has been shown to be inaccurate. The newly published book, *Windfarm Visualisation: Perspective or Perception?* by Alan Macdonald states that "A printed 50mm photographic image will always under-represent our perception of the scale of a more distant object because we are looking at a flat image devoid of any depth information." Visual perception is affected by many characteristics besides just shapes and/or color, which is the only way that objects can be represented in a two-dimensional photograph. In the real world, the eyes see objects in three dimensions, with the depth information perceived carrying much weight when interpreted by the brain. This is particularly true when an object is anomalous to the setting in which it is viewed or if an object is moving in a way differently from its surroundings. In a natural forest setting, if a tree is taller than its neighbors, we may notice it, but it won't have a striking effect on our view of the scene. However, if we place an anomalous object into that setting, such as a massive wind turbine, and especially if that object is spinning, the eye will be strongly drawn to it. In flat photographic simulations of turbine installations such as the ones included in the VIA, the only clues to locate the turbines in the picture are shape and color as they differ from the rest of the picture. These are weak characteristics for distinguishing objects as most photographs contain countless shapes and colors. In a real world situation, the viewer's eyes would be much more strongly drawn to the turbines by their size, the three dimensional depth separation from the background, and especially by the spinning movement of the blades. That said, accurate three-dimensional animated simulated representations of potential wind turbine installations may not always be practical, but it must be understood that the simple two-dimensional photographic simulations included in the VIA thus inherently underestimate the visual impact of the turbines on the viewer. Therefore, reliance on only this methodology to convey their potential visual impact is necessarily a weak and unsatisfactory choice.

My criticism of the specific choice of viewing locations selected to represent the views of the turbines from around Antrim, is that many were poor choices and several potentially more important viewing locations were not used. For example, the choice of viewing the turbines from the Meeting House Hill cemetery and from the Flint Estate is somewhat baffling. These sites, although ostensibly public places, are not visited very frequently. A much more important viewing site would be from along Route 9 when entering Antrim from Hillsborough. The visitor to Antrim from that direction is suddenly confronted with a clear unobstructed view of Tuttle Hill and the 200-foot met tower. If that tower were replaced with several wind turbines 2½ times that height, the impact should be striking and perhaps a bit shocking to a driver. Likewise, there were no views from north of the ridge, where, contrary to the claims of the applicant, there is indeed significant public land along with a number of residences. The Loveren Mill Cedar Swamp, a major recreation area of the Nature Conservancy as well as New Hampshire Fish & Game's North Branch River Fishing Access are both located directly north of the proposed site and would have close views of the turbines.

Q: What are your criticisms of AWE's Shadow-Flicker Technical Memorandum?

A: The Shadow Flicker Memorandum, also produced for AWE by Saratoga Associates, relies on pre-packaged software to estimate the levels and time of potential shadow flicker from the proposed turbines. The problem here, as with most simulation programs, lies in the fact that the resulting computer data output can only be as reliable as the data that is input by the human user. In other words, with all these programs, you will only find what you want to find. In the case of Saratoga Associates' simulations, since they start with the premise that there is no shadow flicker beyond ten rotor diameters (in this case 3800 feet) they cut their map off beyond that range and don't even consider the possibility. I have seen film

of disturbing shadow flicker recorded in homes as far away as 7000 feet from turbines. As turbines get to be as large as the 3MW models that AWE is considering, the probability increases that shadow flicker will be present with significant time and intensity to be a problem.

The most deceptive information in the Saratoga Associates memorandum is the one and only diagram they provide of a "Typical Shadow Pattern" (Figure 1 on page 4 of the report.) For this "typical" pattern they have chosen to illustrate the effects cause by Turbine #1. This turbine is located halfway down the slope of Tuttle Hill at an elevation that is 326 feet lower than its neighbor up the hill. There is no way that a turbine that is over a third of the way down the hill can cast the same shadow as one at the top of the ridge. Since the sun will have to rise quite a bit longer over the hill before it will hit the blades, the potential for shadow flicker is greatly reduced. We have requested that a simulation be calculated from Turbines #2 and #3 at the top of the ridge, but this request has been ignored. When I questioned John Guariglia about the shadow flicker potential from the turbines at the top, he insisted that it would be the same as that of the downhill turbine and that at our house we would never see any. However, from our home during the winter months we can observe the sun rise behind the met tower on Tuttle. Since this is in virtually the same location as Turbine #2 would be, and since the met tower is only 200 feet tall and the turbine would be 500 feet, it is logical to assume that we would likewise have the sun rising behind one or more turbines. Even if one were to accept the "typical" map in the memorandum, one will observe that the potential exists for significant shadow flicker on State Highway Route 9. Shadow flicker falling on drivers, particularly during the early commuting hours, is of great concern in some areas, yet there is no mention of any consideration given to this in the memorandum.

