

Verrill Dana_{LLP}

Attorneys at Law

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November 2, 2009

By E-mail and U. S. Mail

Mr. Mark Margerum
Project Manager
Maine DEP
17 State House Station
Augusta, Maine 04333

Re: Oakfield Wind Project/Aroostook County, Maine
DEP # L-24572-24-A-N/L-24572-TF-B-N

Dear Mark:

The following legal analysis is provided in response to the May 12, 2009 letter and July 19, 2009 e-mail from Brian Raynes of Oakfield, Maine. Mr. Raynes claims that several of the sound easements included in the application violate a restrictive covenant that burdens land within the Patten Corporation Downeast subdivision. As a threshold matter, Mr. Raynes does not own land within the Patten subdivision and therefore does not have standing to raise the issue. In any event, as set forth below, his concerns are misplaced as the sound easements do not violate the restrictive covenant that burdens parcels within the Patten subdivision.

* * * * *

The property owners in question purchased lots in a subdivision that was developed by Patten Corporation Downeast. Their lots are encumbered by the following title restriction: "The lot shall be *used* only for single family residential purposes and no commercial or business activity shall be *conducted on the lot*." (emphasis added). A copy of a deed into one of the lot owners is enclosed with this letter. As set forth in the application, the parcels owned by Jon A. Provost and Tamara R. Greenlaw (Tax Map 5, Lot 2-15), Janine Michaud (Tax Map 5, Lot 2-18), and Roseanna Gorham (Tax Map 5, Lot 1-2) are subject to a sound easement that allows sound generated from the Wind Power Project to exceed otherwise applicable state or local maximum sounds level limits applicable to locations on the servient land. By granting an easement for sound the property owners are not conducting any commercial or business activity on their lots. Thus, the sound easement does not violate the language (or intent) of the restrictive covenant.

Moreover, any attempt to read in additional restrictions runs afoul of well established legal principles. For example, under Maine law, restrictive covenants are disfavored and should be narrowly construed. See Naiman v. Bilodeau, 225 A.2d 758, 759 (Me. 1967) (stating that “[c]ovenants and agreements restricting the free use of property are strictly construed against limitations upon such use.”); Leavitt v. Davis, 153 Me. 279, 136 A.2d 535 (1957) (“Restrictive covenants, being in derogation of the common-law right to use land for all lawful purposes that go with title and possession, are not to be extended by implication.”). When there is a question as to how a restrictive covenant should be interpreted or applied, Maine law applies the interpretation that imposes the least amount of restrictions or limitations on the use of the burdened property. See Leavitt, 153 Me. at 283, 136 A.2d at 538 (stating that “if the language of a restrictive covenant, when read in the light which the context and surrounding circumstances throw upon it, remains of doubtful meaning, it will be construed against, rather than in favor of, the covenant.”); Naiman, 225 A.2d at 759 (“Doubt will be resolved in favor of the unrestricted use of property, so that where the language of a restrictive covenant is capable of two constructions, the one that limits, rather than the one which extends it, should be adopted, and that construction should be embraced which least restricts the free use of the land.”).

In Boehner v. Briggs, the Law Court stressed the importance of narrowly construing a restrictive covenant. 528 A.2d 451 (Me. 1987). In that case, the deed to the subject property stated that the owners “shall not erect, nor allow any person to erect more than a one family dwelling on the ... premises.” Id. at 453. The property contained a single-story house when the defendants purchased it. Id. at 452. A few years later, the defendants constructed a second structure described as follows:

It is a free standing building with its own, separate walls, windows, doors, and roof, and is connected to the older house by a wooden deck. The interior of the new structure consists of workshop and family areas on the first floor and two bedrooms on the second floor. The defendants plan to install a bathroom in the future. Mr. Briggs testified that he planned to use the new structure to provide sleeping and recreational quarters for his twin boys and his daughter.

Id. The Law Court found that the restriction limiting construction on the property to a “one family dwelling” could not be construed to limit construction to one building with four walls. Id. at 453. The Law Court gave the restriction its literal interpretation, stating that the “deed prohibits the erection ‘of more than a one family dwelling on the premises.’ It does not restrict, limit, or control in any way the architectural design of ‘a one family dwelling.’” Id.

While there are cases where the granting of an easement by a property owner to a third party violates a residential only use restriction, such cases typically involve an affirmative easement that requires physical use of or change to the burdened property, such as the construction of an access road or the installation of drainage ditches, pipes, and sewer lines. See ALC Development Corp. v. Walker, 2002 ME 11; 787 A.2d 770. In ALC Development Corp., the lot in question was used solely to construct a roadway to access another subdivision. Id. at ¶ 12. Because a residence could not be constructed on the lot due to the access road, the Law

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Court held that the easement for the road violated the restriction against any lot being "improved or used" for any purpose "except for single family residential purposes." Id.

The granting of easements for sound is clearly distinguishable from such affirmative easements. Sound easements require no affirmative action to be taken by the property owner and no physical modification to the land. These easements merely serve as an acknowledgement of activities taking place on someone else's property and a statement of non-objection to those activities. Moreover, the fact that the property owner receives consideration for the grant of the easements is not dispositive. See Silsby v. Belch, 2008 ME 104, ¶ 13, 952 A.2d 218, 222. In Silsby, the court found that the conversion of a single-family residence into a three-unit apartment building did not violate the language of a restrictive covenant that prohibited "use for any commercial purposes." Id. The court stated:

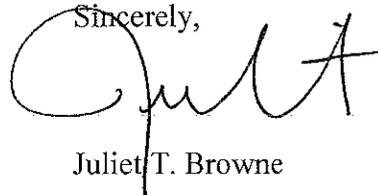
The fact that a resident pays some manner of rent to a building owner, creating a profit ... does not in itself render the residential building a commercial enterprise. The property ... remains a place for people to live. Its character is fundamentally different from a department store or service station.

Id.

In summary, the challenged sound easements do not constitute "commercial or business activity" on the burdened land and any attempt to construe the restrictive covenant beyond its express terms violates long established principles of Maine real estate law.

Please let me know if you have any questions or comments.

Sincerely,



Juliet T. Browne

JTB/prf

Enclosure

cc: Margaret A. Bensinger (w/enc.)
Anthony M. Calcagni (w/enc.)

1738081_1.DOC

WARRANTY DEED

KIM MARTINEAU, of 29 Bradford Street, Rowley, County of Essex and State of Massachusetts 01969

for consideration paid

grants to JANINE H. MICHAUD of 55 Canterbury Road, Brewer, County of Penobscot and State of Maine 04412, with WARRANTY COVENANTS,

The land, together with the buildings thereon, situate in Oakfield, County of Aroostook and State of Maine, bounded and described as follows:

Lot Eighteen (18) as shown on a plan entitled "Oakfield Hills Properties, Phase II" dated December, 1987, prepared by A.E. Sturgeon, Inc., and recorded in the Aroostook County Registry of Deeds, Southern District, in Plan book 37, Page 105A.

The above described lot is conveyed subject to and with the benefit of the rights of way, fifty (50) feet in width, and the right to use the town road, sixty-six (66) feet in width, as shown on said plan and as shown on the plan of "Oakfield Hills Properties, Phase I" recorded in Plan Book 37, Page 103A, for all purposes, including the installation and maintenance of utility lines, poles and cables, to be used in common with Grantor, its successors and assigns, and others lawfully entitled to use the same, including but not limited to public utility companies.

The above described lot is further conveyed subject to a pole line easement given by Patten Corporation-DownEast to the Eastern Maine Electric Cooperative and New England Telephone and Telegraph Company dated January 12, 1988 and recorded in said Registry in Volume 2055, Page 203.

Jordan Law Office

This conveyance is further made subject to the following conditions and restrictions:

1. The lot shall be used only for single family residential purposes and no commercial or business activity shall be conducted on the lot. This restriction shall not be construed to prevent craft work and artistic endeavors conducted from within a private residence. This restriction shall also not be construed to prevent the operation of a tree farm for the growth and development of ornamental trees conducted in accordance with customary land management standards, nor shall this restriction be construed to prevent the commercial harvesting of timber, provided that all commercial harvesting shall be pursuant to a forest management plan prepared by a registered professional forester, which plan shall provide for harvesting of marked trees on a sustained yield basis.

2. No mobile home, tent, trailer, shack, or other structure of a temporary character shall be permitted on the lot, except temporary use by the lot owner of a recreational vehicle, travel trailer, tent, or camper shall be permitted on the lot for recreational purposes or during construction of the principal dwelling and only so long as continually occupied by the lot owner.

3. No lot shall be used or maintained as a dumping ground for rubbish, trash, garbage, used cars, used car parts, or other waste. Rubbish, trash, garbage, or other waste shall not be maintained or kept on any lot beyond a reasonable period of time necessary to arrange for its removal. All incinerators or other equipment for the storage or disposal of such material shall be kept in a clean and sanitary condition.

4. No signs of any kind shall be displayed to the public view on any lot, except one sign of not more than one (1) square foot in area designating the occupant of the lot.

Being the same premises conveyed to Wells Anderson, Trustee of Kim A. Hollingsworth Trust by Deed of Distribution of Joseph A. Monteforte, duly appointed and acting Personal Representative of the Estate of Sally A. Greenwood dated November 3, 1994 and recorded in the Southern Aroostook Registry of Deeds in Volume 2739, Page 305.

Reference may also be made to that deed to Kim A. Martineau from Wells Anderson, Trustee of Kim A. Hollingsworth Trust to be recorded simultaneously herewith.

Also hereby conveying all grantors' right, title and interest in a certain easement described in that conveyance from Jeannette M. Tremouliaris et als to Sally Greenwood et als dated May 3, 1989 and recorded in the Southern Aroostook Registry of Deeds in Volume 2180, Page 192, which interest was not excluded from the deeds from Kim A. Greenwood and James Hollingsworth to Sally Greenwood recorded in said Registry in Volume 2245, Page 318 or the deed of distribution from the Estate of Sally A. Greenwood to Wells Anderson, Trustee of the Kim A. Hollingsworth Trust recorded in said Registry in Volume 2739, Page 305 or the deed from Wells Anderson, Trustee of the Kim A. Hollingsworth Trust to the grantor herein which is to be recorded simultaneously herewith. Therefore, pursuant to Title 33 M.R.S.A. §773, the aforesaid easement is conveyed by said deeds.

Any and all rights, easements, privileges and appurtenances belonging to the within granted estate are hereby conveyed.

The Grantor hereby certifies that this transfer is for adequate and full consideration in money or monies worth.

WITNESS my hand and seal this 26th day of March, 2003.

Signed, Sealed & Delivered
in the presence of

[Signature]
WITNESS

[Signature]
KIM A. MARTINEAU

STATE OF Massachusetts
COUNTY OF Essex, 2003

Personally appeared the above named KIM A. MARTINEAU and acknowledged the foregoing instrument to be her free act and deed.

Before me,

[Signature]
Notary Public/Attorney at Law

SEAL

ANN M. MARTINEAU
Print Name
my Commission Expires 7/24/03

RECEIVED AROOSTOOK, SS
ATTEST: Patricia F Brown
REGISTER OF DEEDS

MAINE STATE
TRANSFER TAX
PAID

Verrill Dana_{LLP}

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By E-Mail and U.S. Mail

Mr. Mark Margerum
Project Manager
Maine DEP
17 State House Station
Augusta, Maine 04333

Re: Oakfield Wind Project/Aroostook County, Maine
DEP # L-24572-24-A-N/L-24572-TF-B-N

Dear Mark:

The following information is provided in response to the September 10, 2009 submission by Philip A. Powers and the September 28, 2009 objections of the Trustees of Martha A. Powers Trust (the "Powers Trust") to the Oakfield Wind Project (collectively the "Powers Trust Objections").

A. Objections to Visual Impact

Attached as Exhibit A is a response by LandWorks, the applicant's visual consultant and expert, to the specific issues raised by the Powers Trust. Please note that the expert retained by the Powers Trust, Jean Vissering, has neither visited the project site nor made any conclusions about the project's visual impacts. Her failure to do so speaks volumes.

B. Objections to Decommissioning Plan

The Powers Trust argues that the decommissioning plan must be fully funded as a condition of obtaining a permit and mistakenly relies on unallocated language of the Wind Power Act to support its claim. See Powers Trust Objections at 11-12. The unallocated language of the Wind Power Act (PL 661, 123rd Legislature) --- incorrectly described by the Powers Trust as a statutory requirement --- requires the DEP and LURC to "specify the submission requirements" for unique provisions associated with wind power. DEP analyzed the Wind Power Act and, as directed, adopted submission requirements for decommissioning in the instructions for a revised Site Location of Development Act application. The language related to decommissioning funding states:

4. *Demonstration in the form of a performance bond, surety bond, letter of credit, parental guarantee or other form of financial assurance as may be acceptable to the*

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department that upon the end of the useful life of the wind generation facility the applicant will have the necessary financial assurance in place for 100% of the total cost of decommissioning, less salvage value. The applicant may propose securing the necessary financial assurance in phases, as long as the total required financial assurance is in place a minimum of 5 years prior to the expected end of the useful life of the wind generation equipment.

The relevant language from the DEP application requirements is attached as Exhibit B. LURC has adopted identical guidance language.

<http://www.maine.gov/tools/whatsnew/index.php?topic=lurcfiles&id=61044&v=tplfiles>

Thus, DEP specifically allows an applicant to set aside the necessary funding in phases, as long as the decommissioning plan is fully funded five years prior to the expected end of the useful life of wind generation equipment. This makes practical sense and strikes an appropriate balance between the potential risks associated with decommissioning and the costs and benefits of requiring applicants to set aside funds for a process that may or may not be required at some point 20 years or more in the future. Megawatt-scale wind turbines are designed and certified by independent agencies for a minimum expected operational life of 20 years. As the wind turbines approach the end of their expected life, it is anticipated that technological advances will make available more efficient and cost-effective generators that will economically drive the replacement of the existing generators. Thus, the risk of decommissioning a wind project once it begins energy production is very low.

Additionally, the disassembly and earthwork associated with decommissioning are relatively straightforward tasks and the risks associated with decommissioning a wind project are similar to the risks associated with a number of other developments, including energy generation projects, which do not require an applicant to set aside costs to decommission the project at the onset. Nonetheless, Evergreen II has committed to removing the turbines and infrastructure consistent with the DEP requirements for decommissioning and to ensure that the decommissioning is fully funded by Year 15 of the project. The phased decommissioning funding proposal is consistent with what has been approved by DEP and LURC for other wind power projects.

The Powers Trust also objects to the applicant taking into account the potential salvage value of the equipment. Powers Trust Objections at 12. The DEP submission requirements specifically contemplate the applicant doing so, *and every other wind power project permitted by LURC or DEP in the State of Maine has allowed the applicant to do so.* Again, this makes practical sense. A great deal of the value of the project is in the physical structures. These structures have a high retained value long after they are put into service. This value is tied directly to the project, and is readily recaptured by disassembly of the turbines. While it may be difficult to accurately predict the salvage value 20 years into the future, it is undisputed that there will be significant salvage value associated with the project's component parts. Moreover, the requirement for the applicant to reassess the decommissioning plan costs at year 15, including

estimates as to salvage value, provides a means for ensuring appropriate funds are available in the unlikely event decommissioning is required.

C. Objections as to Effect on Property Values

The Powers Trust references a study that purports to demonstrate that wind farms adversely impact the value of adjacent properties. See Powers Trust Objections at 12-13 and Exhibit 20. The study relied on by the Powers Trust consists principally of surveys on opinion as opposed to analysis of actual sales data, and otherwise lacks the detail, rigor, and statistical analysis needed to correlate home transaction prices and the impact, if any, of a wind project on those prices.¹

The National Research Council for the National Academies undertook a study on the Environmental Impacts of Wind-Energy Projects and specifically addressed the claims regarding the impact of such projects on property values. See Environmental Impacts of Wind-Energy Projects, National Research Council of the National Academies 2007 (“National Research Council Report”), at pp. 163-65 (attached as Exhibit C). As noted in their report, it is very difficult to generalize about the effects of wind-energy projects on property values, and “[f]orecasts of property values in prospective host areas that are based on comparisons with existing host areas are of questionable validity, especially if there are significant differences between the areas.” *Id.* at 164. Thus, there is no basis for concluding that the results of the surveys reflected in Exhibit 20 to the Powers Trust Objections have any relevance or are a predictor of the impact of the Project on surrounding land values. Indeed, there are a number of studies that conclude the presence of a wind farm did not have any measurable effect on property values. See, e.g., Ben Hoen, Impacts of Windmill Visibility on Property Values in Madison County, New York (April 30, 2006) (absence of measurable effects of wind farm visibility on property transaction values) (attached as Exhibit D); see also National Research Council Report at 163-64 (discussing studies).

D. Objections Based on Sound

The Powers Trust raises a number of issues related to sound, including the adequacy of the DEP sound regulations and health concerns associated with sound from wind turbines.² The health concerns raised by the Powers Trust concerning nighttime noise and their reliance on Dr. Nissenbaum are misplaced.

¹ While the report also includes a section on sales data, it compares sales of parcels within the alleged influence of the turbines to sales of land outside the alleged influence of the turbines, but does not analyze data on sales of parcels before and after installation of the project and therefore does not provide any direct evidence of the impact of the project on property values.

² A complete response to concerns based on sound, including to the specific issues in the E-Coustics Solutions filing, are being provided by Resource Systems Engineering (RSE) and will be forwarded under separate cover.

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First, the Powers Trust states that Dr. Nissenbaum's "study," will soon be published in the New England Journal of Medicine. Powers Trust Objections at 8. In fact, Dr. Nissenbaum surveyed persons living in nine homes and hopes that the New England Journal of Medicine will consider publishing the results of his survey. See Affidavit of Nissenbaum, Exhibit 14 to Powers Trust Objections at ¶ 3. Apparently, the draft has not yet been sent to the New England Journal of Medicine for consideration. Id.

Second, as acknowledged by the Powers Trust and reflected in the preamble to Chapter 375, the Board of Environmental Protection specifically recognized the potential adverse effects of noise, including nighttime noise, when it established the noise limits that govern this project. See Powers Trust Objections at 7 (quoting from preamble). The Chapter 375 noise regulations establish a comprehensive program for regulating sound from developments and set daytime and nighttime limits designed to ensure the protection of the public health and welfare. The rulemaking included two public hearings, eight public workshop sessions, several draft rules, and substantial public comment. See Basis statement for Chapter 375 Section 10. (A copy of the Basis Statement is attached as Exhibit E.) As recently as January, 2008, the Department evaluated the sufficiency of its noise regulations to address the noise effects of wind turbines and found the existing regulations to be appropriate and consistent with the best practices of the National Research Council's 2007 report on the Environmental Impacts of Wind-Energy Projects. (A copy of the Departments January 2007 Memorandum is attached as Exhibit F.)

Third, the Town of Oakfield, working with an outside sound expert, evaluated and resolved the very concerns being raised now by the Powers Trust. See Oakfield Report. (This has been previously provided to the DEP by the Town of Oakfield.) Specifically, the Town and its outside experts engaged in a comprehensive process that involved multiple public hearings and the exchange of technical information among experts, with a particular focus on health and sound issues. Their final report discusses a recent study of the acoustic impact of wind turbine farms on residents. That study found that the only health effect was sleep disturbance, *which occurred at a statistically significant level above 45 dBA outside the home.* Oakfield Report at 13. This is a level that exceeds the DEP quiet nighttime limits that govern this project. The Final Report also noted that "after a literature review, the Committee did not find any peer-reviewed medical or public health reports or journal articles that concluded sound and noise from modern wind turbines in a well-designed, properly sited, operated, and maintained wind energy facility can cause adverse health effects." Id. at 14.

The Powers Trust also raises concerns regarding low frequency sound. See Powers Trust Objections at 10. Again, the Town of Oakfield, working with Ken Kaliski, its expert, concluded that "low frequency sound/vibration issues are uncommon with wind energy facilities, and should not be an issue in a well-designed, properly sited, operated and maintained wind energy facility." Oakfield Report at 20. Likewise, data collected by RSE and included in the SWP Compliance Report and presented at the Oakfield workshops documents that low frequency sound from the 1.5 MW GE turbines (the same model proposed for Oakfield) at noise sensitive areas is below any regulatory threshold or other level of potential concern. SWP Compliance Report at Figure 7-14. In fact, the data indicates that ambient sound was a greater contributor to

the low frequency sound than sound associated with the turbines. These findings are consistent with the conclusions of numerous scientific studies, including, without limitation:

- Low Frequency and Infrasound Noise Immissions from Wind Farms and the Potential for Vibroacoustic Diseases, M. Hayes, 2006.
- Infrasound from Wind Turbines – Fact, Fiction or Deception, G. Leventhall, 2006.
- Low Frequency Noise from Large Wind Turbines, DELTA, 2008.
- The Sounds of High Winds, G.P. van den Berg, 2006.
- Noise Annoyance from Wind Turbines, E. Pedersen, Swedish EPA, 2003.

