STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
State House Station 17 AUGUSTA, MAINE 04333

BOARD ORDER

IN THE MATTER OF

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| SPRUCE MOUNTAIN WIND LLC. | ) SITE LOCATION OF DEVELOPMENT ACT |
| Woodstock, Oxford County | ) NATURAL RESOURCES PROTECTION ACT |
| SPRUCE MOUNTAIN WIND PROJECT | ) |
| L-24838-24-A-Z (denial) | ) APPEAL |
| L-24838-2G-B-Z (denial) | ) FINDINGS OF FACT AND ORDER |

Pursuant to the provisions of 38 M.R.S.A. § 344 (2-A) and 341-D (4) and Chapter 2, § 24 (B) of the Department of Environmental Protection's regulations, the Board of Environmental Protection has considered the appeal of the Friends of Spruce Mountain Inc., Scot and Thelma Kendall, Leo Bilodeau and Irene Chabot, Nathaniel Snow, Richard and Patricia Mabey, Richard Marasse, Robert and Joann Moulton, Daryl Routhier, Nate Ladd and Rob Roy, Kevin Corbett, Wendall Hall and Richard and Suzee Woods (collectively "appellants"), the material filed in support of the appeal, the response of the licensee, and other related materials on file and FINDS THE FOLLOWING FACTS:

1. PROCEDURAL HISTORY:

On January 19, 2010, Spruce Mountain Wind LLC. (licensee) filed Site Location of Development Act (Site Law) and Natural Resources Protection Act (NRPA) permit applications to construct a wind energy development known as the Spruce Mountain Wind Project, in the Town of Woodstock. The licensee proposed to construct a 20-megawatt (MW) wind energy generation facility, which is an expedited wind energy development as defined by the Wind Energy Act, 35-A M.R.S.A. § 3451 (4). The proposed development consists of the construction of: 10 Gamesa G-90 wind turbines (2.0 MW each) with associated turbine pads in a south to northeast array along the ridgeline of Spruce Mountain; 3.5 miles of new access roads and crane path; 6,890 linear feet of electrical transmission line; a permanent meteorological tower; and a 1,750 square foot operations & maintenance building as shown on the set of plans submitted by the licensee dated July 23, 2010 and July 30, 2010.

During the review of the project, the Department requested and received reviews from other state agencies including: Maine Department of Inland Fisheries & Wildlife (MDIFW), Maine Historic Preservation Commission, Maine Natural Areas Program, Maine Center for Disease Control (MCDC), Maine State Soil Scientist at the Department of Agriculture, Maine Public Utilities Commission, Department of Conservation (Bureau of Parks and Lands) and the Department's Division of Watershed Management (DWM) and Division of Environmental Assessment. The Department also hired an independent noise expert, EnRad Consulting (EnRad), to review the evidence regarding noise and an independent scenic expert, Scenic Quality Consultants, to review the evidence regarding potential impacts on scenic character.

On March 25, 2010, the Department held a public meeting in the Town of Bryant Pond pursuant to 38 M.R.S.A. § 345-A (5) to provide interested parties with an opportunity to provide information and to ask questions of the Department regarding the proposed

development. The Department received comments from nine interested persons, including some of the appellants, during the Department public meeting. Additionally, the Department received numerous letters from interested parties throughout the review of the applications, which detailed specific concerns related to the proposed development.

The Department approved the permit applications to construct the Spruce Mountain Wind Project in Department Order #L-24838-24-A-N/L-24838-2G-B-N dated October 5, 2010 On November 3, 2010 the appellants filed an appeal of the Department's decision to the Board.

On December 22, 2010, the licensee submitted proposed supplemental evidence pertaining to a purchase and sales agreement however, on January 12, 2011, the Board Chair ruled not to admit the proposed supplemental evidence into the record on the grounds that the information could have been submitted earlier in the licensing process and that the evidence was not appropriate for consideration in this appeal.

2. AGGREIVED PERSONS:

The Friends of Spruce Mountain, Inc. is a public benefit corporation formed under Maine law to protect Spruce Mountain in Woodstock from adverse environmental impacts from the proposed development of a grid scale wind energy project. The Friends of Spruce Mountain, Inc. was formed for exclusively charitable and educational purposes and its participants own property near the project site.

Kevin Corbett, Richard Marasse, Nathaniel Snow, Leo Bilodeau, Irene Chabot, Daryl Routhier, Wendall Hall, Richard and Patricia Mabey, Robert and Joann Moulton, Nate Ladd, Rob Roy, Richard and Suzee Woods, and Scot and Thelma Kendall are owners of property in the Towns of Woodstock, Bryant Pond and Sumner which either abuts or is located in close proximity to the proposed Spruce Mountain Wind Project site. Each of the above parties describe specific concerns regarding the construction of the Spruce Mountain Wind Project and the Board finds that they have demonstrated they are aggrieved persons as defined in Chapter 2 § 1(B) of the Department's Rules Concerning the Processing of Applications and Other Administrative Matters. As each of the aggrieved persons above are participants of the Friends of Spruce Mountain, Inc. the Board further finds that the Friends of Spruce Mountain, Inc. is also an aggrieved person under Chapter 2 § 1 (B).