Q: What problems have you found with AWE's Noise Survey?

A: Since Robert O'Neal's noise report flatly denies that 3MW wind turbines emit any infrasound in spite of many studies I have read which are completely contrary to this, (and thus won't even test or discuss sounds in these frequencies where the most potential exists for serious health problems), and because his assessment of the ambient noise levels at his chosen sites in Antrim do not seem realistic or accurate, we have engaged Richard James of E-Coustic Solutions in Michigan to assist us in determining a more accurate prediction of what the residents of Antrim could expect to experience from AWE's industrial turbines. Please see his testimony for more details.

Q: What inaccuracies have you found in AWE's Lempster Property Value Study?

A: Professor Gittell, as an economist, relies solely on statistics to reach his conclusions. He does not appear to call upon any appraisal values and has considered only completed sales transactions. By his own admission, "There were very few transactions within a very close distance to the turbines, and also very limited sales of properties with views of turbines, so some caution must be used in interpreting these results" (P.28 in his conclusion.). What's more, he has completely ignored a fair number of houses in the vicinity of the turbines which have not sold and appear to have been vacated or abandoned. On January 9th and February 26th of this year, we photographed at least 22 homes for sale near the Lempster turbines. Of those, all but two appeared empty. I have included some of these photographs as an attachment as Exhibit RB1.

Another significant point in the Lempster Property Value Study which was glossed over is the fact that at least two tax abatements have been granted due to effects from the proximity of the wind turbines. Although this may seem like a small

number, it amounts to a specific determination by the assessor in Lempster, perhaps the person with the most sense of how property values are shifting, that there indeed can be a negative effect on home values due to wind turbine proximity.

Q: Did you find any problems with AWE's Archaeological Study?

A: I was puzzled by the admission in their pre-filed testimony that the archaeological walkover had been conducted in the snow. This did not seem practical or prudent to me, and seeking the advice of a colleague who is an archaeologist, found out that state-issued policy does not sanction archaeologic field work conducted when there is snow cover or frozen ground. (See Exhibit RB2: policy letter from the state archaeologist.) This casts a serious doubt on the validity of the entire study.

Q: How would the quality of life for nearby residents of Antrim be affected by the installation of ten 492-foot wind turbines in the Rural Conservation District?

A: The RCD was established in 1989 to "protect, conserve and preserve the remote mountainous portions of Antrim from excessive development pressures and/or activities that would be detrimental to the unique environmental characteristics and qualities of this district and detract from the peaceful enjoyment and tranquility that this district affords local residents." Part of the protection of this district includes the prohibition of industrial activities. Many of the residents in the western half of Antrim where the RCD is located have resided here for a number of decades, and chose to do so because of the remoteness, the quiet, and the natural beauty which surrounds our homes. Most live conservatively, without excessive consumption of electricity or fossil fuels. The proposal to install ten of the tallest structures in the

northeast, each the height of a fifty-story skyscraper, along with the constant level of noise they will generate and the flashing strobe lights in our night sky, is in complete conflict with the reasons we have all chosen to live here.

Our 230 acres of land is the culmination of over forty years of hard work to establish for ourselves a homestead where we can peacefully live, and be able to pass on to our son something of real value. We know that, in the event that this major industrial facility is constructed next to us, we will not be able to live in our home any more. We have grave doubts as to whether our property will maintain any market value at all and, in the event we are forced to try to sell, are fearful that our prime asset will be lost, leaving us with no home and no estate. We are not the only homeowners who are facing this potential tragedy. AWE admits to there being 98 residences within a one-mile radius of their proposed facility. Because of the potential for serious health problems, groups like the Society for Wind Vigilance are recommending turbine setbacks of 1.25 miles for turbine installations in flat terrain and double that in hilly areas such as Antrim. After repeated requests for the data, AWE still refuses to state how many residences there are within two miles of their turbine site, yet these are exactly the homes which have the potential for the greatest detrimental effects. AWE continues to claim that they have "demonstrated" that homes greater than a half mile from the turbines will encounter no ill effects from their turbines, yet this is completely counter to the many reports of serious health problems suffered by residents living near turbines around the country and the world.