Dr. Dora Mills, the Director of the Maine Center for Disease Control (MCDC) and Maine's chief health officer, researched the issue of wind turbine noise and stated the following: "I found no evidence in peer reviewed medical and public health literature of adverse health effects from the kinds of noise and vibrations heard by wind turbines other than occasional reports of annoyances, and these are mitigated or disappear with proper placement of the turbines from nearby residences." See Wind Turbine Neuro-Acoustical Issues, Dora Anne Mills, June, 2009, at p.2, attached as Exhibit G.³

Finally, there has been substantial work done nationally and internationally, as well as work done in the State of Maine, in response to noise and health concerns. Attached as Exhibit I is a letter from the Independent Energy Producers of Maine summarizing some of that work.

³ The Powers Trust's reliance on a recent Maine Medical Association (MMA) resolution to discredit Dr. Mills on this issue is unavailing. First, the resolution is not based on any evidence indicating that wind turbines result in adverse health impacts. For example, the resolution states that "assessing the potential health impact of wind turbines has been difficult to measure but if present would be of significant concern" (emphasis added). In fact, nowhere in the resolution does the MMA state that it is aware of any credible medical evidence that wind turbines have a negative effect on public health. The resolution does not cite any facts or studies. On the contrary, it states that there is a need for "appropriate evidence-based scientific research." In sum, the resolution amounts to a general statement by the MMA that it is concerned with public health and that if wind turbines were a threat to public health, then that would be a cause for concern. As such, the resolution does not provide any evidence to counter the conclusions of Dr. Mills, which are in full accord with the conclusions of the Town of Oakfield's independent expert, Ken Kaliski, and supported by peer-reviewed literature. Second, the resolution was passed under circumstances that undercut its potential value as evidence. Specifically, the MMA membership passed the Resolution without any substantive examination of the subject, despite the fact that the MMA's Public Health Committee voted 8-1 to reject a similar resolution. Unlike the resolution passed by the MMA's general membership, the Public Health Committee's vote took place after it had studied the potential health effects of wind turbines over the course of several months. During that process, the Public Health Committee heard evidence from stakeholders that included both wind power critics and developers. Due to the complexity of the subject, the Public Health Committee created a special Wind Energy Subcommittee to further examine potential health impacts. The Public Health Committee and the Wind Power Subcommittee devoted part or all of six meetings from February 2009 to August 2009 to discussion and study of the issue. The result of that investigation was an 8-1 vote by the Public Health Committee against forwarding a resolution on wind turbine health effects to the MMA general membership. The minutes from the MMA Public Health Committee meetings regarding wind power are attached as Exhibit H.

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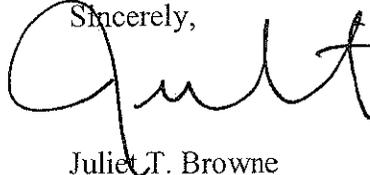
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Thank you for consideration of this material, and if you have any questions, please do not hesitate to contact me, Brooke Barnes from Stantec, or Alec Jarvis, from First Wind.

Sincerely,

A handwritten signature in black ink, appearing to read "Juliet". The signature is fluid and cursive, with a large initial "J" and a long, sweeping tail.

Juliet T. Browne

JTB/mtr

Enclosures

cc: Alec Jarvis (w/encls.)
Brooke Barnes (w/encls.)
Charlie Wallace (w/encls.)

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APPENDIX OF EXHIBITS

- A. LandWorks Visual Impact Report
- B. Site Location of Development Law Application Instructions § 29 (Decommissioning)
- C. Environmental Impacts of Wind-Energy Projects, National Research Council of the National Academies (2007)
- D. Ben Hoen, Impacts of Windmill Visibility on Property Values in Madison County, New York (April 30, 2006)
- E. Basis Statement for DEP Rules Ch. 375 § 10
- F. Memorandum from Andrew Fisk to David Littell regarding DEP Noise Standards (Jan. 10, 2008)
- G. Wind Turbine Neuro-Acoustical Issues, Dr. Dora Anne Mills (June 2009)
- H. Letter from Independent Energy Producers of Maine to Maine Medical Association Committee on Public Health regarding Wind Turbine Health Effects (May 19, 2009)
- I. Minutes of Committee on Public Health of Maine Medical Association Public Health Committee (February-August 2009)

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LandWorks

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November 2, 2009

Attached please find responses, as prepared by LandWorks, that address specific concerns of visual impacts raised by representatives of Powers Trust – Philip A. Powers letter dated September 10, 2009 and Jean Vissering memorandum dated September 21, 2009. A visual simulation from the boat launch was also prepared by LandWorks and is included as Attachment 1. A visual simulation prepared by Terrence J. DeWan & Associates is also included in this response as Attachment 2.



LANDWORKS RESPONSE TO LETTER PREPARED BY PHILIP A. POWERS**Initial note of clarification:**

The Addendum prepared by LandWorks only assessed the visual impact of the turbines proposed in Phase I (36 turbines, including 2 alternates, located entirely in Oakfield). Therefore, this response only addresses those questions that are directly related to this phase of work. LandWorks makes no claims to nor addresses the visibility of turbines proposed in potential expansion phases, nor can we address the accuracy of other visuals prepared by other representatives of First Wind or Mr. Powers. For ease of review, we have numbered and paraphrased the issues raised by Mr. Powers in black text and then provided our response in blue text.

1. *There are no photographs showing the bottom two thirds of the lake in T4R3, which represents undeveloped shoreline, because this view represents dramatic proof of the visual significance of the Lake.*

LW RESPONSE:

There was no effort to emphasize views from the boat launch at the expense of views from other locations. In fact, it is apparent that the photographs put more prominence on the eastern, undeveloped portion of the lake, which 3 of the 4 photos characterize (photos 2, 3, and 4). These pictures were all taken from the lake in T3R4 WELS and plainly highlight the undeveloped nature of the shoreline. The picture of the Powers' road was taken October 17, 2008, about a year ago, so it clearly cannot be argued that all the vegetation has since grown back. Moreover, a significant amount of clearing occurred in order to accommodate the road - a swath at least 50 feet wide was cleared (see photo below). This vegetation will never grow back and a thinning of the trees will always be visible, especially after the leaves have fallen off.



Road that was cleared to access the Powers camp

- 2. The table discusses the visibility of the WTGs from the boat launch but fails to mention that at least seven of the proposed WTGs are situated within two miles of the southern shore of the Lake.*

LW RESPONSE

While there is indeed visibility from other portions of the lake, a point which is not discounted in any way, it is important to accentuate the visibility from the boat launch and western half of the lake, since this is where a significant amount of development and public activity occurs. It is a vantage point open to people of all ages and all abilities and therefore receives a higher amount of visitation than the far eastern reaches of the lake, from which there are restricted or no public access points. Moreover, people without boats who just want to swim or fish directly off of the dock frequently visit the boat launch. A visual simulation from the boat launch has been prepared to illustrate what the majority of people will see from this point (see Attachment 1).

Table 1 accurately indicates that the closest turbine (S17) to the lake is approximately 1 mile away from the northern shore. That same turbine is approximately 2 miles distant from the southern shore. The Addendum did not conceal or make misrepresentations about the distance of other turbines since it can clearly be deduced that all other turbines would be 1 mile or greater from any part of the lake. While it is evident that there are other turbines located between 2-3 miles distant from the southern shoreline, it is not clear which 7 turbines Mr. Power is referring to of the significance of those 7 turbines with regard to visual impact. Moreover, our analysis indicates that only 1 turbine is within 2 miles of the southern shoreline, while most are 2 miles and greater in distance.

- 3. In Table 1 and in numerous other instances throughout the Addendum no mention is made of the lakeside camps located in the town of Dyer Brook.*

LW RESPONSE

Island Falls and T4R3 were specifically mentioned because Pleasant Lake is situated entirely in these two towns. Per the tax maps, no camps that have lake frontage are located in Dyer Brook. With that said, all camps along the lakeshore were considered.

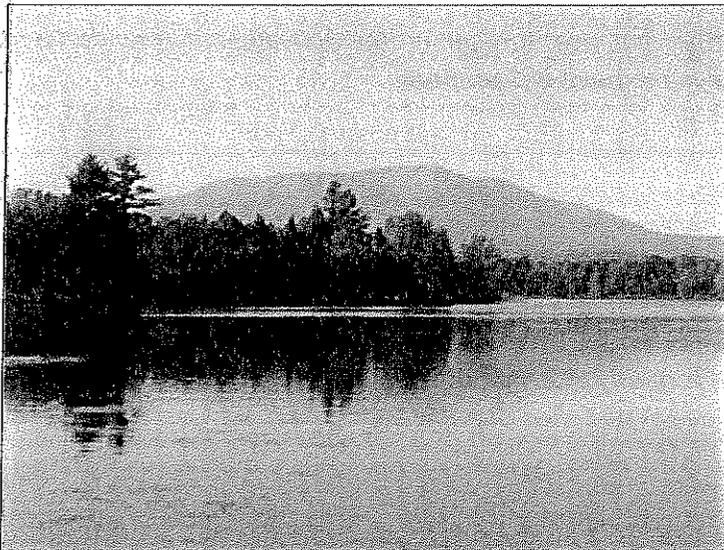
- 4. The Addendum makes the claim that the Lake can be considered common and typical of other lakes in the region. This is clearly incorrect as numerous impartial studies and assessments over the years have determined that Pleasant Lake is scenically significant.*

LW RESPONSE

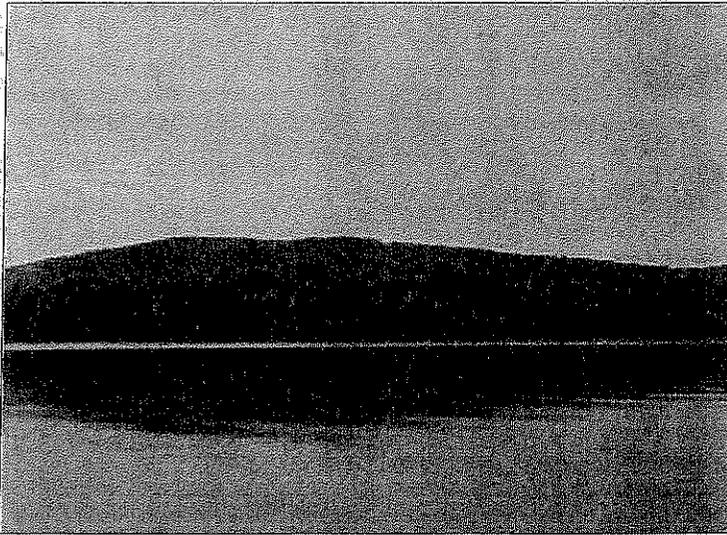
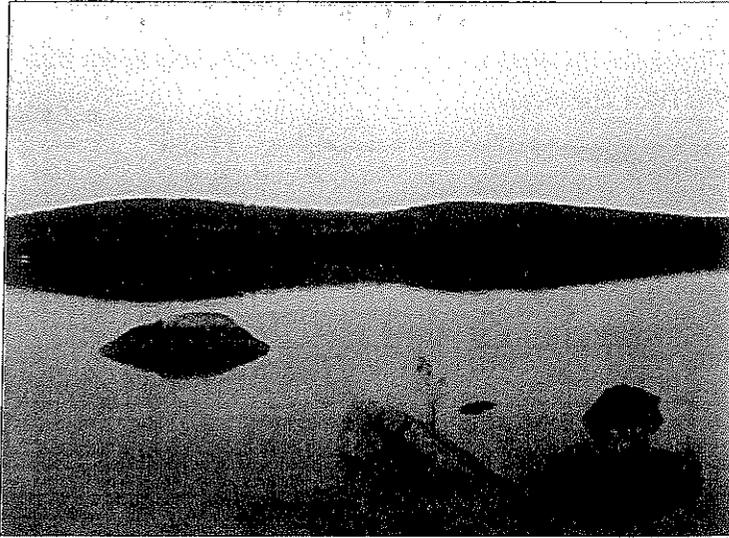
Much has changed since the *Maine Wildlands Lake Assessment* and *Maine's Finest Lakes* reports were completed twenty years ago. Lakeshores have been developed, access roads have been cleared and people's perceptions have changed. Accepted methodologies for determining scenic quality and significance have also been clearly defined and adopted. While these important studies provide a point of departure for identifying lakes that may be significant, the studies cannot be used as the only indicator. There is established scenic

quality to these and other lakes listed as "significant" but that does not necessarily translate into a lake being unique or so important from a scenic perspective that no development can occur on or within the viewshed of those lakes.

While it is true that a portion of Pleasant Lake is listed as "significant" on the LURC Lakes Assessment, and there are indeed a number of pleasing characteristics, the views from here are not outstanding or unlike many landscapes that can be viewed elsewhere in the region. Landscapes that are very scenic or outstanding usually have prominent distinctions between landforms, such as a flat open field in combination with a steeply rising mountain (see Jean Vissering's sketch on page 5 of her Memorandum to the Department of Environmental Protection on behalf of the Trustees of the Maria A. Powers Trust), or have unique focal points and distinct, memorable profiles. The striking view of Mount Katahdin from the Penadumcook Lakes is a good example of this (see photo below). Wind turbines, to function properly, are visible above treelines and are nearly impossible to screen from view. However, they are considered less obtrusive when they do not compete visually or detract from an important scenic focal point. The horizontal or undifferentiated ridgelines of the Oakfield hills do not stand out from Pleasant Lake and therefore are able to absorb development of wind turbines (see photos that follow). The expectations of the individual viewer also help to establish the visual significance of the area. For example, a predominantly undeveloped lake that does not allow motorized use would be an area from which viewers are likely to expect a highly undeveloped scenic landscape. The nature of uses on and around the lake - motor boats, water skiing, jet skis, snowmobiling, logging and associated activities - provide an indication that viewers will be less sensitive to development of wind turbines.



Mount Katahdin as seen from the Penadumcook Lakes is an example of a scenic landscape and a unique and memorable feature.



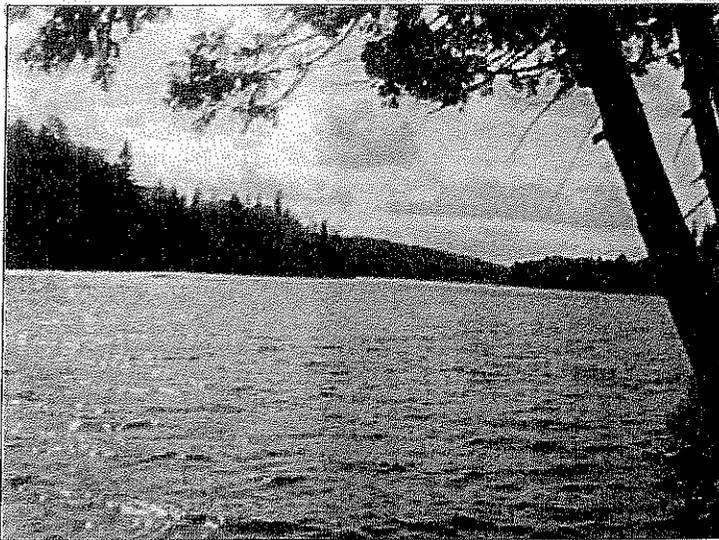
The top 2 photos are looking toward the Oakfield Hills from the south shore of Pleasant Lake, just east of Sand Cove. Compared to the previous photo of Katahdin, the views are not striking or unique, and demonstrate an undifferentiated, nondescript, horizontal ridge line from this perspective. While the views are pleasing, the hills are clearly not a memorable focal point.

In this last photo, the top of Oakfield hills is barely visible behind the trees, located just right of middle. This photo was taken from about the middle of the lake, traveling from Sand Cove to the Powers Trust dock. It demonstrates that visibility will diminish as you travel from point to point.

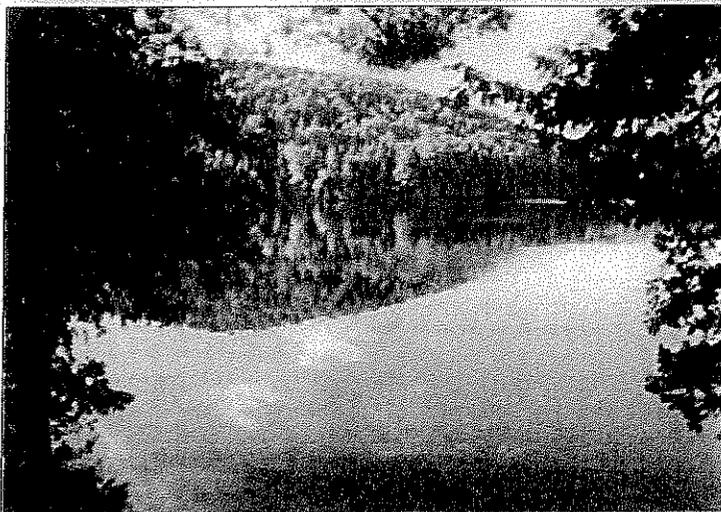
5. *The Addendum makes no mention of the many uniquely beautiful locations on the Lake, such as Sand Cove, Outlet Mountain, the Barker Rocks, the islands and the many coves and points of view that render this Lake significant.*

LW RESPONSE

While these locations do indeed provide some pleasing qualities, they are not "unique" to the area. "Unique" implies it is unlike anything else found in the surrounding landscape. Similar coves, rocks and islands, as well as more spectacular views, can be experienced in lakes all over the area (see photos below). These features on Pleasant Lake, while scenic, did not rise to the level of being so visually important or striking that they needed to be identified or singled out for description and discussion.



Timoney Lake



Mickerson Lake

6. *The position that the landscape can "absorb" the proposed WTG project does not take into consideration the fact that many people have worked and sacrificed to protect the lake over the generations. The authors of the Addendum either did not interview or chose to ignore the many visitors and camp owners who feel very strongly about the scenic significance of Pleasant Lake. These people emphatically disagree that the Lake can absorb the proposed WTGs.*

LW RESPONSE

The efforts by some local landowners to protect the lake had no bearing on our visual assessment, which is based on the visual character of the area and proposed project. Interviewing visitors and camp owners was not included in our scope of work for this project, and we have no basis by which to confirm Mr. Powers' statements or representations with regard to visitors' or camp owners' feelings. However, we did talk with several parties at the boat launch who were visiting the lake from Southern New England and they did not indicate that the view of wind turbines would be a problem for them from any part of the lake.

7. *Table 2 shows that 67% of Pleasant Lake will have potential visibility of the project, but the paragraph immediately following Table 2 states that the turbines "will only be visible over one small section of the shoreline." This is clearly not true as several of the proposed turbines located within two miles of the lake shore will loom over the northern shore and will be visible from almost every vantage point on the southern shore.*

LW RESPONSE

The phrasing of this sentence needs clarification. The intent was not that only a small portion of the shoreline will have visibility of the turbines, but that the turbines are clustered together in a manner such that they are not spread out across the entire northern shoreline, thus reducing their prominence. The northern shoreline measures approximately 4.7 miles from east to west, compared to the turbine array measuring a maximum of 1.2 miles, or less depending on your vantage point. Moreover, due to orientation, topography and vegetation, there will be limited if any visibility from the northern shoreline (see photo 4 of the Addendum). While the number of visible turbines increases as one approaches the southern shoreline, it is important to note that not all turbines in the southern array (17 total) will be visible at the same time, and not all portions of the turbines will be visible. For most locations on the southern shore, it appears that 4 - 7 turbines might be visible at any given vantage point, while 1 - 5 of these would likely have visibility only from the hub area and above. From the eastern end of the lake, however, as many as 10 - 13 might be visible.

Characterization of Potential Views from Lake

- Western shore (boat launch): It appears that 3 turbines would potentially be visible, one of which would likely only be visible from the hub area and above. Of all locations on the lake, this represents the most distant view (see Attachment 1).