Q: What brought you to the conclusion that valuable wildlife habitat and land of significant ecological import is at risk from this project?

A: Having explored the land around the North Branch area of Antrim for over two decades, I have always been aware of the unique natural assets here. As a member

of the Contoocook and North Branch Rivers Committee which worked for several years to achieve Designated River status in 1991, we made intensive studies of the land in the river corridor which includes Tuttle Hill. Moreover, this entire region is at the heart of the Monadnock Supersanctuary and the Quabbin-to-Cardigan Corridor, large regions of more-or-less contiguous open space land which have been identified and protected through the efforts of countless conservation leaders over several decades of work. All of the conservation groups involved in the preservation of this massive region of two million acres, one of the largest remaining areas of intact, interconnected, ecologically significant forest in central New England, agree that the biggest threat to the wildlife within is from fragmentation caused by human development. The construction of the largest wind turbines in the Northeast along with the requisite clearing, blasting, and roadbuilding, right in the center of this corridor, would result in serious fragmentation of habitat, probably with no hope of ever recovering from the damage caused.

On July 10, 2012 and again on July 19, 2012, I was part of a group of hikers which climbed to the top of the Tuttle-Willard Ridge and followed the flagged route of the proposed road and turbine sites. We were all instantly struck by the large quantity and variety of signs of wildlife habitat, from bear, bobcat, moose, and coyote, to frogs, salamanders and birds. This was obviously what is described as "core" habitat, and we were able to document many examples.

What was extremely troubling, however, was that loggers working for the landowners of most of the northern part of the ridge have already clearcut a massive swath along the proposed project site, following the road layout flagging obviously placed by AWE and the large circular clearings for the first six turbines. One can find the stakes there identifying the exact locations for each of the turbines. In spite of the fact that no permit has yet been issued, it appears that over half of the wind facility area has already been cleared in preparation for construction. The level of habitat destruction resulting from this clearcutting is staggering. We were

able to find several vernal pools and wetland areas delineated earlier by the wetland scientists who surveyed the ridge for AWE, and we also found several marked wetland violations committed by the logging company which had never been corrected before they vacated the area.

The southern half of the proposed project site has not yet been cleared, but the future road has been flagged and the turbine sites have been staked out. Also troubling was that the proposed road is laid out through one of the most wild and spectacular boulder and erratic fields I have seen in the region. The climbing along this route was rigorous and it was apparent that the level of blasting and earth moving that would be necessary to enable construction of a road there is staggering. At the summit of Willard Mountain, within fifty yards of the staked-out turbine location, is a spectacular example of a massive Kinsman granite formation, and there are countless more glacial erratics and post-glacial fractured boulders all along the flagged route of the proposed access road. The entire area is an exceptional geological site which would be reduced to rubble by this project.

Q: Why do you feel that this project will have no positive effect on the area's energy needs?

A: The applicants have admitted from the beginning that none of the electricity generated by their facility would add to the available power used by Antrim and area residents. In fact, since New Hampshire is already producing significantly more power than it consumes, any additional electricity added to our grid will end up in the population centers in Massachusetts or Connecticut. Since there is still a great uncertainty as to the effect of the Antrim Wind facility on the town's tax base, we do not know if our property taxes will go down at all or if they might actually rise to cover the added burden on our tax rolls, as they have in Lempster. The applicants have claimed their facility will run at a 37.5% to 40.5% efficiency. This is

contradicted by every public record of actual wind turbine output. In Ontario, where government regulations require utilities to post hourly output figures, the typical rates vary from 3% to 18% and rarely exceed 20%. We have asked on several occasions for the met tower wind data results which have led AWE to their claim of high potential efficiency, yet they have refused on the grounds of confidentiality and their claim that we would not be able to utilize the data, notwithstanding the fact that we have a wind industry professional standing by to analyze that data for us to determine if the efficiency projections have any basis. We also question the validity of their efficiency claim since the National Renewable Energy Laboratory rates the wind resources in the Antrim area as marginal to fair.