- Southern shore, western third of lake: It appears that 4 – 7 turbines would potentially be visible from this stretch of shoreline, while 1 – 2 (25%) of these would only be visible from the hub area and above.
- Southern shore, center third of lake: It appears that 6 – 7 turbines would potentially be visible from this stretch of shoreline, while 3 – 5 (50-70%) of these would only be visible from the hub area and above. The closest ridgeline and its associated tree cover greatly affects which turbines can be seen from this stretch of lake.
- Southern shore, eastern third of lake: It appears that 7 – 13 turbines would potentially be visible from this stretch of shoreline. Up to 8 (61%) of these would likely be visible from the hub area and above. The DeWan visual simulation submitted as Attachment 2 of this response is from this part of the lake and appears to represent the approximate area of highest visibility of the proposed wind project in terms of the number of visible turbines.
- Eastern shore: It appears that 7 turbines would potentially be visible from this end of the lake, while 1 of these would likely have visibility only from the hub area and above.
- Northern shore, western third of lake: It appears for the most part that no turbines would be visible from this stretch of lake, although our viewshed analysis indicates that there might be some short sections of shoreline with potential limited views. There would be potential limited views near the boat launch, diminishing as you travel east.
- Northern shore, center third of lake: It appears that no turbines would be visible from this stretch of shoreline due to the intervening topography and tree cover.
- Northern shore, eastern third of lake: It appears for the most part that no turbines would be visible from this stretch of lake, although our viewshed analysis indicates that there might be some short sections of shoreline with potential limited views.
- Center of lake: Along the length of the lake, views of the turbines typically become more pronounced when moving away from the northern shoreline with its associated topography and tree cover. The northern edge of potential visibility depicted in the viewshed map gives a rough sense of when the turbine hubs would first come into view above the nearest ridgeline. Gradually the turbine towers would become more revealed while travelling toward the southern shore. However, the turbines will be at ones back or in peripheral view when traveling south. This is also the case as one travels along the center of the lake toward the eastern shoreline.

8. *The authors claim that since the turbines will be visible from only one small section of the shoreline their presence will be “de-emphasized and the turbines will not appear to be dominant.” Since the proposed turbines will be visible from a substantially greater portion of the shoreline they should be considered “emphasized” and dominant. Exhibit C is a simulation provided by First Wind showing the proposed and potential future WTGs. It is in stark contrast to the simulation they provided for the Addendum. Clearly from a different vantage point, this view shows the proposed WTGs will dominate the skyline on the north shore of the Lake and will be visible and overwhelming from most points of view on the Lake.*

LW RESPONSE

See response above regarding prominence. It should also be noted that from the southern

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shoreline, all turbines will be more than 2 miles away. As distance increases, the turbines become less dominant, combined with the fact that the ridgeline is generally horizontal and undistinguished in visual character, as illustrated in LandWorks' visual simulation and photos presented in number 4 of this response. Based on our visual simulation, our site visit, and our understanding of the landscape, it was our conclusion that the turbines would not dominate the shoreline. LandWorks did not prepare the unattributed visual simulation submitted by Mr. Powers and therefore cannot account for the accuracy or visibility of the proposed and future turbines exhibited.

9. *The same paragraph following Table 2 states as a reason for "de-emphasizing" the turbines the presence of trails, woods roads and logging activity "even where the lake appears to be undeveloped." The lake appears to be undeveloped in those areas precisely because the trails, woods and logging activity are not visible, unlike the proposed WTGs.*

LW RESPONSE

The visual experience in approaching Pleasant Lake helps to inform the visitor's perception of its environmental context, which includes natural and manmade forms. The lake is situated in an area that is actively managed and used by humans for commercial profit, as opposed to being located in a pristine wilderness area devoid of any development whatsoever.

10. *Color – The white/grey color of the WTGs will only blend with atmospheric conditions when the sky is the same color. The authors chose a grey and cloudy day to take the photograph for their visual simulation. If the background sky is blue, which is when most people will be visiting to enjoy the Lake's scenic beauty, the WTGs stand out starkly.*

LW RESPONSE

LandWorks photographed the light and environmental conditions as they were on the limited timeframe of that site visit. No attempts were made to choose conditions that would downplay the potential visual impact of the project. Regarding the issue of cloudy conditions, LandWorks simply makes the point that this is a situation that affects many days of the year. As noted in the main report, "In this part of Maine, regular cloud cover, inclement days that can characterize a third of any given season, and the reduced presence of recreational activity in the winter season will further reduce any potential adverse effects from the visibility of the project."

11. *Line – The Addendum attempts to equate the stark vertical lines of the proposed WTGs with lines for roads and electrical corridors. There are no visible roads or electrical corridors on the two thirds of Pleasant Lake representing the T4R3 ownership. The only road that is potentially visible was specifically designed to be invisible once vegetation grows back, as it has.*

LW RESPONSE

See response #1 regarding Powers Trust access road. LandWorks is referring to the general

visual character of the region, as opposed to particular views from Pleasant Lake.

12. *Intactness* – The Addendum concludes in this section that the overall landscape form “will remain intact and unbroken” but the vertical nature of the WTGs, and their extreme size, guarantees that this will not be the case.

LW RESPONSE:

In the addendum, we explain that “the project does not require the removal of extensive areas of forest cover, nor will its associated facilities create unnatural breaks or changes in the landscape.” For this reason, we made the assessment that “intactness” would be preserved. In other words the project would result in a visual addition to the landscape, as opposed to a visual removal or destruction of it.

13. *Texture* – The simulations attached as Exhibit D 1-5 emphatically show the stark contrast between the WTGs and the sky when it is blue. The impact on people who enjoy the scenic beauty of the Lake will be greatest when the sky is blue, as most people frequent the lake on clear days. The argument the Addendum employs in this section is like saying that the proposed WTGs will not harm the scenic quality because they are not visible at night!

LW RESPONSE:

See comments for the previous section entitled *Color* (response #10). Although these images are described as “simulations,” they really do not simulate what the eye would see and so are perhaps better described as “computer models.” There are a number of issues with these computer models that undermine their ability to accurately portray the potential visual impacts from the proposed wind project. First of all they are not photorealistic simulations, so they do not present a realistic view of the project site or environs. As such, it appears that the sky is quite dark for “afternoon light,” while the turbines themselves are completely white. This creates a heightened sense of contrast that makes the turbines stand out visually more than they would under typical lighting conditions. Second, we do not know that they used a reliable technique to create these simulations, and we cannot confirm the GPS points and elevations that they used. Third, it does not appear that tree cover is incorporated into their models. Tree cover would reduce the visual impact of the turbines- significantly so in some locations. The screening effect of trees is most noticeable where the foreground ridge begins to obscure the view of the turbines.

14. *Spatial Dominance* – The Addendum claims that the project site is not located on a dominant or distinct landform, but the locations are indeed significantly elevated relative to their surroundings.

LW RESPONSE:

It is true that the project sits at a higher elevation than Pleasant Lake (approximately 650’ higher). However, the project is situated on topography that is set some distance back from the lake and has a character that is typical of the low rolling hills in the area. This view of the Oakfield hills does not provide a “unique” focal point and the hills are not easily

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differentiated from others in the area.

15. *Distances – The Addendum notes that the nearest turbine will be about one mile from the shoreline of the Lake. Several other turbines are planned within two miles of the Lake.*

LW RESPONSE

The nearest and farthest turbines in the southern array from the northern shoreline will be 1 mile and 2.4 miles respectively. The closest turbine to the northern shoreline will be on average 1.75 miles away. The closest turbine to the center of the lake will be on average 2.25 miles away. And, the closest turbine to the southern shoreline will be on average 2.8 miles away. Thus, the turbines that are more likely to be visible will be situated 2 or more miles away from most areas of the Lake that will have a view of the Project.

16. *In this section of the Addendum three viewer groups are identified: Camp Users and Owners, Recreational Boaters, and Anglers. Two additional particularly relevant viewer groups are excluded from consideration by the Addendum. The first consists of people who visit specific locations on the lake and stay for several hours in order to enjoy the beauty of the Lake, picnicking, swimming and relaxing. The second group excluded from the Addendum is snowmobile users.*

LW RESPONSE

No viewer groups were intentionally excluded to skew the results of the report. Rather, the report identifies the "key" or most frequent users to the lake. With that said, the activities of "enjoying the beauty of the Lake, picnicking, swimming and relaxing" are all activities that we would attribute to the key users that were outlined: "camp users and owners, recreational boaters, and anglers." In order to reach specific locations on the lake and to stay for several hours, you still need to access via a recreational boat. Winter users, snowmobilers and ice fishermen would have an experience similar to that of summer boaters and anglers.

17. *In addressing the expectations of camp users and owners the Addendum makes two significant erroneous statements. First the Addendum states that camp users and owners expect to see development of the lakeshore. While this is true of the approximately one third of the lake which is developed, it is certainly not true of the eastern two thirds of the lake in T4R3 which is not developed. This expectation of undeveloped beauty by camp users and owners is one of the significant attractions of a camp on Pleasant Lake.*

LW RESPONSE

Mr. Powers' comments support our statement that the average camp user expects to see development on the lakeshore, since the majority of camps and activity are located on the portion of the lake that is developed. The exception, of course, is that of Mr. Powers, whose camp is one of the only, if not the only, located on the eastern part of the lake, which is owned entirely by the Powers Trust, and by which a long access road needed to be cleared and upgraded in order to accommodate him and his family on their secluded

portion of the lake.

18. *The Addendum makes the incorrect statement that there only two camps to the east of Whitney Point oriented in the northeast direction of the project. The Addendum itself contains a map called Diagram 1 that shows numerous (up to 15 camps) east of Whitney Point from which the proposed WTGs will be highly visible. Furthermore, numerous additional camps located on the southwest shoreline will have direct and unobstructed views of the proposed towers.*

LW RESPONSE:

Agreed. However, it is our conclusion that some camps along the southwest shoreline may have views of very few turbines, but not all turbines as Mr. Powers insinuates. Moreover, the turbines will not be dominant as they will be situated at a distance 3 miles or greater. "Highly visible" is also subject to further discussion, as the distance is sufficient to reduce the visual impact. See also our response to #7.

19. *In addressing the expectations of Anglers, the Addendum fails to recognize that anglers seek places where they can enjoy the totality of the angling experience, including the visual beauty of undeveloped nature. The Addendum points out that they can move to an area where the proposed structures are not visible, but since the Addendum acknowledges that the proposed structures will be visible from 67% of the Lake, a logical alternative would be to move to another lake entirely. The simulations in Exhibits D 1-5 clearly show that the proposed WTGs are highly visible from most vantage points on the Lake.*

LW RESPONSE:

The Addendum clearly indicates an understanding that anglers seek "scenic environs." This expectation was not overlooked in our analysis. However, anglers do not recreate solely for the purpose of visual beauty. They fish for pleasure and the thrill of a catch. The turbines will not interfere with this experience and will in no way impact the quality or quantity of fish in the lake, or one's ability to catch a fish. Moreover, people can orient themselves away from the turbines if they wish not to look at them - they do not have to move to another part of the lake entirely. Even so, as Mr. Powers points out, the lake is of sufficient size (1832 acres) to ensure that there are extensive opportunities to fish out of the view of the turbines. Our report states that 67% of the lake would have potential visibility. This number is based on our viewshed analysis that utilizes GIS data to analyze potential visibility of the turbines (hub and below) and assumes a conservative 40' tree cover over forested areas. Thus, looking at the area indicated as 'potential visibility' in the viewshed map, the northern edge of 'potential visibility' would likely indicate that the turbine hubs are just becoming visible over the intervening topography and tree cover. These limited views would become more pronounced while travelling to the southern shoreline, where the intervening topography would have less screening impact. Also this 67% assumes that the viewer is looking in the direction of the proposed turbines at all times, which does not reflect the reality of a boater's experience of taking in the entire panorama of views. The wind turbines in fact result in a small "horizontal scale," occupying less than 1/2 miles (more

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like .5 miles when accounting for perspective from the southern shore) of the 4.5 miles of northern shoreline or 1.0 miles of total shoreline. See also our response to #7 regarding turbine visibility.

20. *The Addendum claims that viewers tend to look down the Lake in an east west orientation and that the structures will therefore not be dominant. This is not true. As the Addendum itself notes, the area of development on the Lake is concentrated towards the western end of the Lake. Viewers looking for an unspoiled natural vista will therefore tend to look towards the north side and east end, which is exactly where the proposed structures will be highly visible. Even looking east/west a viewer will not be able to escape the proposed towers nearest to the lake, as they will loom in the viewer's direct and peripheral vision from two thirds of the lake. Exhibit D 5 clearly shows this to be the case.*

LW RESPONSE

Viewers from the boat launch will indeed be looking in an eastern direction, with views to either the north or south. However, as shown by picture 1 of the Addendum, vegetation, distance and topography limit views to the turbines. Moreover, there is no unique focal point from this location that would be adversely impacted by the presence of the turbines. As one moves to the center of the lake, where turbines become more visible, views do not tend toward the north, rather, they are drawn to the east and south, the natural direction of the lake's form. Additionally, if one continues to the eastern and southern tip of the lake, the turbines are in one's far peripheral field of vision. Therefore, the turbines are not seen in the context of an important focal point, nor do they compete with a unique natural feature. Mr. Powers (Exhibit D only) illustrates possible views from the southern shoreline, but fails to show views from mid-lake or the northern shoreline. One's direction may be drawn to the north when standing on the southern shoreline, but not all activity occurs only from this direction. See also our response to #13 regarding the accuracy of Mr. Powers's so-called simulations.

21. *The Addendum notes that the proposed structures, which will be visible from the Lake, are located within 1/2 mile from one another along the ridge above the north shore, but that the length of the Lake is approximately 4 1/2 miles. This is meant to imply that the concentration of the proposed towers will limit their effect and exposure, but the Addendum elsewhere acknowledges that the proposed towers will be visible from 67% of the Lake. The fact that they are located within 1/2 mile of one another is irrelevant since their sheer size makes them overwhelmingly visible from most areas on the Lake. The simulations in Exhibit D clearly show this to be true.*

LW RESPONSE

The fact that the turbines are clustered together is extremely relevant when siting for projects like this. Turbines by their very nature will be impossible to screen; but, when turbines are organized into small groupings, their visual impacts become less because they are less visible over a wider area and they tend to be better absorbed into the surrounding environs. Additionally, not all turbines or all portions of turbines will be visible from 67% of

the lake. This number simply represents the percent of the lake that may have some form of visibility, which could be as limited as the tip of 1 blade/rotor.

22. *The Addendum claims that most of the camps are oriented away from the proposed site with several exceptions. This is simply not true, as a cursory examination of the map provided in the Addendum will clearly show.*

LW RESPONSE

The map included in the Addendum clearly shows that most (75%) of the camps situated along the lakeshore are not directly oriented toward the proposed site. The other 25% that are situated in a northeasterly direction may or may not have views of some of the turbines.

23. *The Addendum suggests that the north half the Lake will be out of the viewshed. This is not true as many of the camps on the north side of the Lake are oriented in such a way as to render the proposed structures visible.*

LW RESPONSE

In most instances, camps on the northern shore are oriented toward the lake in a southerly direction and away from the turbines. The most common views, therefore, are to the lake and south, and the opposite direction of the project site. In fact, Exhibit 1 of the original report demonstrates that much of the north shore does not have potential visibility.

24. *The Addendum states that boaters and fishing parties can orient to the 1/3 of the lake that will not have views of the project. Most likely they will orient to another lake where the natural beauty is not marred by such overwhelming structures.*

LW RESPONSE

This statement is purely conjecture and not based on any fact or study. It is our assessment that Pleasant Lake would continue to be an attractive recreational asset to the area. The presence of turbines will not unreasonably adversely affect potential users' ability to peacefully enjoy the recreational activity of choice - access to the lake will remain unfettered, the number and variety of fish will remain intact, and the waters will remain pristine and clear. Moreover, Pleasant Lake and its environs do not represent a remote wilderness environment unscathed by development, nor is it the only reason people visit the lake. The lake is situated within a working landscape where motorized use is not restricted. In fact, a myriad of modern amenities are used for recreational enjoyment, from jet skis to snowmobiles. A boater who is seeking solace can simply look away or turn their backs if the sight of turbines is undesired, but one cannot turn off the vociferous sound of an accelerating recreational machine.

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25. Pleasant Lake is exceptional among lakes in the area since approximately two thirds of the shorefront is not visibly developed.

LW RESPONSE

See comments in previous responses. The number of users to this less developed side of the lake is limited somewhat due to the lack of roads and public access points. Moreover, there are indeed other lakes in the region that have undeveloped shorelines of lesser or greater extent than this lake.

26. In this rebuttal we have responded in detail to each of these claims and statements. In addition, we have provided as a comparison a more likely set of visual simulations, attached as Exhibits D 1-5.

LW RESPONSE:

Without knowing the technical details for how these simulations were prepared, LandWorks cannot presuppose that these are a "more likely set of visual simulations." All of the models overstate the visual impact of the turbines because they are not photorealistic simulations, they depict an unnaturally contrasted sky background, and the screening effect of tree cover is not represented (see our response to #13). In analyzing their computer models, we also found that VP2 was glaringly misrepresentative. We found that 7 - 8 turbines would potentially be visible, compared with the 13 - 15 turbines that are depicted in their model. The visual simulation prepared as part of our Addendum is near the location of VP3 in Exhibit D, and provides a more realistic view of what might be visible from this vantage point. The simulation prepared by DeWanas Attachment 2 of this submittal closely matches the location of VP4, and also provides a more true to life view of the project. This simulation portrays a photorealistic view, uses known and reliable techniques, and accounts for vegetation. Moreover, the sky is representative of a typical New England day and does not overstate the visual impact of the project. In fact, the turbines appear to be somewhat whiter or brighter than what would actually be visible on a cloudy, overcast day.

LANDWORKS RESPONSE TO JEAN VISSERING MEMORANDUM

This responds to the issues raised in Ms. Vissering's September 21, 2009 Memorandum to the DEP. At the outset, it is important to point out that Ms. Vissering's comments are of limited value due to the following: 1) by Ms. Vissering's own admission she has not visited the site and is therefore unfamiliar with the area and project context; 2) Ms. Vissering appears not to have considered or appropriately taken into account the changes in visual impact standards resulting from An Act to Implement Recommendations of the Governor's Task Force on Wind Power Development, 2007 Public Law Chapter 661; 3) Ms. Vissering presents information (sketch regarding "increasing scenic quality"), which contradicts some of her emphasis on the significance of Pleasant Lake and surrounding landforms, which are *not* distant; 4) Ms. Vissering clearly states that she cannot draw any conclusions regarding the project's scenic impacts; and, 5) Ms. Vissering does not appear to have read our original report and may not realize that the Addendum is an add-on to that report – it is not meant to be a stand-alone report about the visibility from Pleasant Lake. With this information in mind, the following are our responses to Ms. Vissering's bulleted points:

Sufficiency of Photographs

- Our original report contains 40 photos that depict the context of the entire area. Included in these 40 photos are 4 of Mattawamkeag Lake, the other designated great pond in the area, as well as Pleasant Lake (photograph no. 29) and Drews Lake (photographs 19 and 20). Likewise, we included 4 photos of Pleasant Lake in the Addendum. It is not necessary to include countless photographs of the lake when just a few are more than enough to portray the overall context and features of the lake.

Oakfield Hills as the Only Major Landform

- We agree with Ms. Vissering that one consideration is whether the project is located on a distinct landform that might serve as a visual focal point. See our response to #4 of the Powers letter. Importantly, and as a site visit would have revealed, there are several other landforms and unnamed ridges that surround the lake and the area (Outlet Mountain, Crow Hill, Byron Mountain, Robinson Mountain, and Timoney Mountain to name a few). Due to the horizontal or undifferentiated ridgelines, Oakfield Hills are not a major focal point and do not provide a distinct, memorable profile.

Scenic Character of Pleasant Lake

- The character of the lake was adequately addressed in the Addendum and within the parameters of State permitting standards. As reflected in the principal report, there are other lakes in the region, and Pleasant Lake is not "unique" to the area. There are other lakes nearby that have undeveloped shorelines, coves, rocks and islands (e.g. Timoney Lake, Drews Lake, Nickerson Lake). See our response to #5 in the Powers letter. The lake was identified as only "significant", not "outstanding", for scenery because of its undeveloped nature in T4R3 WELS, but as Ms. Vissering acknowledges, that does not necessarily translate into the lake being so unique or so important from a scenic standpoint that no development

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can occur there. Rather, it is one consideration, and one that we took into account in our report.

Viewshed Map

- A viewshed map was prepared as Exhibit 1 in our original report. The citation of other states' established radii is irrelevant here because Maine already identifies 3 and 8 miles as the appropriate radii for determining impact. In fact, the statute affirms *"There is a rebuttable presumption that a visual impact assessment is not required for those portions of the development's generating facilities that are located more than 3 miles, measured horizontally, from a scenic resource of state or national significance. The primary siting authority may require a visual impact assessment for portions of the development's generating facilities located more than 3 miles and up to 8 miles from a scenic resource of state or national significance if it finds there is substantial evidence that a visual impact assessment is needed to determine if there is the potential for significant adverse effects on the scenic resource of state or national significance."* Our report took a conservative approach under Maine's law and prepared a visual impact assessment for all scenic resources of state or national significance located within 8 miles of the closest turbine. Furthermore, we emphatically disagree with Ms. Vissering's comment that "line-of-sight analysis...[is] not particularly useful for assessing the visual impacts of wind energy projects." The book, *Visual Simulation: A User's Guide for Architects, Engineers, and Planners* and written by Stephen R. J. Sheppard, which is one of the most notable resources for such analysis, states:

"Some basic tools exist that can be used by nonexperts to check simulation accuracy. An example is the use of accurately drawn cross sections through topography, trees, and buildings. They can reveal how much of a proposed structure would be screened from view, and the results can then be compared with the simulation. Such line-of-sight profiles can resolve questions of accuracy in the position of objects in the up-down dimension and depth of the picture, as well as questions of relative height." (p. 135)

Visibility of Turbines

- As noted in #2 of our response to Mr. Powers, it is important to accentuate the visibility from the public boat launch and western half of the lake, since this is where most of the activity occurs. It is accessible to people of all ages and abilities and therefore receives the highest amount of visitation. The eastern and farthest reaches of the lake, over 4 miles distant, are only accessible by boat, or by Mr. Powers' family camp. Moreover, it would be overly burdensome to determine the extent of visibility from infinite vantage points all across the 1832-acre lake. While the viewshed map provides a point of departure for *where* the turbines might be visible from, it does not accurately portray the *size, scale or number* of visible turbines. Not all turbines, or all portions of turbines, will be visible from any one vantage point. See our response to #7 of the Powers letter for a characterization of potential views from the lake.

Views from Other Resources

- This information is included in the original report. Note that the definition of scenic resources set forth in 2007 Public Law Chapter 661 apply, not the definition of scenic resources specified in Chapter 315.

Lighting

- Lighting is addressed in the original report.

Associated Facilities

- The associated facilities are addressed in the original report. Moreover, they are not visible from Pleasant Lake.

Considerations Relevant to Boaters

- It is our determination that the project will not significantly compromise one's ability to enjoy the lake and will continue to be an attractive recreation asset to the area. The existing landscape and uses permitted on the lake help to inform the visitor's perception. The lake is situated in an area that is managed and used by humans for commercial use, as opposed to being a remote wilderness area devoid of any development. The nature of uses on and around the lake – motor boats, water skiing, jet skis, snowmobiling, ATV's – provide an indication that viewers, including boater's, will be less sensitive to the project. Moreover, the quality and quantity of fish as well as the pristine waters will not be impacted at all. Finally, we disagree with Ms. Vissering that the comments about the boaters' experience are irrelevant. The test for determining the acceptability of the visual impact is whether the development significantly compromises views such that it has an unreasonable adverse effect on the scenic character *or existing uses related to scenic character of the resource*. (Emphasis added.) The expectations of the typical viewer, the extent, nature and duration of potentially affected public uses of the resource, and the impact of the turbines on the public's continued use and enjoyment of the resource are considerations specifically set forth in the statute. 35-A M.R.S.A. § 3452 (application of standard and evaluation criteria). As such, boaters' experience and their ability to continue to utilize and enjoy the resource is relevant.

Number of Simulations

- As part of the overall visual assessment, LandWorks did prepare other visual simulations from varying locations to demonstrate a variety of views throughout the 8-mile study area. Only one simulation from Pleasant Lake was prepared and the viewing location is clearly identified on that exhibit. The preparation of many visual simulations from a single location can become costly, and there are no state requirements for doing so. In this regard, LandWorks tried to choose a viewing location from the lake, which we believe to be representative of typical views. This point is also in direct axis to the turbine array and the closest location on the southern shoreline to the turbines, and demonstrates the turbines at their largest scale. In addition, the point chosen for this visual simulation appeared to be a popular destination for recreational boaters.

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Technical Aspects of the Simulation

- We did use a focal length equivalent to 35mm, which is closest to what the human will see. It is true that 2 photos were combined for the simulation in Exhibit 1, but not a full panorama view. We believe this is the best approach to simulate the view and to ensure that the most realistic context is represented. People do not only focus on one spot – their eyes and head wander side to side. A “normal lens” cuts off peripheral vision and it would be misleading not to include all visible turbines from a single vantage point.

Significance of the Trust Land

- The undeveloped part of the lake is in private trust for the benefit of the Powers family. It is not publicly conserved land for public use, like a state park or wildlife management area. There is no guarantee that this land will remain undeveloped for eternity. Importantly, there is no direct public right of access to the private land held in trust by the Powers. The visual impact standards applicable to this project, as is the case with visual impact standards generally, focus on the visual impact to the public and public users of the resource, and the nature of the surrounding area, including the existence of privately owned land, was a factor very relevant in our evaluation.

Relevant Review Criteria

- 35-A MRSA §3452 specifically states *“determination that a wind energy development fits harmoniously into the existing natural environment in terms of potential effects on scenic character and existing uses related to scenic character is not required for approval under either Title 12, section 685-B, subsection 4, paragraph C or Title 38, section 484, subsection,”* and continues *“a finding by the primary siting authority that the development’s generating facilities are a highly visible feature in the landscape is not a solely sufficient basis for determination that an expedited wind energy project has an unreasonable adverse effect on the scenic values and existing uses related to scenic character of a scenic resource of state or national significance.”* As required by statute, the original report and addendum apply the visual impact criteria set forth in Section 3452 and not the more general DEP criteria.
- Ms. Vissering’s approach may be useful for some projects, but is not applicable in this instance. The State has specific guidelines by which the development of the original report and addendum were prepared. We applied a framework that we thought fit best with the review criteria set forth in Maine law, although we appreciate the perspective provided by other experts in the field. As shown below, applying the framework suggested by Ms. Vissering supports our conclusion as to the acceptability of the visual impacts on this resource. Importantly, while Ms. Vissering might approach the project and organize her report differently, she has not provided any information that suggests, let alone supports, a conclusion other than the one reached by LandWorks here.

Documented Significance: The Addendum was prepared for the very fact that Pleasant Lake is included on the LURC Lakes Assessment. This does not mean that it is so unique or significant as to preclude any development.

Scenic Quality/Focal Point: Oakfield Hills are not focal points due to their horizontal and undifferentiated characteristics. The hills do not provide a striking or memorable profile. See also our response to #4 in the Powers letter.

Viewer Expectations: Other modern uses are permitted on the lake, which must be factored into the visitor experience. This is not a remote wilderness area with restrictive access.

Uniqueness of Resource: There are many lakes in the area that have undeveloped shorelines. This characteristic is not unique or unlike anything else that can be found in the region, as noted in #5 of our response to Mr. Powers.

Duration of View: Not all turbines or all portions of turbines will be visible across the entire shoreline, and will vary from location to location. Moreover, duration of view in this instance is a highly subjective determination. It is dependent on a number of factors, including but not limited to: viewer interests and expectations, infinite number of viewing points, speed of traveler, activity of viewer, and viewer approval/disapproval of the project.

Proximity to Project: This is dependent on one's vantage point and will vary by location. From the southern shoreline, the closest turbine on average will be 2.8 miles away. From the center of the lake, the closest turbine will be on average 2.25 miles away. Turbine visibility is limited to none along the northern shoreline. It is therefore more likely that the most visible turbines will be situated 2 or more miles away. See also our response to #7 of the Powers letter.

Spatial Dominance: The ridgeline is not a notable feature in the landscape and moves to people's peripheral vision as they travel to the eastern shores. The turbines are also clustered together which helps to reduce their prominence. See also our responses to #4, #7, #8 and #14 of the Powers letter.

VISUAL SIMULATION FROM PLEASANT LAKE BOAT LAUNCH, ISLAND FALLS

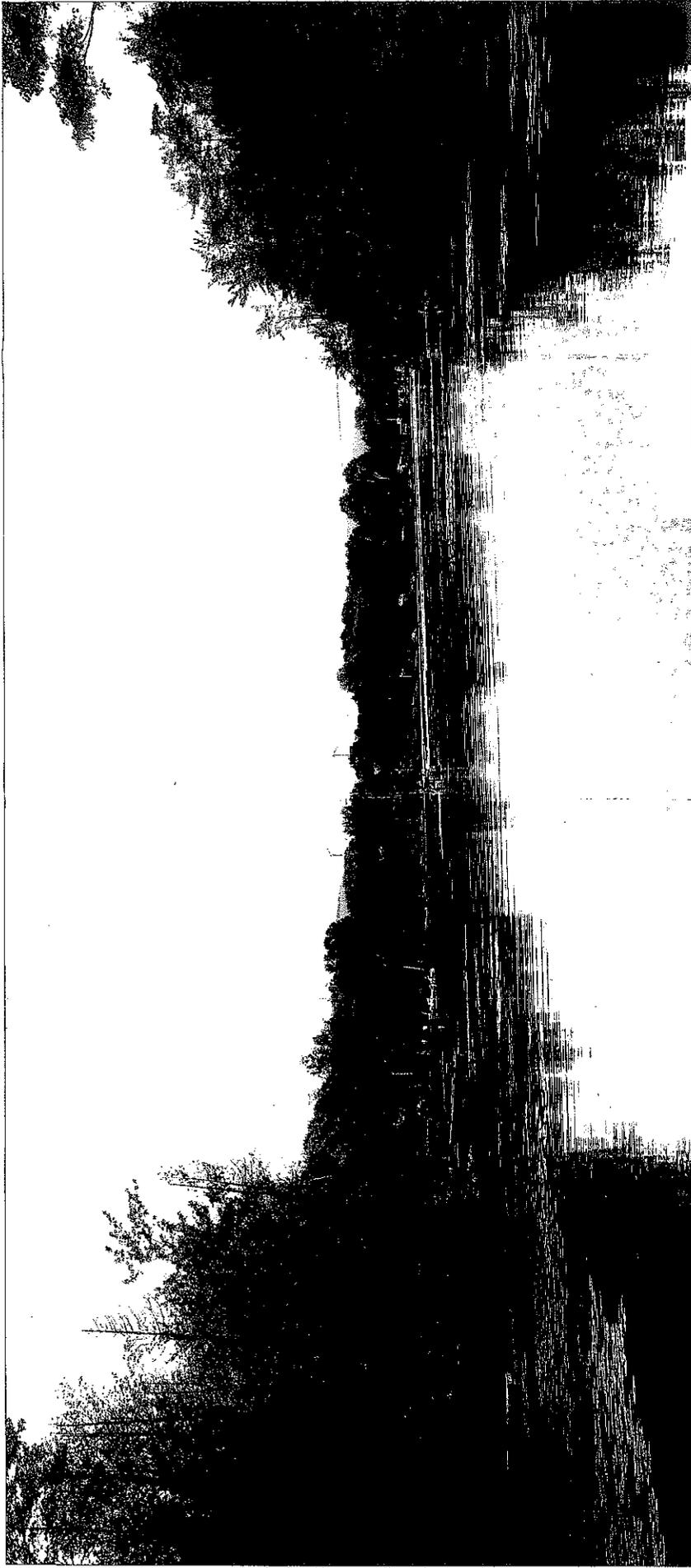
Oakfield Wind Project

10/27/09

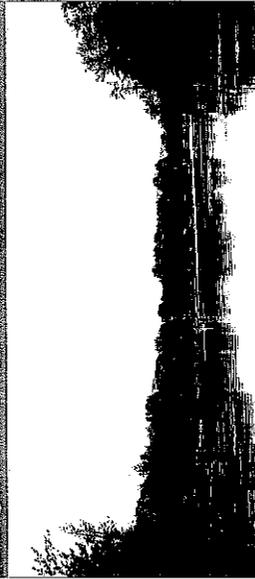
LandWorks

Prepared by LandWorks, Middlebury, VT

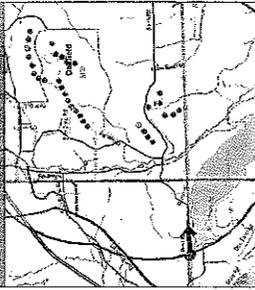
584



Existing Conditions Photograph



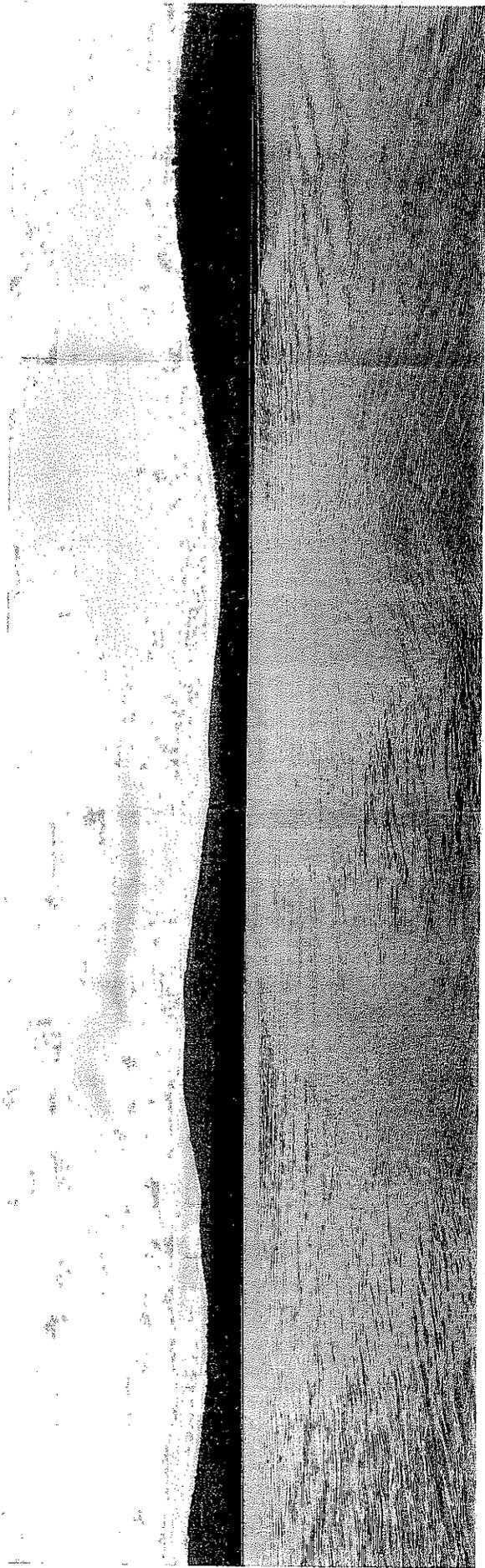
View Location Map



Simulation Information

Turbine Information	Model: GE 1.5 MW s1c 60Hz Hub height: 262'-6" (80 m)
Photograph Information	Rotor diameter: 292'-11" (77 m) Date and time: 7/29/08, 4:30 pm Location: At Pleasant Lake Boat Launch: 46.036° N, 66.208° W Camera elevation above sea level: 620' (189 m) Focal length (35mm equivalent): 56mm Distance to farthest visible turbine (S13): 3.8 miles (6.12 km) Distance to nearest visible turbine (S17): 3.2 miles (5.15 km)
Technical Information	Software: ArcGIS 3D Analyst; Nemetschek VectorWorks 2008; SketchUp Pro 7; Adobe Photoshop CS3 Digital elevation data source: http://www.mega.maine.gov/catalog

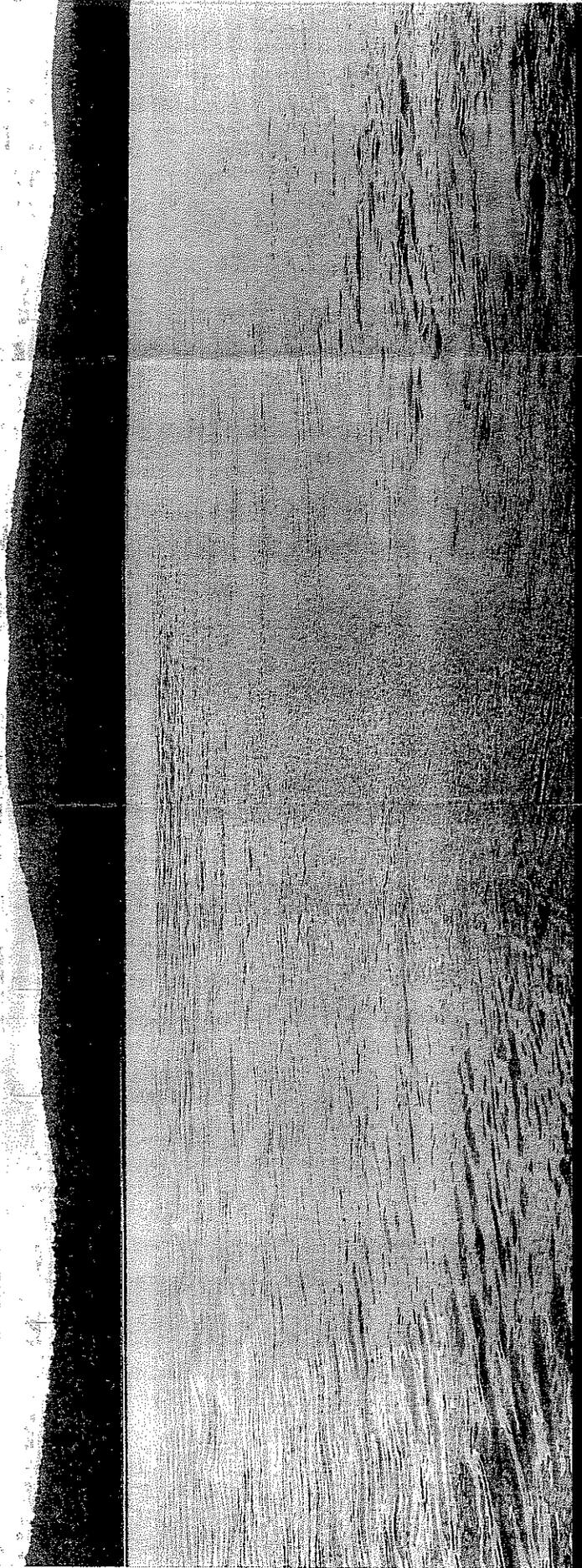
Prepared for
Evergreen Windpower II



Photosimulation of a panoramic view looking northeast toward the proposed Oakfield turbines from the southeast corner of Pleasant Lake.

<p>VIEWPOINT LOCATION MAP</p> <ul style="list-style-type: none"> ● Oakfield Turbines visible from this viewpoint ○ Oakfield Turbines not visible from this viewpoint ● Viewpoint Location 		<p>PHOTOSIMULATION INFORMATION</p> <p>Model: GE 1.5 s1e</p> <p>Hub Height: 80m</p> <p>Rotor Diameter: 77m</p> <p>View Coordinates: Northing: 46,011204, Easting: -68,148792</p> <p>Viewer Elevation: 163m</p> <p>Direction of View: North-Northeast</p> <p>Focal Length: Digital equivalent to 50mm normal lens</p> <p>Closest Turbine: 2.1 miles</p> <p>Furthest Turbine: 2.9 miles</p> <p>Date of Photo: 07.21.09</p> <p>Time of Photo: 12:29 pm</p>	
		<p>Pleasant Lake T4 R3 WELS</p> <p>tjd&a <small>Thomas J. DeWitt & Associates 17000 13th Avenue, Suite 100 Golden, CO 80401 Phone: 303.440.7272</small></p> <p>Evergreen Wind Power II, LLC</p> <p>Page 1</p>	

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Photosimulation looking northeast toward the proposed Oakfield turbines from the southeast corner of Pleasant Lake. Viewer should hold this image, when printed at 11" x 17", approximately 19" from eye to replicate actual view.