Q: Does this conclude your testimony for the SEC?

A: Yes, it does.

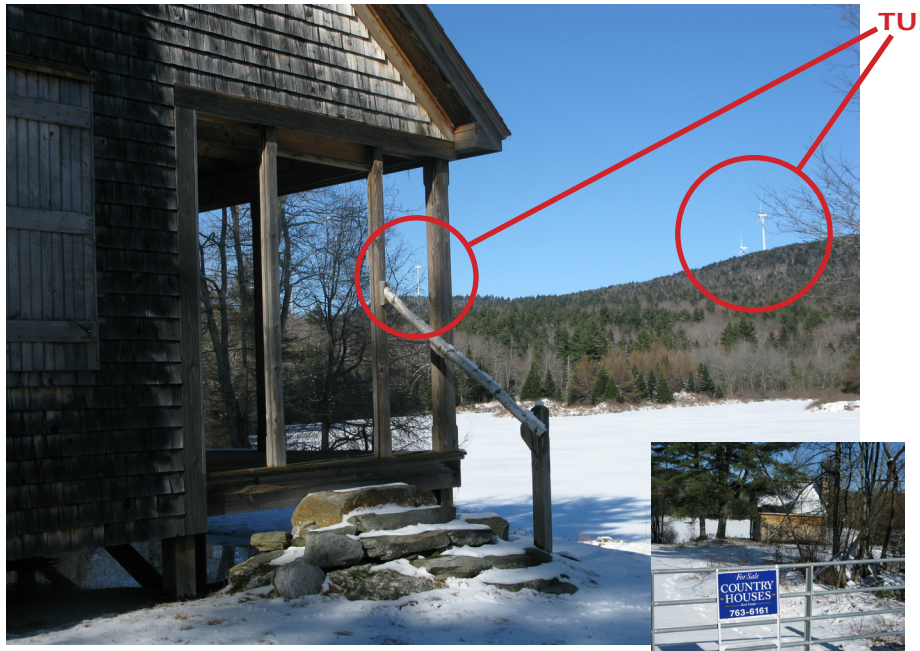
Exhibit RB1

Photographs of homes for sale in the vicinity of the
Lempster Wind Turbines
January 9, 2012 and February 26, 2012

95 Mountain Road

Properties for sale on Mountain Road with views of turbines.

353 Mountain Road



Mountain Road

Mountain Road

Abandoned farm on Mountain Road Note the view of multiple turbines.

Properties for sale on Nichols and Orchard Roads with views of turbines across the road.

Properties for sale on Camp Kirkham Road, Silver Springs Road, and Juniper Drive in close proximity to turbines.

Exhibit RB2

Photographs of homes for sale in the vicinity of the
Lempster Wind Turbines
January 9, 2012 and February 26, 2012

NEW HAMPSHIRE DIVISION OF HISTORICAL RESOURCES
State of New Hampshire, Department of Cultural Resources 603-271-3483
19 Pillsbury Street, P. O. Box 2043, Concord NH 03302-2043 603-271-3558
Voice/TTY RELAY ACCESS 1-800-735-2964 FAX 603-271-3433
http://www.state.nh.us/nhdhr *preservation@nhdhr.state.nh.us*

MEMO

To: Edna Feighner, Review & Compliance Coordinator

From: Richard Boisvert, State Archaeologist

Re: Wintertime Archaeological Fieldwork

Date: January 10, 2003

It has come to my attention that some contracting archaeologists have been asked to undertake fieldwork through the winter months. Clearly it is not possible to execute a responsible and acceptable reconnaissance survey when the ground is snow-covered or frozen. Please advise prospective clients and agencies whose projects we have required archaeological fieldwork that such investigations will not be possible until ground conditions permit. Phase II evaluation and testing projects might be hypothetically possible where the client can provide adequate shelter for the fieldwork and the ground can be thawed. Such logistical considerations would place an added expense to the project for the client that would be viewed as prohibitive in most circumstances.

Please advise the clients and agencies that reconnaissance surveys conducted on snow-covered ground, or shovel test pit surveys on frozen ground will be rejected, as they could not reasonably be expected to identify archaeological resources.