Section 29. Decommissioning Plan The applicant must provide a plan for decommissioning the project if that becomes necessary. The decommissioning plan shall include but is not limited to the following:

1. A description of the trigger for implementing the decommissioning plan. There is a rebuttable presumption that decommissioning is required if no electricity is generated for a continuous period of twelve (12) months. The applicant may rebut the presumption by providing evidence, such as a force majeure event that interrupts the generation of electricity, that although the project has not generated electricity for a continuous period of 12 months, the project has not been abandoned and should not be decommissioned.
2. A description of the work required to physically remove all wind turbines, associated foundations to a depth of 24 inches, buildings, cabling, electrical components, and any other associated facilities to the extent they are not otherwise in or proposed to be placed into productive use. All earth disturbed during decommissioning must be graded and re-seeded, unless the landowner of the affected land requests otherwise in writing.

[Note: At the time of decommissioning, the applicant may provide evidence of plans for continued beneficial use of any or all of the components of the wind energy development. Any changes to the approved decommissioning plan shall be approved as a minor amendment to the department license for the wind energy development.]

3. An estimate of the total cost of decommissioning less salvage value of the equipment and itemization of the estimated major expenses, including the projected costs of measures taken to minimize or prevent adverse effects on the environment during implementation of the decommissioning plan. The itemization of major costs may include, but is not limited to, the cost of the following activities: turbine removal, turbine foundation removal and permanent stabilization, building removal and permanent stabilization, transmission corridor removal and permanent stabilization and road infrastructure removal and permanent stabilization.
4. Demonstration in the form of a performance bond, surety bond, letter of credit, parental guarantee or other form of financial assurance as may be acceptable to the department that upon the end of the useful life of the wind generation facility the applicant will have the necessary financial assurance in place for 100% of the total cost of decommissioning, less salvage value. The applicant may propose securing the necessary financial assurance in phases, as long as the total required financial assurance is in place a minimum of 5 years prior to the expected end of the useful life of the wind generation equipment.

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Environmental Impacts of Wind-Energy Projects
<http://www.nap.edu/catalog/11935.html>

Environmental Impacts of Wind-Energy Projects

Committee on Environmental Impacts of Wind-Energy Projects

Board on Environmental Studies and Toxicology

Division on Earth and Life Studies

NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

THE NATIONAL ACADEMIES PRESS
Washington, D.C.
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- How much will I be paid and how will I receive payments?
- Are the proposed payments adequate now and will they be adequate in the future?
- Does the proposed method of payment or the agreement itself present adverse tax consequences to me?
- Are there firm plans to develop my land, or is the developer just trying to tie it up?
- If payments are to be based on revenues generated by the wind turbines, how much information is the developer willing to disclose concerning how the owners' revenue will be determined?
- What rights is the developer able to later sell or transfer without my consent?
- Does the developer have adequate liability insurance?
- What are the developer's termination rights?
- What are my termination rights?
- If the agreement is terminated either voluntarily or involuntarily, what happens to the wind-energy structures and related facilities on my land?

Policies to Protect the Parties Involved

In a companion document, Windustry's Wind Easement Work Group issued a short set of best practices and policy recommendations regarding easements and leases (Nardi and Daniels 2005b). These included:

- *Public disclosure of energy production from wind turbines:* In order to facilitate transparency for production-based payments, increase public knowledge about the wind resource, and provide information to the state on the economic contribution of wind power.
- *Public filing of lease documents and public disclosure of terms (or include a "no gag" clause):* In order to reduce competition among neighbors, encourage developers to give fair deals, and lower the possibility of a single holdout among landowners.
- *Limiting easement periods to 30 years and option periods to 5 years:* To avoid tying up either the landowners or the developer for unduly long periods.

Property Values

It has been claimed that wind-energy projects do not adversely affect property values (Associated Press 2006). In contrast, it has been asserted that "adverse impacts on environmental, scenic and property values are often overlooked" (Schleede 2003, p. 1).

It is difficult to generalize about the effects of wind-energy projects on property values. A 2003 Renewable Energy Policy Project (REPP) study of the effect of wind development on property values found no statistical effects of changes in property values over time from wind-energy projects (Sterzinger et al. 2003). This study examined changes in property values within 5 miles of 10 wind-energy projects that came online between 1998 and 2001, looking at the three-year period before and after each project came online and using a simple linear-regression analysis. The study found no major pre-post differences, and it also found no major differences when property-value changes in the 5-mile areas around the wind-energy projects were compared with selected “comparable communities.”

The REPP study, however, examined only *average* price changes. The authors noted that “it would be desirable in future studies to expand the variables incorporated into the analysis and to refine the view shed in order to look at the relationship between property values and the precise distance from development” (Sterzinger et al. 2003, p. 3). A 2006 study (Hoen 2006) more closely examined the effects on property values between 1996 and 2005 within 5 miles of a 20-turbine, 30-MW project in Madison County, New York. This study used a hedonic regression analysis method and found no measurable effects on property values, positive or negative, even on residences within a mile of the facility. In contrast, a 2005 analysis by the Power Plant Research Program of the Maryland Department of Natural Resources concerning a proposed wind energy facility—the Roth Rock facility in Garrett County, Maryland—concluded that the facility would have an uncertain impact on the property values of neighboring properties. It reached this conclusion after reviewing the 2003 REEP study as well as a 2004 study in the United Kingdom by the Royal Institution of Chartered Surveyors (RICS), which found negative impacts, especially on non-farm properties (RICS 2004), and after analyzing the property-value impacts of the Allegheny Heights (Clipper) wind-energy project located north of the Roth Rock project and permitted in 2003 (MDDNR 2006).

Property values are affected by many variables. Thus, empirically isolating the impacts of one variable (a wind-energy project) is extremely difficult unless one or more turbines are located close to a specific property, and even then, there may be confounding factors. Forecasts of property values in prospective host areas that are based on comparisons with existing host areas are of questionable validity, especially if there are significant differences between the areas.

Assessment

Despite the difficulty of reaching widely generalizable conclusions about the effects of wind-energy projects on property values, it is possible to theo-

size about important variables. The discussion of aesthetic impacts earlier in this chapter is relevant. On the one hand, to the extent that a property is valuable for a purpose incompatible with wind-energy projects, such as to experience life in a remote and relatively untouched area, a view that includes a wind-energy project—especially one with many turbines—may detract from property values. On the other hand, to the extent that the wind-energy project contributes to the prosperity of an area, it may help to bring in amenities and so may enhance property values.

Because wind installations in the United States are a relatively recent phenomenon and are only now beginning to burgeon, the long-term effects of wind-energy projects on property values also are difficult to assess. While property values may be initially affected by a wind-energy project, the effect may diminish as the project becomes an accepted part of the landscape. On the other hand, the effects on local and regional property values of a few projects with 20 to 50 turbines may be quite different from the effects of numerous projects with 100 to 200 turbines.

Mitigation Measures

When siting facilities that provide a public benefit but may be undesirable as neighbors, one mitigation measure that has been explored, for example, with waste facilities, is to provide property-value guarantees to property owners within a specified distance from the facility when they want to sell their properties (Zeiss and Atwater 1989; Smith and Kunreuther 2001). An issue in this arrangement is the fair level of the guaranteed selling price, as adjusted over time by an inflation factor.

Employment and Secondary Economic Effects

A wind-energy project is a source of jobs throughout its life cycle: for parts manufacturers and for researchers seeking to improve wind-turbine performance; for workers who transport and construct wind turbines and related infrastructure; for workers employed in the operation and maintenance of turbines, transmission lines, etc.; and for workers involved in project decommissioning. The number, skill and pay level, and location of the jobs will vary depending upon the scale, location, and stage of the project. Some of the jobs may be in the area that will host the wind turbines; some may be in a manufacturing plant several states away. At all locations, in addition to direct employment impacts, employment may be indirectly fostered through secondary economic effects, including indirect impacts (e.g., changes in inter-industry purchasing patterns) and induced impacts (e.g., changes in household spending patterns).

In addition, however, it is conceivable that a wind-energy project will

BASIS STATEMENT

In 1987 the Legislature enacted LD. 1803 which directed the Department to adopt amended rules for the control of noise generated by development to replace those currently under section 10 of Chapter 375 of the Site Location of Development Law regulations.

The legislation specifically required that the rules:

- A. Reflect consideration of local zoning with regard to both the zone in which the development is located and the proximity of the development to residential areas;
- B. Employ a consistent methodology to assess background and intrusive noise effects of developments of a similar nature;
- C. Provide that the board may limit the hours of operation of the development to minimize the impact on surrounding uses; and
- D. Contain an appropriate list of activities which, although connected with a development, are wholly or partially exempt from review by the board.

Since the existing regulations have proven difficult to interpret by staff and applicant alike and currently do not consider local zoning, consistent with the legislation, the rule's intent is to provide clear predictable and enforceable noise standards which consider local land use. The rule describes specific noise control standards for daytime and night-time operation as well as construction, maintenance operations and blasting. It further describes specific submittal requirements and measurement procedures for technical information needed to determine potential noise impacts, and utilizes local zoning land use and comprehensive plans to determine noise control standards for a development. In addition the rule contains a list of exempted activities and a section to allow for variances from the sound level limits under certain conditions.

In January of 1988 the Department began the process of devising the noise control rules. Two staff workshop sessions were held and drafts sent to potentially affected parties. On September 19th and October 12th of 1988 a public hearing was held to gather public input on that initial draft. Due to significant controversy regarding this draft, the APA rulemaking process was suspended and six public workshop sessions were held, two in November of 1988, two in January of 1989, one in February of 1989 and one in March of 1989. An opportunity for written comments was also provided. Several drafts of the rule were completed throughout the process with the final draft completed on April 17, 1989. On June 6, 1989 a formal public hearing was held on this draft with the period for written comments closing on June 19th. During the public hearing and comment period a great number of constructive comments were received. In the interest of keeping this statement as concise as possible, multiple comments concerning the same section of the rule which were similar in nature have been summarized into one general comment. Each comment/comment summary is followed by the Department's response to the comment. The comments and responses are organized chronologically by the appropriate chapter and sections of the draft rule.

1. Comment: "The noise is averaged; there must be some way of including some kind of real excess so that it is limited"

Response: The use of "Leq" in itself sets an upper excess limit depending on the amount of noise events occurring over the measurement period. We feel that this limit is acceptable to protect public health and welfare for the "Leq" limits chosen.

2. Comment: The rule is too complex.

Response: Changes to the rule have been made in several areas to simplify it as much as possible. Since the rule is designed to cover a variety of development types coming under the jurisdiction of the Site Law, we believe that it's complexity is necessary to fairly regulate the various sound produced, while providing some flexibility.

3. Comment: The rule will have an unknown economic impact and several commenters expressed concern that provisions should be made for the board to reconsider the rules one year from the effective date.

Response: A note has been added to the rule under the applicability section as a reminder to the Department and Board to consider the effect and operation of the rule one year from the effective date.

CONTROL OF NOISE

B. Applicability

4. Comment: Several commenters indicated that the rule should allow greater flexibility in establishing local noise standards to regulate proposed developments by allowing greater than a 5 dBA increase over the rule's sound level limits. One of the commenters suggested a 15 to 20 dBA allowance.

Response: Since the rules are based in part on the EPA "levels document" which provides guidance to protect public health and welfare with an adequate margin of safety, we believe that 5 dBA is an allowable increase over level limits and still is with the intent of that document. Anything greater than 5 dBA we believe will not. In addition a variance procedure has been built into the rule to allow flexibility for developments which cannot practicably meet sound level limits.

5. Comment: Clarification and internal consistency suggestions were made for paragraph #2 and 3 concerning the applicability of the rules to development modifications and to applications in the review process at the effective date of the rule.

Response: The suggestions were adopted for modifications and expansions since we agree they should be covered by the rule. Project applications submitted prior to the effective date of the rule will not be subject to it provided the application is complete for processing prior to that date. This is addressed under the definition of existing development. In the interest of keeping the rule as concise as possible and to insure that incomplete applications "in process" are not considered exempt from the rule, the suggestions concerning these applications were not adopted.

6. Comment: The rule does not protect undeveloped land used for recreational purposes and by wildlife species which could be disturbed by the noise levels.

Response: Since the rule is designed to protect public health and welfare we believe that consideration of undeveloped lands as protected locations purely for recreational purposes would pose an undue hardship on developers. However, we agree that these lands deserve some protection and have amended the rule to include an 75 dBA sound level limit at the property line of the proposed development. This limit was based on hearing loss considerations and was included in the rule, among other considerations, to insure that if an owner of nearby undeveloped land decided to inhabit the property after the development is permitted or uses it for recreational purposes he would at least be protected from hearing loss. Regarding disturbance to wildlife species, we agree that excessive noise levels can disturb wildlife, however we believe that effects of noise on species inhabiting a specific site could be better assessed under the wildlife section of the site law regulations on a case-by-case basis upon recommendations by a state wildlife biologist. We have amended the rule to include a section to reserve the Board's right to impose conditions limiting noise levels under the Protection of Wildlife regulation of the Site Law (Chapter 375.15), to make it clear to all parties that noise effects on wildlife can be regulated under this Chapter.

7. Comment: The proposed regulations apply only to areas that are defined as protected locations which is impermissibly narrow given the purpose and language of the Site Location of Development Law. The Site Law mandates that the developer make adequate provision for fitting the development harmoniously into the existing natural environment.

Response: In the preamble of the current regulation for control of noise it indicates that certain developments may cause excessive levels of noise which result in psychological, physiological or economic damage. These appear to, pertain to human health and welfare considerations which we believe should be the intent of the rule. We agree, however, that the rule should protect areas other than those designated as protected locations and have amended the rule for reasons given in response to Comment #6. No evidence has been submitted or could be found which indicates that noise levels which comply with level limits in the amended rule, would pose a threat to the natural environment.

8. Comment: A modest increase in the limits should be permitted when noise is produced on only a part-time schedule. The following should be added to Section B or Section F of the regulation.

Sound level limits of this regulation apply to new developments that will operate year-round, twenty-four hours per day. For developments with noise sources that operate on only a part time basis, the sound level limits for routine operation and routine ongoing maintenance shall be increased in accordance with the following relationship. However, this increase of the limits shall not exceed 5 dB without prior approval of the Board or Commissioner.

Percentage of Full Time Operation	Allowable Increase In Limits
--------------------------------------	---------------------------------

595

100%	0 dB
80%	1 dB
60%	2 dB
50%	3 dB
30%	5 dB
20%	7 dB
10%	10 dB

Response: We agree that some increases in limits may be warranted for part-time developments but believe that the Board should be able to review these on a case-by-case basis through the variance provision of the rule.

C. Sound Level Limits

1. Sound From Routine Operation of Developments

9. Comments: Many commenters indicated that the way daytime is defined (ending at 7 pm) is too restrictive and that 10 pm should be adopted instead. Some commenters indicated that this would adversely impact second shift work, and "off peak" energy consumption incentives and was not consistent with the EPA "levels document."

Response: We believe that a 7 pm limit is necessary to assure a time of day when neighbors of a development may rely on lower noise levels to enable them to enjoy their property without significant noise intrusion. In addition, the 7 pm daytime limit has also been used in other state noise regulation and the rule also allows for a variance from noise level limits if levels cannot be practicably met by developments who could be adversely affected.

10. Comment: Two commenters indicated that the 7 pm daytime limit should be retained.

Response: We agree, based upon the reasons given in reponse to comment #9 above.

11. Comment: The sound level limits of 60 dBA daytime and 50 dBA nighttime are set too low.

Response: We believe that since the limits are based on the EPA "Levels document" they are reasonable to protect public health and welfare. Added flexibility exists in the rule for developments which cannot practicably meet the level through the use of the variance procedure.

12. Comment: The concept of having a lower level limit for areas with low background levels is not consistent with exemptions on snowmaking, forest activities and farming as well as unregulated recreational noise making machines.

Response: We believe that areas with low background levels need to be regulated differently since an increase in 20 decibels would have a significant impact on existing noise levels and to individuals living near a development. Since the exemptions mentioned tend to be seasonal or transient activities we believe that they do not equate in impact to a permanent development producing essentially continuous levels of noise.

13. Comment: In an effort to simplify the rule it was suggested that section C(1)(9)(iv) be amended to allow an applicant to avoid measuring or estimating predevelopment ambient.

Response: The suggestions to allow the developer to avoid measuring or estimating the pre-development ambient sound levels were adopted, but only when the proposed development's operational sound levels are at least 5 dBA below the sound level limits of this section. This change from the commenters suggestion was necessary to be consistent with other portions of the rule and as a matter of regulation philosophy. We believe that given the difficulty and expense of installing noise control equipment after-the-fact and the time and expense of dealing with enforcement action, the Department prefers to be reasonably assured, (by this 5 dBA buffer) prior to the development's construction, that the level limits will be met.

14. Comment: We have amended the rule so that developments will produce, in most cases, no more than a 15 dB increase in ambient sound levels at protected locations. However, in very quiet areas (those with ambient sound levels below 40 dBA during the day and 30 dBA at night), increases greater than 15 dBA might occur and would be allowable. The rule was written in this way to be as concise and predictable as possible and since it is believed that relatively few inhabited areas of the State have ambient sound levels this low. Those areas that do exist may have relative increases in ambient sound level greater than 15 dBA, but will be protected at sound level limits of 55 dBA during the day and 45 dBA at night (which are more stringent than the limits that apply in more built-up areas of the State in most cases). With the way the sound level limits have been structured, we believe it is unnecessary to require all developers to measure "background" in all cases.

Response: We have amended the rule to maintain in most cases no more than a 15 dBA increase in ambient noise levels. However, in areas with ambient noise levels below 40 dBA during the day and 30 dBA at night, increases greater than 15 dBA are allowed. This was done to keep the rule as concise and predictable as possible and was based on the premise that relatively few inhabited areas of the state would have background levels below 30 dBA at night and 40 dBA during the day. Those that do exist will have greater relative increases in ambient levels but would be protected from impacts on health and welfare by a noise level limit more conservative than the rule requires for some of the more described portions of the state. Requiring measurement of "background levels" in all cases by developers we believe is unnecessary. The rule has been designed as a performance standard type of regulation for the protection of health and welfare with special provisions for low ambient noise areas, the measurement of ambient levels therefore, would provide no useful function since relative increases above these levels are not considered.

15. Comment: There is a bias towards noise producers in the limits established for remote, low ambient noise areas. If the noise levels are on the order of 40 decibels during the day or 30 decibels at night, then the same limits apply 60 and 50 which essentially is allowing a 20 decibel increase over

Response: We agree and have modified the rule for the reasons outlined in comment #14 above.

16. Comment: A suggestion was made to clarify subsection C to insure that a developer is not required to measure existing ambient levels and that he or she has the option of abiding by the rule's level limits or the hourly sound levels of their development plus 3 dBA.

Response: The suggestion was adopted, since the rule should be clear that there is no requirement to measure existing ambient levels prior to expansions and that the use of the 3 dBA plus background is indeed optional for a developer.

17. Comment: Three commenters expressed a concern about "creeping" increases in existing noise levels as a result of expansions of a facility. One commenter indicated that in the case of short duration repetitive sound it would allow one to essentially double the noise producing activity of a facility.

Response: It is generally accepted in the acoustics field that an increase of not more than 3 decibels in sound levels is difficult to perceive by humans. Therefore, we felt that allowing industries their grandfathered noise level plus 3 dBA would not significantly impact nearby neighbors.

18. Comment: The "3 dBA plus background" proposed for future expansions cannot possibly cover every industrial situation in the state. The grandfathered concept needs to be expanded for existing industries.

Response: We believe that the 3dBA allowance combined with the option of either using the rule's sound level limits or requesting a variance, is sufficient to provide needed flexibility for existing industries.

19. Comment: Many commenters opposed the rule's handling of short duration repetitive sound due to its impact on affected industries and/or its lack of basis in the EPA "levels document", or precedence in other federal state or local noise regulations. Suggested changes included the use of a 5dBA penalty, elimination of the maximum sound level measurement requirements changing the short duration repetitive sound time limit to 3 seconds and assessing a 10 dba penalty on short duration repetitive sound from 10 pm to 7 am.

Response: The section on short duration repetitive sound has been modified to allow for most short term duration sounds to be measured using a 5 dBA penalty and including it in the hourly sound level as suggested. However for scrap metal, drop forge or metal fabrication operations, or for particularly annoying short duration repetitive sounds, or those which could pose a threat to the health and welfare of nearby neighbors, we believe the Board should reserve the right to impose a maximum fast sound level limit using an "Lmax fast" metric, to insure that nearby neighbors are adequately protected.

20. Comment: Several commenters urged that the short duration repetitive maximum sound level limits (using "Lmax fast" as a metric) be retained.

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Response: We agree, but only for particularly annoying sounds or those which pose a threat to public health and welfare. The section of the rule has been modified accordingly to regulate scrap metal, drop forge or metal fabrication operations and to allow the Board to make the distinction on other types of noise on a case-by-case basis.

2. Sound From Construction of Developments

21. Comment: A 6 am to 10 pm definition of daytime was proposed to apply to construction sound limits to allow contractors greater flexibility due to weather conditions and Maine's abbreviated construction season.

Response: We believe that the 7 am to 7 pm definition of daytime is reasonable, since under the rule a permit from a municipality where the construction is taking place can authorize higher levels of night-time construction sound for up to 90 days. If longer than 90 days is required the municipality and the Board can issue a permit to authorize this for greater periods.

22. Comment: The contractor or developer should not have to go to the Board for approval when, because of unforeseen circumstances a project falls behind schedule and necessitates a night-time permit for less than 90 days.

Response: We agree. The rule has been drafted to allow this by allowing municipalities, not the Board, to issue permits.

23. Comment: Construction activity noise levels should be limited to OSHA Standards unless the developer is able to show that due to existing circumstances or absolute necessity OSHA Standards cannot be met.

Response: We agree. Section C (2)(b) has been modified accordingly.

24. Comment: Duration of construction noise levels in excess of OSHA Standards should be limited to the greatest extent possible with not more than a 10 dba increase in any area.

Response: We agree. Section C(2)(b) has been modified accordingly.

25. Comment: Two commenters expressed concern that the requirement for best available noise abatement on construction equipment purchased one year or more after the effective date of the rules will be unusually burdensome to contractors.

Response: We agree. Section C(2)(c) has been amended to eliminate the best available noise control devices requirement.

26. Comment: "Railroad equipment operating in compliance with federal noise regulations" should be changed to read "Railroad equipment operating which is subject to federal noise regulations".

Response: We agree. It would impose an undue hardship on a developer to assure that federal noise regulations were being met by railroad equipment (operating on the site) that he does not necessarily own and to provide abatement if the regulations were not being met. The aircraft operations exemption was also changed to reflect this comment to provide consistency.

27. Comment: "Registered and inspected automobiles and trucks and their accessory equipment" should be changed to "Registered and inspected vehicles" so that truck tractors, trailers and semi-trailers would also be taken into consideration in the exception.

Response: We agree. The intent of the exemption is to have all types of vehicles exempted from the rule.

28. Comment: It was recommended by one commenter that the exemption for registered and inspected cars and trucks, and accessory equipment associated with a development requiring site law approval, be eliminated.

Response: We believe that the exemption is a reasonable one since in many cases developers have little or no control over the selection of vehicles making deliveries to a site. In addition, we believe that noise levels of vehicles operating on a public way are best regulated under current motor vehicle laws.

29. Comment: One commenter requested the relaxation of the 30 minute exemption to 1 hour for parked delivery or pickup vehicles in a development due to the move by industry toward not keeping large inventories.

Response: We believe the request is reasonable and will not have significant impact on protected locations. The rule has been modified accordingly.

30. Comment: A commenter requested that the exemption for "watercraft while underway" be amended to add "anchored, moored or working cargo"

Response: Since watercraft are exempted from the rules in most situations unless they are working cargo, anchored, or moored at a facility licensed under the site law and since a major noise event which occurred at such a facility in the past prompted this rule, we believe that this proposed exemption would not be within the rule's intent of protection of public health and welfare.

31. Comment: One commenter recommended that the exemption for watercraft associated with developments requiring site law approval be eliminated.

Response: We do not believe the site law can regulate noise from watercraft underway on a adjacent waterbody originating from a development site. We believe that watercraft noise is best regulated under existing state or federal watercraft regulations.

32. Comment: Eliminate the residential development exemption at least with respect to construction of such developments.

Response: We recognize that construction of residential developments could produce significant levels of noise which should be regulated. Appropriate changes to this exemption have been made.

33. Comment: Eliminate the forestry exemption for development related activities (site clearing).

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Response: Since we believe it would be an undue hardship for developers to provide for noise abatement for a temporary activity that could be done as a matter of Forest Management (without a site permit), we believe the exemption is a reasonable one.

34. Comment: Waste water treatment operations and solid waste recycling and disposal operations should be added to the exemption list.

Response: Although we believe that these activities are environmentally important, if they are not properly designed or operated they could possibly produce excessive noise on a long term basis. There appears to be no justification to exempt them.

D. Submissions

1. Developments with Minor Sound Impact

35. Comment: Why require a developer to, by estimate or example, demonstrate that the regulated source from routine operations will not exceed 5 dBA less than the applicable limits established by the rule. If an estimate that operations will meet applicable limits proves inaccurate and those limits are exceeded, the developer would be subject to enforcement action.

Response: It is a matter of regulation philosophy. We believe that given the difficulty and expense of installing noise control equipment after-the-fact and the time and expense of dealing with an enforcement action, the Department prefers to be reasonably assured (through this 5dBA "buffer") prior to the development's construction, that the level limits will be met.

36. Comment: Changes were suggested by one commenter to include expansions or modifications of an existing development under this section.

Response: The suggestions were adopted, since some expansions or modifications could have minor sound impact and it would be an undue burden on a developer to be required to submit unnecessary technical information.

F. Variance From Sound Level Limits

37. Comment: Criteria could be added to the variance section to allow defense contractors to exceed noise level limits if it was in the interest of national defense.

Response: We agree. The section has been modified to allow this as well as developments in the interest of public safety provided the sound level limits would unduly limit the development's intended function.

G. Definitions

38. Comment: It was suggested by two commenters that the definition of permanent residence be modified. One commenter suggested the word "seasonal" be deleted. Another indicated that the definition be modified to include the following: "This term does not include buildings or structures owned by the applicant" or alternately that a sentence be added to the definition to provide that the term doesn't include any building for seasonal residential occupancy located on lands owned by the applicant.

Response: We do not believe that exempting seasonal residences from being considered as protected locations is within the intent of protecting public health and welfare. Many times one of the primary reasons for the seasonal residence is to afford the owner a place relatively free from noisy activities. The allowance for purchasing of noise easements in the rule would allow flexibility for dealing with leased lands as well as for occassionally used seasonal residences.

39. Comment: It was suggested by 3 commenters that the protected location definition be modified so that historic areas, nature preserves and state parks without camping areas be considered protected locations only during their regular hours of operation and that daytime hourly sound level limits apply regardless of the time of day.

Response: We agree. Suggestions were incorporated into the definition to reflect this, since the intent of the rule is to protect public health and welfare and these areas would not need protection when not open to the public.

40. Comment: Suggestions were made by one commenter that the Moosehorn National Wildlife Refuge, Appalachian Trail, federally designated wilderness areas and National Audubon Society sanctuaries be considered as protected locations.

Response: We agree. They are of similar importance to other areas designated and deserve similar protection. The definition has been modified to include these as well as state designated wilderness areas.

41. Comment: Special situations where the Board may designate transient living accommodations as protected locations are not defined.

Response: The definition has been modified to provide the Board guidance on these special situations by requiring determination of whether the health and welfare of guests and/or the economic viability of the establishment will be unreasonably impacted.

42. Comment: Several commenters suggested that the definition of short term duration repetitive sounds be modified. One commenter was concerned about the use of the 6dBA spike above baseline in the definition as being arbitrary. Another commenter suggested a duration of 3 seconds or less rather than 10 seconds or less.

Response: We believe that the definition is a reasonable one which will describe potentially annoying short duration repetitive sounds. An increase in the sound level of at least 6dBA above the sound level observed immediately before and after the event was selected on the basis of measurement practicality. If the event raised the sound level by 5 dBA or less the measurer would have difficulty deciding whether the sound level increase was due to a short duration sound event or to some other occurrence of noise. We chose 10 seconds or less as a duration limit rather than 3 seconds or less because we believe there are noise events of greater than 3 seconds in duration that should be considered short-term as compared to one hour.

2.4 Measurement Location

43. **Comment:** The rule does not state where sound level readings ought to be taken. A suggestion was made by the commenter that they be taken at the property line of the development.

Response: The rule has been amended to include a sound level limit of 80 dBA at the development's property line which will require that sound level readings be taken at that location. The rule further states that in addition sound level readings need to be taken at nearby protected locations most likely affected by the sound of the development. At protected locations more stringent sound level limits will apply. In some cases, where a protected location abuts the development's property line, the protected location will be the most likely measurement location and the more stringent sound level limits will take priority.

Measurement of Ambient Sound

3.1 Predevelopment Ambient Sound

44. **Comment:** One commenter suggested that Section 3.1(a) be modified so that a developer would only be required to measure predevelopment ambient a representative sample of days, as opposed to everyday of the week the development will operate. The commenter suggested that the second sentence of the paragraph be replaced with "at a minimum measurements shall be made on two weekdays during all hours of the day that the development will operate. If the proposed development will operate during weekends an additional measurement shall be made for one weekend day during the hours that the development will operate".

Response: We agree that the minimum measurement period can be reduced from everyday of operation; however, we believe that if operation of a development is to occur on Saturday and/or Sunday, that measurements need to be taken for all hours of operation on these days. Since sound level limits in most cases may not vary greatly on "weekdays" from (Monday thru Friday) we believe that measurements need only be taken at a minimum of 3 representative days rather than 2 as suggested. Three days would provide a greater range of sound level data to better determine pre-development ambient. Changes have been made to 3.1(a) to reflect this.

Measurement of Sound from Routine Operations

45. **Comment:** One commenter suggested that Section 4.1 be amended to require Department staff investigating a complaint and doing compliance testing to be required to notify the development or industry to allow its participation in the testing.

Response: We believe this should be left up to the Department's enforcement staff to determine on a case-by-case basis or possibly included in an enforcement policy. As a requirement of the rule it would severely limit the enforcement capability of the Bureau in some cases.

Errata Sheet
Proposed Final Rule
10-11-89

- Pg. 13 Definition #16. Protected Location, Paragraph #1, Line #14, Eliminate "." after the word "area" and add "; or any location within consolidated public reserve lands designated by rule by the Bureau of Public Lands as a protected location."

- Pg. 18. Paragraph a. Line 5 change "Monday to Friday" to "Monday thru Friday".

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Attachment I. DEP Standards on Noise and Shadow Flicker at Wind Power Projects

January 10, 2008

To: David Littell, Commissioner

From: Andrew Fisk, Bureau Director, Land & Water Quality

Re: DEP standards on noise and shadow flicker at windpower projects

Noise standards

The Department has extensive experience with its noise regulations (06-096 CMR, Chapter 375) which are administered under the provisions of the Site Location of Development Act. These rules have been in place since 1979 and have been applied to hundreds of different types of projects around the state. These rules were developed to consider a wide range of activities that generate different types of noise in different settings. The rules were consciously designed to consider many different types of developments, rather than be particular to any one type of noise or development. That said, there are rules and ordinances that have been developed for particular types of projects, including wind power projects.

Following the issuance of the Site Location permit for the Mars Hill windpower project, which required the submission of detailed predevelopment wind studies, the Department worked with the owners of the facility to scope and then review a post-development noise study. This monitoring work began in spring 2007 and is continuing through the winter of 2008. The results of this ongoing assessment of the noise generated by the project have been reviewed by the Department as well as a consultant hired by the Department to peer review the work of the applicant's consultant.

As a result of the consultant's assessment of other existing noise rules developed for windpower projects; the Department's experience with its own noise regulations; and the peer review of both pre- and post-development noise studies at the Mars Hill site, the Department has developed a number of specific conclusions and recommendations regarding the applicability of the noise rules to wind power projects.

Shadow flicker

There has been some comment provided to the Department that wind turbines have caused impacts on private residences from shadow flicker when sun shines behind an operating turbine. Maine's northern latitude may make wind power projects susceptible to causing irritating shadow flicker as a result of low altitude sun during certain times of year. Shadow flicker is described as "moving shadow on the ground resulting in alternating changes in light intensity" and has been noted to cause concern in Northern Europe (NRC 2007). The NRC report notes that there is available modeling software that allows for shadow flicker to be assessed and mitigated in the layout and design of windpower projects that are near developed areas.

Conclusions & recommendations

- ❖ Except for one clarifying change outlined below, the existing statute and rules are sufficient to allow the Department to regulate the noise effects of wind power turbines. DEP's noise rules conform with the stated best practices of the National Research Council's 2007 report on the "Environmental Impacts of Wind-Energy Projects."
- ❖ Revise Chapter 375.10 (E) to provide the Commissioner with the authority to "establish any reasonable requirement to ensure that the developer has made adequate provision for the control of noise . . ." Present language limits that authority to the Board of Environmental Protection (BEP) only.
- ❖ Noise generated from wind turbines does have attributes that warrant particular focus in the review of projects, including the low-frequency modulating noises generated as turbine blades pass by towers.
- ❖ Analysis of ambient noise generated by wind must be carefully evaluated with specific equipment in pre-development and post-development monitoring so that it is not considered a component of noise generated by a wind turbine.
- ❖ Post-monitoring studies require careful placement of monitors that account for the effects of topography, prevailing wind (at both ground and turbine levels).
- ❖ Post-monitoring studies must be conducted during operational conditions that generate the most noise and during seasons or times when sound propagation is likeliest (such as wintertime snow cover).
- ❖ Variances from the existing noise regulations should only be granted in the circumstances set forth in the applicable section of the DEP regulations, where particular attention must be focused on precisely determining the characteristics of ambient noise.
- ❖ LURC should adopt parallel rules to those of the DEP to provide more detailed guidance than LURC rules currently provide and to make standards consistent statewide.
- ❖ To ensure that shadow flicker is not an adverse impact on protected locations, applicants for windpower projects in either LURC or DEP jurisdiction should demonstrate where shadow falls will occur and to what extent shadow flicker will result. Shadow flicker should be considered in the design of any project and minimized to the extent practicable. There is sufficient statutory authority in DEP and LURC law to request and review this information.

References

National Research Council. 2007. Environmental Impacts of Wind-Energy Projects. (Washington, D.C.: National Academies Press)

Wind Turbine Neuro-Acoustical Issues
Dora Anne Mills, MD, MPH Maine CDC/DHHS
June, 2009

1. What protections are in Maine law regarding excessive noise and vibrations?

Maine DEP has rules that apply to all developments in unorganized areas of the state and in all municipalities without a more restrictive noise ordinance. The rules recognize in its text that excessive noise can degrade health and welfare of nearby neighbors, and they provide limits based on the type of development in the area surrounding the noise. For instance, they limit noise levels for routine operation of a proposed development: to 75 dBA at any time; to 60 dBA during the daytime and 50 dBA during the nighttime for non-commercial and non-industrial areas; and to 55 dBA daytime and 45 dBA nighttime for areas in which ambient sounds are 45 dBA or less daytime or 35 dBA or less nighttime.

Maine DEP also has retained the services of a noise expert to review noise study submissions as part of wind turbine applications and compliance evaluations.

DEP's ambient, post development monitoring at the Mars Hill wind farm shows dBA levels higher than 45, sometimes exceeding 60 when there are windy conditions both at ground level and at turbine height. This presents an example of how ambient noise from wind at these locations (which is why turbines are placed there) is in excess of the optimal nighttime 45 dBA. The DEP rules and compliance monitoring provide for distinguishing between the ambient contribution to noise and that from turbines at wind farms.

In summary: Maine law appears to essentially place a 45 dBA noise limit on most wind turbine projects in Maine. A 5 dBA variance to limits may be granted upon specific findings that concern pre-development existing ambient noises that are in excess of a particular standard. For compliance with the rule, noise levels are measured at the boundary of the property owned by the proposed developer.

Sources:

- o Maine DEP rule-making authority on noise is in Title 38 Section 343
Rules are in Chapter 375, Section 10:
<http://www.maine.gov/sos/cec/rules/06/096/096c375.doc>
- o Maine SPO Noise Technical Assistance Bulletin
<http://www.maine.gov/spo/landuse/docs/techassist/techassistbulletins/noisetabulletin.pdf>

2. What do different noise levels compare to?

40 dBA is comparable to a quiet room. 55 dBA is comparable to a household room or office in which there is normal background vibration and sounds such as is commonly found from household appliances.

COMPARISON OF SOUND PRESSURE LEVEL AND SOUND PRESSURE		
Sound Pressure Level, dB		Sound Pressure, Pa
	120	20
Pneumatic Chipper (at 5 ft)	110	10
Textile Loom		5
	100	2
Newspaper Press		1
	90	0.5
Diesel Truck 40 mph (at 50 ft)		0.2
	80	0.1
	70	0.05
Passenger Car 50 mph (at 50 ft)		0.02
Conversation (at 3 ft)		0.01
	50	0.005
	40	0.002
Quiet Room		0.001
	30	0.0005
	20	0.0002
	10	0.0001
	0	0.00005
		0.00002
		Rock-n-Roll Band
		Power Lawn Mower (at operator's ear)
		Milling Machine (at 4 ft)
		Garbage Disposal (at 3 ft)
		Vacuum Cleaner
		Air Conditioning (Window Unit at 25 ft)

Canadian Centre for Occupational Health and Safety
(see www.ccohs.ca/oshanswers/phys_agents/noise_basic.html).

3. What kinds of noises are expected from wind turbines?

According to several resources, new wind turbines are relatively quiet, and meet federal and international standards and regulations for noise, including Maine's regulations. According to the US Department of Energy, a modern wind farm at a distance of 750 – 1,000' is no louder than a kitchen refrigerator or a moderately quiet room.

However, there are people who live about these distances from wind turbines who disagree with this federal agency statement. It appears from the research that distance from the wind turbine, height of the wind turbine relative to the surrounding topography, the quality of the sound (repetitive low frequency sound), wind conditions, and wind direction all affect how the wind turbine noise affects people. Research done on wind turbines, airport and other sources of noise indicates that annoyance levels are difficult to assess. However, taking in account the above factors as well as careful measurements need to be considered when siting wind turbines near residential properties.

Sources:

- o US Dept of Energy's Wind Energy Guide for County Commissioners:
<http://www.nrel.gov/wind/pdfs/40403.pdf>
Page 6: An operating modern wind farm at a distance of 750'-1,000' is no louder than a kitchen refrigerator or moderately quiet room.
- o University of Massachusetts Renewable Research Energy Laboratory:
http://www.windpoweringamerica.gov/pdfs/workshops/mwwg_turbine_noise.pdf
Contains a number of resources on sounds emitted from wind turbines
- o Noise levels of small residential wind turbines:

Dept of Energy's Consumer Guide on Small Wind Turbines
http://apps1.eere.energy.gov/consumer/your_home/electricity/index.cfm/mytopic=10930

Comparable sounds to wind turbines

- Wind Turbine Noise Issues: A white paper prepared by Renewable Energy Research Laboratory, U of Massachusetts, 2004:
<http://www.town.manchester.vt.us/windforum/aesthetics/WindTurbineNoiseIssues.pdf>

4. Are there health effects to the levels of sound heard by wind turbines?

According to a 2003 Swedish EPA review of noise and wind turbines:

“Interference with communication and noise-induced hearing loss is not an issue when studying effects of noise from wind turbines as the exposure levels are too low.”

In my review I found no evidence in peer-reviewed medical and public health literature of adverse health effects from the kinds of noise and vibrations heard by wind turbines other than occasional reports of annoyances, and these are mitigated or disappear with proper placement of the turbines from nearby residences. Most studies showing some health effects of noise have been done using thresholds of 70 dBA or higher outdoors, much higher than what is seen in wind turbines.

Sleep disturbance is another commonly raised concern, and the WHO guidelines for community noise recommend that nighttime outdoor noise levels in residential areas not exceed 45 dBA, which is consistent with Maine law.

Sources:

- Noise Annoyance from Wind Turbines – A Review 2003 Sweden Environmental Protection Agency
<http://www.barrhill.org.uk/windfarm/noise/10%20pederson.pdf>
 This study found no evidence of health problems, reviews the variety of noise regulation laws in place in Europe
- British Medical Journal 2007 Swedish Study (Eja Pedersen)
<http://oem.bmj.com/cgi/content/full/64/7/480?ijkey=b1a1ac4a98c9453315a90941395e0a05262aca53>
 Survey in Sweden of residents near wind turbines found annoyance increased with increased sound pressure levels (SPLs), and increased annoyance was associated with lower sleep quality and negative emotions.
- Noise Pollution: Non-Auditory Effects on Health, 2003
<http://bmb.oxfordjournals.org/cgi/content/full/68/1/243>
- World Health Organization Community and Occupational Noise
<http://www.who.int/mediacentre/factsheets/fs258/en/>
- World Health Organization 2002 Technical Meeting on Relationship Between Noise and Health
<http://www.euro.who.int/document/NOH/exposerespnoise.pdf> Page 52 says that WHO standard is for nighttime noise not to exceed 45 dB.

5. What about low frequency noises (LFN)?

Some have pointed to LFN emitted from wind turbines as a possible source of adverse health effects. The reasons LFN are focused on include: LFN encounter less absorption as they travel through air than higher frequency sound, so they persist for a longer distance; the amount of sound transmitted from the outside to the inside of a building is higher with LFN; and some models for assessing impact of noise do not adequately include LFN.

Low frequency and infrasound (lower than what is perceptible) vibrations are very common in our background, and known to be emitted from many household appliances and vehicles as well as in neighborhoods near airports and trains. Exposure to very intense LFN can be annoying and may adversely affect overall health, though these levels appear to be more intense than what is measured from modern wind turbines.

The DEP noise regulations are based on the "A" frequency range of noise, which measures the higher frequency end of the noise spectrum, and is denoted with the term dbA. Because the dbA measurement deemphasizes noises from the lower end of the frequency spectrum (or "C" weighted noise, dbC), Maine DEP has been evaluating noise models and predicted noise levels from proposed wind power facilities using a handicapping system that requires an applicant to prove that dbA noise levels will be at such a level at property boundaries that they are effectively controlling for low frequency noises in the dbC range. The Land Use Regulation Commission has required monitoring for dbC noise at one of its recently permitted wind turbine facilities in order to evaluate dbC noise levels at property boundaries.

One recent study commonly cited by proponents of the belief of the physiological impacts of LFN is: "Tuning and sensitivity of the human vestibular system to low-frequency vibration", Todd, et al. Neuroscience Letters, 2008, which can be found at: <http://www.ncbi.nlm.nih.gov/pubmed/18706484>. This study indicates that the human vestibular system is sensitive, which means it shows a physiological response, to low-frequency and infrasound vibrations of -70 dB, indicating that human seismic receptor sensitivity of the vestibular system may possibly be on par with the frog ear. However, sensitivity, i.e. showing a physiological response, does not mean there are adverse effects.

Summary:

Reviews found in peer reviewed journals of the possible health effects of low frequency noise have not found evidence of significant health effects (several references are listed below).

Sources:

- o Infrasound from Wind Turbines: Fact, Fiction, or Deception? Journal of Canadian Acoustics, Volume 34, no 2, 2006.
<http://www.wind.appstate.edu/reports/06-06Leventhall-Infras-WT-CanAcoustics2.pdf>

"Infrasound from wind turbines is below the audible threshold and of no consequence. Low frequency noise is normally not a problem, except under conditions of unusually turbulent in flow air. The problem noise from wind turbines is the fluctuating swish. This may be mistakenly referred to as infrasound by those with a limited knowledge of acoustics, but it is entirely in the normal audio range and is typically 500Hz to 1000Hz. It is difficult to have a useful discourse with objectors whilst they continue to use acoustical terms incorrectly. This is unfortunate, as there are wind turbine installations which may have noise problems. It is the swish noise on which attention should be focused, in order to reduce it and to obtain a proper estimate of its effects. It will then be the responsibility of legislators to fix the criterion levels. However, although the needs of sensitive persons may influence decisions, limits are not normally set to satisfy the most sensitive."

- Sources and Effects of Low-Frequency Noise 1996
<http://scitation.aip.org/getabs/servlet/GetabsServlet?prog=normal&id=JASMAN00099000005002985000001&idtype=cvips&gifs=yes>
J. Acoust. Soc. Am. Volume 99, Issue 5, pp. 2985-3002 (May 1996)
- Characteristics of low frequency signals emitted from home electric appliances:
<http://sciencelinks.jp/j-east/article/200507/000020050705A0229983.php>,
- Magnetic Emission Ranking of Electrical Appliances:
<http://rpd.oxfordjournals.org/cgi/content/abstract/nem460v1>)
- International Meeting on Low Frequency Noise and Vibration and Its Control, the Netherlands, 2004
[http://www.viewsofscotland.org/library/docs/LF turbine sound Van Den Berg Sep04.pdf](http://www.viewsofscotland.org/library/docs/LF_turbine_sound_Van_Den_Berg_Sep04.pdf)

6. What are the health benefits to wind turbines?

- There are tremendous potential health benefits to wind turbines, including reductions in deaths, disability, and disease due to asthma, other lung diseases, heart disease, and cancer. Maine has among the highest rates in the country of asthma and cancer.
- Wind turbines mean less dependency on foreign oil and coal that contribute to global warming and pollution (coal produces carbon dioxide, acid rain, smog, particulate pollution, carbon monoxide, and mercury), which in turn contribute to the diseases above.
- According to the Maine DEP, if Maine generated 5% of its electricity from wind power, there would be significant pollution cuts:
 - 464,520 tons per year of CO₂
 - 252 tons per year of SO₂
 - 147 tons per year of NO_x

7. What about a moratorium on wind turbine projects?

- I do not find evidence to support a moratorium on wind turbine projects at this time. The articles cited by those who are in favor of a moratorium are either from non-peer reviewed journals (though some are labeled as "peer reviewed") or are misinterpreted analyses from peer reviewed journals.

- If there is any evidence for a moratorium, it is most likely on further use of fossil fuels, given their known and common effects on the health of our population.

Basic Wind Turbine Noise-Related Resources:

- US Dept of Energy's New England Wind Power Website on Wind Turbine Sound – this has a good summary and links to references
http://www.windpoweringamerica.gov/ne_issues_sound.asp
- Massachusetts DEP Regulations
<http://www.nonoise.org/lawlib/states/mass/mass.htm>
"A source of sound will be considered to be violating the Department's noise regulation (310 CMR 7.10) if the source: Increases the broadband sound level by more than 10 dB(A) above ambient, or Produces a "pure tone" condition - when any octave band center frequency sound pressure level exceeds the two adjacent center frequency sound pressure levels by 3 decibels or more. These criteria are measured both at the property line and at the nearest inhabited residence. Ambient is defined as the background A-weighted sound level that is exceeded 90% of the time measured during equipment operating hours. The ambient may also be established by other means with the consent of the Department."
- Ongoing Research is being done by the US Dept of Energy Wind Turbine Aeroacoustic Research:
http://www1.eere.energy.gov/windandhydro/wind_research_enable.html#research
"Turbine noise can be caused by rotor speed, blade shape, tower shadow, and other factors. The program is sponsoring both wind tunnel and field tests to develop a noise prediction code that turbine manufacturers can use to ensure that new rotor designs and full systems aren't too noisy. This is especially true for high-growth U.S. markets for small wind turbines that will demand quieter rotors, especially when turbines are sited in residential neighborhoods. Small turbines operate at high rotational speeds and tend to spin even if they are furled (pointed out of the wind).
- **Background Information on Noise:**
http://www.osha.gov/dts/osta/otm/noise/health_effects/physics.html
http://www.ccohs.ca/oshanswers/phys_agents/noise_basic.html
<http://www.phys.unsw.edu.au/jw/dB.html>
The decibel (dB) is used to measure the intensity of sound. It uses a logarithmic scale and describes a ratio where 0 is at the threshold of human hearing. When measuring sound, filters are usually used. The A scale filter results in sound level meters called dBA that are less sensitive to very high or very low frequencies. The C filter provides more of a measurement of low frequency noise.

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May 19, 2009

Dr. Charles Danielson
Chair, Public Health Committee
Maine Medical Association
P.O. Box 190
Manchester, Maine 04351

Dear Dr. Danielson:

The Independent Energy Producers of Maine (IEPM) is a not-for-profit association of renewable power producers, suppliers of goods and services to those producers, and other supporters of the industry. IEPM members generate electricity in a sustainable manner from hydropower, biomass, wind, tidal, and waste to energy. On behalf of the members of the IEPM with interests in wind power, I am writing regarding the ongoing discussion within the Maine Medical Association's (MMA) Public Health Committee on sound and other purported health issues related to the operation of wind turbine facilities in Maine. We understand that the MMA has been asked to consider the medical and scientific facts related to this matter and that the committee will likely be making recommendations in the near future.

The purpose of this letter is to share information relevant to this discussion that may be helpful to the members of the Public Health Committee as they consider this matter.

The information provided herein comes from credible sources that have performed measurements and prepared reports that are consistent with the scientifically objective standards of medical professionals and organizations like MMA. Many of the listed sources/organizations are recognized for their primary research of various aspects of sound produced by utility grade wind turbines (e.g., DELTA) and are principal organizers of internationally recognized specialty conferences (e.g., INCE Europe - 2005, 2007 & 2009) related to causes, effects and mitigation of wind turbine noise (e.g. Leventhal, Pederson, Sondergaard and van den Berg). Several of the listed authors can be found published in a variety of technically peer-reviewed, scientific journals. Caution should be exercised when referring to publications that rely on the author's selection of secondary or tertiary sources of information or when authors have no direct experience with measuring wind turbine sound in accordance with appropriate national and international standards (such as the American National Standards Institute (ANSI) and the International Standards Organization (ISO)).

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Independent Energy Producers of Maine PO Box 743 Augusta, Maine 04332 (207) 626-0730 info@iepm.org

This material also reflects IEPM's strong belief that a science-based approach is essential to considering these matters. Accordingly, we rely on direct measurements and scientifically objective materials, as MMA members and other credible organizations and individuals would. It is imperative that decisions on these matters be based on fact and science to avoid blurring of any legitimate issues with issues created or overstated for the sole purpose of fomenting opposition to wind energy projects. Clearly, any concern that wind turbines may impact someone negatively must be explored. However, we are not aware of scientifically peer-reviewed information demonstrating a link between wind turbines and negative health effects of infrasound and low frequency noise (ILFN). ILFN is produced by all heavy rotating machinery, combustion sources, including domestic furnaces and HVAC equipment commonly found in hospitals. IEPM also urges the MMA to place wind turbine sound levels into the context of other common energy, industrial, commercial, medical, residential, traffic, aircraft and natural sources. These other common sources produce sounds – including ILFN – that equals or substantially exceeds that produced by utility grade wind turbines.

IEPM and its members have gathered a significant amount of information on infrasound, low-frequency sound, and shadow flicker – the most frequently cited concerns related to health effects. We urge committee members to review these materials prior to making any recommendations. Following is a synopsis of relevant studies and sources, with citations linking to each of the studies that have been provided as attachments to this letter.

Infrasound. Low frequency pressure vibrations are typically categorized as *low frequency sound* when they can be heard near the bottom of human perception (<1-200 Hz), and *infrasound* when they are below the common limit of human perception. According to a review by Rogers et al. (2006) of the University of Massachusetts at Amherst, infrasound is always present in the environment and stems from many sources including ambient air turbulence (i.e., wind), ventilation units, waves on the seashore, distant explosions, traffic, aircraft, and other machinery. Although infrasound may not be “heard” based on the normal meaning of the word, under certain circumstances it can be perceived by humans; there is some degree of auditory perception below frequencies of 20 Hz and there are non-auditory mechanisms such as the vestibular balance system and the resonant excitation of body cavities by which humans can sense infrasound (Howe et al.2006).

In the peer-reviewed journal *Canadian Acoustics*, Dr. Geoff Leventhall, an acoustical expert specializing in wind turbine sound, concludes, “...it is clear that modern, utility-scale wind turbines do not generate infrasound at levels of concern.”

In November 2006, HGC Engineering was asked to address the issue of infrasound related to wind farms and concluded that “*there is no evidence of adverse health effects due to infrasound from wind turbines.*” According to HGC Engineering, while infrasound can and does occur around wind turbines (primarily at very close distances) it is generally below background levels caused by natural sources such as wind (Howe et al. 2006).

In October, 2008, the Canadian Wind Energy Association compiled a list of articles and publications from reputable sources on issues associated with infrasound from wind turbines. CANWEA noted that these publications “...clearly show that there is no peer-reviewed scientific evidence turbines have an adverse impact on human health.”

Finally, according to a review by Danish Electronics Light & Acoustics (DELTA 2008), “*There seem to be solid evidence and general agreement among researchers and technicians that wind turbines do not emit audible infrasound. The levels are far below the hearing threshold.*”

Low-Frequency Sound. The overall sound signature of most wind turbines is broadband. *Low frequency sound* (LF) is the audible sound at the low end of the sound spectrum. It is not a new or mysterious phenomenon. As a general rule, lower frequency sound does carry farther than higher frequencies, and is less likely to be attenuated by structures. (*RISO National Laboratory: "Low frequency noise from MW wind turbines - - mechanisms of generation and its modeling"; April 2008*). This is well known to acousticians and is accounted for in the assessment of environmental sound impacts. According to a review by Danish Electronics Light & Acoustics (DELTA 2008), "...at distances at 6 hub heights (600m)[1,969 ft] or more, the wind turbine is among the sound sources with the least contribution to LF-noise indoor and outdoor".

The terms *infrasound* and *low-frequency sound* are sometimes used erroneously in reference to *amplitude modulation* (AM). Wind turbines make a fluctuating "whoosh-whoosh" sound that results from the rotating blades passing at 1-2 second intervals (i.e., at a low frequency of 1-2 Hz). It is this sound that most experts agree can be objectionable to neighbors (e.g., see Howe et al. 2006, Leventhall 2006, Moorhouse et al. 2007). This sound is within the audible range (typically 500 to 1000 Hz, according to Leventhall 2006), measureable, and here in Maine there are specific regulatory standards that address sounds of this type (see below).

Maine Noise Regulations. Predicting, measuring and regulating environmental sound is a complex and technical undertaking. Here in Maine, wind energy facilities are required to meet the standards set forth in the noise regulations administered by Maine DEP. DEP's current noise regulations were developed with a variety of industrial installations in mind, such as paper mills and power plants; they have been applied to literally hundreds of projects around the state over the last 20 years and have stood the test of time. Though sophisticated, Maine's standards provide relatively clear, consistently applied, measurable standards for all projects. Importantly, Maine DEP regulations stipulate that measurements to demonstrate compliance be made when sound from the operating facility is *most clearly noticeable*. Measurements conducted at Mars Hill are consistent with published studies indicating that the sound from an operating wind facility is most noticeable at downwind locations, at night when there is a mild to strong atmospheric inversion resulting in little or no wind and ground level and moderate to strong winds aloft.

Amplitude Modulation (AM) is addressed under the *short duration repetitive sound* (SDRS) provisions of the DEP noise regulations. If sufficient in magnitude, a SDRS source is subject to a penalty of 5 dB under the regulations. Wind energy facilities are required to consider SDRS for assessing impacts and determining compliance. For example, standards for demonstrating compliance with the SDRS provisions are explicitly set forth in the recently issued DEP Order for the Rollins project in Lincoln, which reads, in part, "...In consideration of ... the potential for SDR sounds to occur, and to ensure that the 45 dBA hourly sound level limit is met during all conditions, the applicant must implement an operational compliance assessment methodology for use during very selective, meteorological and background sound conditions. The compliance assessment method will enable compliance measurements to be determined under the most favorable conditions for sound propagation and maximum amplitude modulation".

Maine DEP also regulates tonal sound, and a similar 5 dB penalty is applied to sources that meet the criteria for tones. Wind projects in Maine are required to consider tonality for assessing impacts and determining compliance.

In 2008 DEP was asked to review their regulations with respect to wind energy development as part of the *Governor's Wind Power Task Force*. Upon review of their regulations, DEP concluded that,

"...the existing statute and rules are sufficient to allow the Department to regulate the noise effects of wind power turbines".

In addition, DEP notes that their noise rules conform to the best practices of the National Research Council's 2007 report on the "Environmental Impacts of Wind-Energy Projects." Maine DEP's noise regulations were written to be protective of human health. The preamble to Maine DEP's noise regulations reads:

The Board recognizes that the construction, operation and maintenance of developments may cause excessive noise that could degrade the health and welfare of nearby neighbors. It is the intent of the Board to require adequate provision for the control of excessive environmental noise from developments proposed after the effective date of this regulation. [emphasis added]

In reviewing the concerns expressed about wind energy projects it is also critical to look at the distances where health concerns are being claimed. A significant number of health effects claims are within 1,500 feet of turbines. The Maine DEP noise regulation requires a "de-facto" setback from nearby protected locations in order to meet specified limits. Maine's quiet area (45 dBA) noise regulations for a neighboring dwelling in most rural residential areas typically requires setbacks from neighboring dwellings in excess of 2,000 feet. Despite this, there can be instances where very low ambient background sounds occur at the ground level when wind turbines are operating in accordance with quiet limits that result in clearly audible wind turbine sounds at distances of 2,000 feet and beyond.

Mars Hill. The Mars Hill facility is a unique case. Most importantly, the project was granted a variance from certain of the noise standards, so it is not subject to all of the same standards as new projects that are coming under review. Further, neighbors expected to hear no sound from the project, and so hearing any sound is contrary to what they expected. Wind turbines do make sound that can be audible to, and under certain circumstances, irritating to neighbors. (DELTA 2007; van den Berg 2006)

Shadow Flicker. Shadow flicker occurs when the blades of a turbine pass in front of the sun to create a recurring shadow on an object. Models in wind development software can determine -- down to the hour - the days and times during the year that specific buildings in close proximity to turbines may experience shadow flicker (National Research Council 2007). The effects of shadow flicker are most noticeable within about 1,200 feet and drop off with distance, and are negligible beyond about 10 rotor diameters (i.e., about 2,500-3,000 feet), according to the Northern Ireland Planning Service. The allegation is sometimes made that shadow flicker from wind turbines can cause epileptic seizures, however shadow flicker from wind turbines occurs much more slowly than the light "strobing" associated with seizures (Epilepsy Foundation undated). The strobe rates necessary to cause seizures in people with photosensitive epilepsy are 3 to 30 flashes per second and large wind turbine blades cannot rotate this quickly.

Health Benefits. Not to be overlooked is the very real potential for a shift toward emission-free electricity generation to have substantial human health benefits. Particulate matter in the air, often as a result of power plant emissions, has been shown to affect cardiovascular and respiratory health. The generation of electricity from the wind does not result in any air emissions. Wind energy can offset more polluting forms of energy generation and actually

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improve air quality. In 2007, wind energy generation prevented the emission of nearly 28 million tons of carbon dioxide – a greenhouse gas that contributes to climate change (AWEA 2007). Even when the manufacturing process of wind turbines is accounted for, wind energy results in less than two percent of the emissions from coal combustion per megawatt-hour; giving it one of the lowest greenhouse gas lifecycle emissions of any power technology (Kempton and Levy 2007).

In conclusion, we urge committee members to review the enclosed information before making a decision on this matter. We believe the MMA is on stable ground in asserting that existing wind power regulations more than adequately protect the health of the people of Maine. Furthermore, the clean, renewable power these projects generate bring significant environmental and economic benefits to the State, region, and country at large. Thank you for the opportunity to share this material.

Sincerely,



Jeremy N. Payne
Executive Director

cc: Gordon Smith, Executive Vice President
Andrew MacLean, Deputy Executive Vice President & General Counsel
Kellie Miller, Director of Public Health Policy

Enclosures:

Howe Gastmeier Chapnik Limited (HGC Engineering) study "Wind Turbines and Infrasound" for the Canadian Wind Energy Association. November 29, 2006.

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MINUTES OF MAINE MEDICAL ASSOCIATION - PUBLIC HEALTH COMMITTEE

MEETING MINUTES
February 24, 2009

MEMBERS PRESENT: In person: Chuck Danielson, MD, Norma Dreyfus, MD
Joining by phone and video: Lisa Letourneau, MD, Lani Graham, MD and Albert Aniel, MD

OTHERS PRESENT: Andrew MacLean, and Kellie Miller (Staff)

TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS
<p>Welcome & Introductions Members attended in person and via conference call and video-conference.</p> <p>Review of the December 2008 PHC meeting minutes</p>	<p>Minutes accepted</p>	
<p>Childhood Immunizations</p>	<p>Draft legislation submitted by the Maine Immunization Coalition is moving forward. Met with Health Plans to amend the language. Discussed convening a meeting with the Maine Health Management Coalition to provide an educational update on this legislation; to identify if all have preventive riders that include childhood immunizations. Kevin Lewis from the Maine Primary Care Association will connect with MHMC.</p> <p>Members discussed the need to connect with the Maine Autism Society Director and Board Members</p>	<p>Kellie will continue to represent MMA's at the Maine Immunization coalition and work with them on the legislation as it moves forward. Continue to work with Dr. Sewall and Dr. Losey on talking points that the coalition can use to educate legislators.</p> <p>Dr. Danielson will connect with the Director, after attending the May 12th Conference on Autism.</p>

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TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS
Healthy Weight Initiatives	<p>A public hearing on one of the three childhood obesity bills, will be LD 315, An Act to Track the Prevalence of Childhood Obesity.</p> <p>MMA will be working in conjunction with the Health Policy Partners of Maine (HPP) to recruit physicians to testify.</p> <p>Dr. Lisa Letourneau indicated that the MYOC is winding down and asked if there was a continued need to support ongoing efforts to help clinicians with childhood obesity in the clinician's office.</p> <p>Kellie briefly updated the members on the Childhood Obesity Press Conference that occurred with Speaker Pingree, Rep. Rankin and Rep. Miller on the three-pronged approach to combating childhood obesity. MMA was represented as well at the Press Conference, along with the American Heart Association and Health Policy Partners of Maine.</p>	<p>Dr. Danielson will testify at the Health and Human Services committee in March and testimony to be prepared by staff. Serving as backup will be Dr. Lani Graham.</p> <p>Dr. Danielson asked how we can be involved in assisting with MYOC's efforts and to keep us in mind with future endeavors to keep these efforts out in front for our physician members.</p>
Health Effects of Wind Turbines	<p>Dr. Albert Aniel connected into the meeting via conference call</p>	<p>Invite Dr. Aniel, Dr. Nissenbaum, Dr. Dora Mills and August King.</p>

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TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS
	<p>and provided a brief overview of the issue in Northern Maine regarding the use of Wind Turbines as an alternative energy source. Dr. Aniel discussed the health effects regarding the noise itself and the low frequency vibration causing stress and sleep deprivation. It was indicated that Europe is implementing guidelines for set-back at least 1.5 miles away for the large industrial wind turbines.</p>	<p>Former Governor of Maine to discuss the issue in detail at the March 25th Public Health Committee at 4pm at the MMA office.</p>
<p>2009 Annual Session Public Health Forum Focus</p>	<p>Committee members discussed the opportunity to organize the 2009 Public Health Forum on Environmental Toxins with panel members representing:</p> <ol style="list-style-type: none"> 1. The clinical connection – the use of the Pediatric Tool Kit. 2. Maine State Toxicologist to address the exposure risks in Maine. 3. The economic viewpoint – perhaps requesting Mary Davis, an economist at the University of Maine to discuss the economic cost assessment of environmentally related childhood diseases in Maine. 	<p>Committee members agreed to move forward on organizing a panel of experts for the 2009 Annual Session Public Health Forum on:</p> <p>“Environmental Toxins” – The economic cost of in-action.</p> <p>Held Sunday, September 13th, HarborSide Resort, Bar Harbor, Maine</p>

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	<p>4. Update on the Toxic Toys legislation and rulemaking process – perhaps have NRCM (Natural Resources Council of Maine) present</p> <p>5. Dr. Stephanie Lash's experience with the toxin study</p>	
<p>MMA Legislative Update</p>	<p>Andrew MacLean provided a brief legislative update on LD 353, The Budget, as well as the bill to allow for independent hygienists to perform and diagnosis/interpret x-rays, minor's access to reproductive health, ban smoking on State Beach parks.</p> <p>LD 330, An Act to Change the Classification of Certain Waters of the State and LD 550, An Act to Protect Maine Residents from Home Fires and Carbon Monoxide were brought to the committee's attention as pertinent public health legislation for the association to monitor.</p>	<p>Reminder that every Thursday evening at 8:30 pm – MMA's Legislative Conference Call is available to all members wishing to weigh in on upcoming bills in the legislature. The Call in number is 1-800-989-2842, Passcode: 6223374#</p>

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TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS
<p>Other Business:</p> <ul style="list-style-type: none"> ▪ Maine Medical Center, Division of Community & Preventive Medicine ▪ DEP's Stakeholder Meeting on the Designation of Priority Chemicals <p><u>Upcoming Activities for Public Health Involvement:</u></p> <ul style="list-style-type: none"> a. Maine Public Health Association/American Public Health Association – April 6-12, 2009 b. May 12 – Autism Conference, Augusta Civic Center c. Physicians' Day at the Legislature – May 21, 2009 	<p>Dr. Linder brought advocated for all to attend the Maine Medical center, division of Community & Preventive Medicine Conference on March 6th</p> <p>DEP's first of three stakeholder meetings on the Designation of Priority Chemicals to occur on March 6th. These preliminary draft rules are due to passed legislation, LD 2048, An Act to Protect Children from Toxic Toys.</p>	<p>Dr. Lani Graham and Dr. Paul Liebow are on this stakeholder group and will report back to the PHC when appropriate.</p> <ul style="list-style-type: none"> a. Participate in the Public Relations Campaign to increase awareness of public health. b. Dr. Danielson to attend the conference, meet with the Maine Society of Autism Executive Director and Board members to continue a dialog. c. All members attend Physicians' Day at the Legislature and promote our Public Health Efforts. <p>Next PHC meeting – March 25th, 4-6pm at the MMA or at the Dana Center, Classroom #2</p>

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TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS

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**MINUTES OF MAINE MEDICAL ASSOCIATION – PUBLIC HEALTH COMMITTEE
MEETING MINUTES**

March 25, 2009

MEMBERS PRESENT: In person: Chuck Danielson, MD, Ted Walworth, MD, Dr. Jennings joining by phone and video: Lani Graham, MD, Jim Maier, MD, Paul Santomenna (PSR), Larry Mutty, MD, Stephanie Lash, MD and Steve Meister, MD.

OTHERS PRESENT: Andrew MacLean, and Kellie Miller (Staff) and Guest Speakers: Former Governor Angus King, Dora A. Mills, MD, Michael Nissenbaum, MD and Aniel, MD, and six wind energy representatives.

TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS
<p>Welcome & Introductions Members attended in person and via conference call and video-conference.</p>	<p align="center">Minutes accepted</p>	
<p>Review of the February 2009 PHC meeting minutes</p>	<p>The entire meeting was reserved for the presentation and discussion by the following Speakers:</p> <ul style="list-style-type: none"> ▪ Former Governor Angus King, Independence Wind, LLC ▪ Dora A. Mills, MD, MPH, Director, Maine Centers for Disease Control & Prevention, DHHS ▪ Michael Nissenbaum, MD, Northern Maine Medical Center <p>Dr. Danielson framed the discussion and provided his handout on Wind Turbines and Health Effects that outlines the Relevant areas of interest to the Public Health Committee, such as:</p>	<p>The Public Health Committee's next steps will occur at the May 20th, 2009 Public Health Committee in regards to the issues brought forward by the speakers.</p> <p>If there is a recommendation by the Public Health Committee to develop a resolution on this issue, a resolution will be drafted over the summer months for</p>

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TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS
	<p>1. Health Effects. 2. Permitting and licensing. (Dr. Danielson's outline is attached for reference.)</p> <p>Former Governor Angus S. King, Jr. addressed the committee and provided an excellent overview of Independence Wind, LLC's project and the need for increased usage of wind energy. He stated that the fundamental question is "The Set Back" and proceeded to provide an overview of noise standards and provided a noise chart measuring decibels in the average hospital ER department. Mr. King reviewed that Maine has established standards through the Department of Environmental Protection, who conduct an independent study on these types of projects.</p> <p>Dora A. Mills, MD, MPH provided an overview from the departments perspective and indicated that although this is a polarizing issues, which a lot of emerging issues are like that, she noted that many websites make some very strong statements on nonpeer-reviewed studies. She paired down the issue to three over-arching concerns:</p> <ul style="list-style-type: none"> ▪ Distance ▪ Tall Wind Turbines ▪ Topography <p>Dr. Mills stated that the Mars Hill project was granted a variance and didn't have to comply with the current regulations. She also requested that as we move forward to be mindful of research in other countries and that they haven't placed any moratoriums.</p> <p>Michael Nissenbaum, MD addressed the measuring of decibels</p>	<p>presentation to the full membership at the MMA's Annual Business meeting occurring in conjunction with the Maine Medical Association's Annual Meeting, held September 11-13, 2009 at the Harborside Hotel, Bar Harbor, Maine.</p>

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TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS
	<p>and his discussion surrounded the ambient sound of the area, plus the current level of the sound of the turbine. He further discussed the health effects on the body and that everyone is different and people react differently to different noise levels.</p> <p>He provided information on the Mars Hill Wind Turbine Project Health Effects preliminary findings that he is conducting through interviews of residents living in Mars Hill. He discussed the symptoms residents are complaining of due to shadow flicker, noise of the turbines</p> <p>He requested that the MMA Public Health Committee members consider the following options:</p> <ul style="list-style-type: none">• Request moratorium until more extensive medical studies are done and current state of knowledge is fully understood by authorities and regulations reflecting risks and hazards put into place• Request siting setbacks reflecting current state of knowledge and non US jurisdictions' best practices (France, Germany, Australia) – including use of db(C) calibration• Request a Wind Developer "Code of Conduct" be established and enforced by the State's Attorney General's Office (similar to NY State)	

**MAINE MEDICAL ASSOCIATION – PUBLIC HEALTH COMMITTEE
MEETING MINUTES**

May 20, 2009

MEMBERS PRESENT: In person: Chuck Danielson, MD, Chair, Lisa Letourneau, MD, Larry Mutty, MD, Norma Dreyfus, MD, Richard Jennings, MD
Joining by phone and/or video: John Garofalo, MD, Jo Linder, MD, Stephanie Lash, MD, Ted Walworth, MD, Michael Nissenbaum, MD, Dora Anne Mills, MD, and Albert Aniel, MD

OTHERS PRESENT: Kellie Miller and Andrew MacLean (Staff) and Guest William Kelley (MMA Student Intern)

TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS
<p>Welcome & Introductions</p> <p>Members attended in person and via conference call and video-conference.</p> <p>Review of the March 2009 PHC meeting minutes</p>	<p align="center">Minutes accepted</p>	
<p>Health Effects of Wind Turbines Follow-up discussion</p>	<p>Dr. Danielson began discussion addressing the wind energy resolution and recommended in developing the draft resolution that:</p> <ol style="list-style-type: none"> 1) Gather pertinent information that we should know and determine if there is a general agreement; 2) He (Dr. Danielson) will draft a more in-depth resolution for dissemination to the entire committee <p>Dr. Aniel pointed out that Maine doesn't have standards on monitoring the noise levels and recommended that we support a strict enforcement of Maine's ordinance.</p> <p>Dr. Lash indicated that we need to ensure that we are relying upon scientific evidence.</p>	<p>The Public Health Committee will review a final draft of the resolution at the August 26th, 2009 Public Health Committee to determine if it will be forwarded to the general membership at the MMA's Annual Business meeting occurring in conjunction with the Maine Medical Association's Annual Meeting, held September 11-13, 2009 at the</p>

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TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS
	<p>Dr. Mutty commented that due to the Mars Hill incident, perhaps a moratorium should be considered on waivers until more data is available.</p> <p>Based upon the discussion by the members of the PHC, Dr. Linder indicated that it is quite apparent that there is a lot of information and it's very complicated and complex and suggested that we form a committee to work specifically on this issue.</p>	<p>Harborside Hotel, Bar Harbor, Maine.</p> <p>A subcommittee was formed to meet twice during the summer to report back to the PHC on August 26th.</p> <p>The Wind Energy Subcommittee comprised of the following members: Dr. Danielson, Dr. Mutty, Dr. Mills, Dr. Walworth, Dr. Graham, Dr. Dreyfus, Dr. Richard Jennings, Dr. Aniel and Dr. Nissenbaum. And staff to include: Kellie Miller and Gordon Smith</p>
<p>Childhood Immunizations</p>	<p>Dr. Mutty asked that we address the increasing cost of vaccines and the difficulty that families have to pay for these with their high deductible plans.</p> <p>Dr. Mills indicated that the department is moving in the right direction by appropriating an additional \$2 million dollars for the</p>	

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TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS
	<p>childhood immunization program and she also briefly updated the committee members on LD 1408, An Act to Establish</p> <p>Dr. Mills also provided an overview of the other vaccine bills that were heard during the legislative session and that a workgroup has been established to study the impact and report back to the legislature.</p> <ol style="list-style-type: none"> a. Mandating school vaccines – working to define what the criteria is for mandating school vaccines and then apply all vaccines to this criteria and report back to the legislature with recommendations. b. Waiver legislation for chicken pox (varicella), to allow children who haven't been vaccinated to stay in school when there is an outbreak. <p>Also, Dr. Mills noted that the Pharmacists Vaccine bill was passed and it will allow pharmacists to provide flu and pneumococcal vaccines to individuals 18 years of age and older.</p>	<p>Staff will continue to work with the interested parties working on LD 1408 and will keep members apprised in preparation for the 2nd Session of the 124th Legislative session. MMA staff to lead discussions with the Health Plans regarding the proposed finance structure.</p> <p>Dr. Mills will have an update on the suggested criteria at a subsequent Public Health Committee meeting either late 2009 or early 2010.</p>

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TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS
<p>Healthy Weight Initiative Bill Update</p>	<p>Staff provided a brief report on the status of the legislative bills of which were still in the process of being heard in the legislature. A final report will become available at the end of the session.</p> <ul style="list-style-type: none"> ▪ Menu Labeling ▪ BMI ▪ PE4ME ▪ PH Infrastructure Bill - <p>Members discussed the need to include physicians more prominently on the District Coordinating Councils and work more closely with the Statewide Coordinating Council and the Healthy Maine Partnerships.</p>	<p>Staff to provide a full legislative report on the mentioned bills for PHC members by the August 26th meeting.</p>
<p>H1N1 and the 2009 Public Health Forum</p>	<p>Dr. Mills reviewed to date the extent of the H1N1 outbreak and asked to have the survey send out in the Maine Medicine Weekly Update.</p> <p>Due to the serious outbreak of H1N1, discussion ensued to change the focus of the 2009 Public Health Forum to H1N1 and the practicing physicians role.</p> <p>Title of the 2009 Public Health Forum is now: Public Health, Swine Flu & You: The Practicing Physicians Role in Emerging Public Health Threats.</p> <p>Possible speakers to include: Dr. Dora Mills, Dr. Charles Danielson as moderator, a school based physician, as well as a regional level speaker yet to be defined.</p>	<p>Staff will ensure that this survey is submitted to the MMWU for membership input.</p> <p>Staff will work with Dr. Danielson to finalize the panel of speakers for the 2009 Public Health Forum</p>

**MAINE MEDICAL ASSOCIATION - PUBLIC HEALTH COMMITTEE
MEETING MINUTES
May 20, 2009**

TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS
<p>Post MYOC</p> <p>Committee adjourned at 6:00 pm</p> <p>Next Committee Meeting scheduled:</p> <p>August 26th, 2009</p> <p>Maine Medical Association</p> <p>Conference call/video connection will be available</p> <p>- Major agenda item will be the approval of resolutions to submit to the MMA Annual Session of the General Membership</p>	<p>Dr. Lisa Letourneau requested input from the committee on what MYOC can do now to move MYOC forward in the clinical office setting and to ensure its sustainability. She suggested that it could possibly tied into the patient centered medical home, to stay connected with it on an on-going local childhood obesity network, To perhaps have a periodic meeting and to establish a strategy to broaden it exposure. (currently MYOC is in 40 out of 400 PCP offices)</p>	<p>Dr. Letourneau will apprise the committee on any new developments.</p>

MAINE MEDICAL ASSOCIATION - PUBLIC HEALTH COMMITTEE
MEETING MINUTES

(Pending Committee Approval on 10/21/09)
August 26, 2009

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MEMBERS PRESENT: In person: Chuck Danielson, MD, Chair, Norma Dreyfus, MD, Jo Linder, MD, John Garofalo, MD, Richard Jennings, MD
Joining by phone and/or video: Lisa Letourneau, MD, Albert Aniel, MD, Lani Graham, MD and Daniel Oppenheim, MD

OTHERS PRESENT: Kellie Miller, Gordon Smith and Andrew MacLean (staff)

TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS
<p>Welcome & Introductions Members attended in person and via conference call and video-conference.</p> <p>Review of the August 2009 PHC meeting minutes</p>	<p>Dr. Danielson opened the meeting at 4:00 pm.</p> <p>Minutes accepted</p>	
<p>PH Accomplishments over the Past Two Years</p>	<p>Dr. Danielson reviewed the PHC accomplishments during his Chairmanship. (2008-2009 Accomplishment Highlights attached) He discussed the transition to a new Chair, and Dr. Norma Dreyfus accepted to commence chair duties following the MMA's Annual Meeting, September 11-13, 2009.</p> <p>Dr. Danielson noted that the PHC needs to work on health disparities in the future.</p>	<p>New Chair to bring forward the 2010 Priorities for discussion at the October 17, 2009 PHC meeting.</p>
<p>2009 Public Health Forum on Emerging Public</p>	<p>Dr. Danielson informed the committee that the forum was well organized and look forward to our panel of presenters and encouraged all members to attend the MMA Annual Session and</p>	<p>Staff finalize any details related to the forum held September 13, 2009</p>

**MAINE MEDICAL ASSOCIATION – PUBLIC HEALTH COMMITTEE
MEETING MINUTES**

(Pending Committee Approval on 10/21/09)
August 26, 2009

TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS
<p>Health Threats Brief Updates on MMA PH Priorities</p> <ul style="list-style-type: none"> ▪ H1N1 Update ▪ Chemical Use in Children's Products ▪ LD 1408 Childhood Immunization Financing Structure Legislation Work group & Immunization Congress Update 	<p>the Public Health Forum.</p> <p>Dora Mills, MD could not be available to provide a full update to the committee. However, staff, Kellie Miller indicated that weekly H1N1 updates will be available through the MMWU and that one of the issues that the schools have is liability concerns if conduct mass vaccination clinics at the school setting. Additional information will be forthcoming.</p> <p>Lari Graham, MD reported that Maine is the first state in the US to determine a priority chemical list and that the DEP is working diligently on this issue to reduce toxic chemicals in children's products.</p> <p>The workgroup has been meeting monthly to work out the fine details on LD 1408, which will be heard in the second session of the 124th Legislature in the Health and Human Services Committee. The financing structure is based on New Hampshire's Vaccine Program governance structure.</p> <p>The Immunization Congress, scheduled for September 29th is a collaborative effort by the MMA, AMA and the Maine Chapter of the AAP. Two national speakers will be presenting in the morning on the benefit and safety of childhood vaccines and the afternoon will consist of a working group to improve the financing structure of the current childhood immunization system in Maine. Fifty-five people have registered to attend at this time, with a cap of 60 people.</p>	<p>Staff continue to provide weekly updates in the MMWU on an ongoing basis to alert the membership.</p>

MAINE MEDICAL ASSOCIATION – PUBLIC HEALTH COMMITTEE

MEETING MINUTES

(Pending Committee Approval on 10/21/09)

August 26, 2009

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TOPIC	DISCUSSION	ACTION/FOLLOW UP/RESULTS
<ul style="list-style-type: none"> ▪ Health Policy Partners Legislative Summary 	<p>Staff provided the HPP's legislative summary on the successful passage of smoking and obesity legislation.</p>	
<p>Finalization of the 2009 Proposed Resolutions</p>	<p>Discussion ensued on each of the proposed resolutions. Below is the action taken on each resolution:</p> <ul style="list-style-type: none"> ▪ Childhood Immunization Financing Structure – approved, all in favor. ▪ Public Health Infrastructure – approved with minor edits, all in favor. ▪ Global Climate Change – approved with minor edits, all in favor. ▪ Wind Energy – a motion was made, “That the Public Health Committee not move this resolution forward for a vote at the MMA’s General Membership Meeting.” 8 votes in favor and 1 vote oppose. Resolution fails to move out of committee. ▪ Oral Health Resolution – approved, all in favor <p>Two activities were mentioned briefly: Sept. 12th Smokefree Outdoor Dining Press Event, Bar Harbor and the October 13th Maine Public Health Association Annual Meeting, Augusta.</p>	
<p>Upcoming Activities</p> <p>Committee adjourned at 5:57pm.</p>		<p>Next Committee Meeting scheduled:</p> <p>October 21, 2009 Maine Medical Association Conference call/video connection will be available</p>