3. BASIS FOR APPEAL:

The appellants assert that the Department erred in making the following findings:

A. Noise: The licensee made adequate provisions to ensure that noise standards pursuant to the Site Location of Development Rules, Chapter 375(10) were met;
B. Decommissioning: The licensee made adequate provisions for demonstrating a decommissioning plan and the means to execute the plan;
C. Scenic Character: The proposed project will not have an unreasonable adverse effect on the scenic character of scenic resources of state or national significance or related existing uses;

D. Wildlife: The proposed activity will not unreasonably harm any significant wildlife habitat, freshwater wetland plant habitat, threatened or endangered plant habitat, aquatic habitat, travel corridor, freshwater, estuarine, or marine fisheries or other aquatic life; and
E. Stormwater: The licensee has made adequate provision to ensure that the proposed project will meet the Chapter 500 General Standards for stormwater.

Appellants also contend that the proposed wind energy development will have an unreasonable adverse impact on the value of their personal property.

4. REMEDY REQUESTED:

The appellants request that the Board hold a public hearing and reverse the October 5, 2010 Department decision approving a permit for the construction of the Spruce Mountain Wind Project in the Town of Woodstock.

The appellants specifically request that the Board reverse the October 5, 2010 Department decision and direct the Department to require the licensee to:

- demonstrate that the project will not exceed 35 dba during the nighttime hours and will not exceed 5 dba in excess of pre-development background sound levels;
- site the turbines one mile away from existing residences or alternatively shut down the operation of the turbines at night;
- fully fund the decommissioning plan prior to the commencement of operation, with no credit for the recovery of scrap metal; and
- reconsider the project's impact on the scenic character of the surrounding area.

5. REQUEST FOR A PUBLIC HEARING:

The permit applications were filed on January 19, 2010. The Department did not receive any requests that it conduct a public hearing on the proposed project. In a public notice published in a local newspaper on February 18, 2010, the Department stated that in anticipation of significant public interest and in accordance with 38 M.R.S.A § 345-A(5) the Department would conduct a public meeting in the Town of Bryant Pond to afford the public an opportunity to provide information directly to the Department for consideration and to allow the opportunity to ask questions of Department staff, staff of other state agencies reviewing the application and the Department's experts. The Department held the public meeting on March 25, 2010.

The appellants request that the Board conduct a public hearing on the issue of noise to give them the opportunity to present technical information and medical evidence that proves that the Department erred in finding that Chapter 375 (10) was met. The appellants propose to present the testimony of Richard James, E-Coustics Solutions, and Dr. Michael Nissenbaum at a public hearing.

In response to the request for a public hearing, the licensee states that even if the Board determines that there is credible, conflicting information in the record that does not require a hearing be held, and that the Board must decide that a public hearing will likely assist it in understanding the evidence. The licensee argues that the appellant is proffering the same

evidence that it did in both the Record Hill Wind Project appeal and the Oakfield Wind Project appeal. During both appeals, the Board did not find that a public hearing was warranted. The licensee contends that a public hearing is not warranted in this case.

During the eight month period of the review of the applications, the appellants had the opportunity to present information and argument to the Department and availed themselves of that opportunity both at the public meeting and through the submission of information during the review process. Members of Friends of Spruce Mountain and other interested persons submitted information related to the licensee's title, right, or interest in the property proposed for development, noise, health effects, wildlife, tangible benefits, scenic character, groundwater, stormwater management, decommissioning, and economic feasibility.

The Board has considered the information contained in the permitting record, the arguments of the appellants, and the licensee's response. Pursuant to 38 M.R.S.A. § 341-D (4) and the Department's regulations, holding a public hearing is discretionary. In this appeal the Board finds that the evidentiary record is well developed with regard to the statutory criteria. The appellants had the opportunity to submit evidence from Mr. James and Dr. Nissenbaum and did so. The appellants also had the opportunity to submit evidence in response to the licensee's submittal with regard to noise and the analysis by the Department's noise expert. The Board finds that a public hearing in this case is not warranted to assist the Board in understanding the presented evidence.

6. DISCUSSION AND RESPONSE TO APPEAL:

A. NOISE:

The appellants argue that the Department erred in its conclusion that the noise generated from the proposed project will not have an unreasonable adverse effect on the surrounding environment based on the following contentions:

(1) The Department failed to require the licensee to correctly consider short duration repetitive sound in its predictive noise model;
(2) The Department failed to require the licensee to use line source analysis in its predictive noise model;
(3) The Department failed to require the licensee to correctly consider ground absorption and atmospheric stability in its predictive noise model;
(4) The Department accepted a predictive sound model which forecasts sound levels too close to the Department's regulatory limits because of the limitations of the licensee's model and the licensee's proposal to rely on an unproven operating method (noise reduction operation) to meet Department's standards; and
(5) The Department failed to adequately consider potential adverse health effects of nighttime noise.

To assess whether the developer of a proposed project has made adequate provision to control noise, the Department has adopted regulations which provide noise level limits for various settings. Chapter 375 §10 sets forth hourly sound pressure level limits ($L_{Aeq\text{-}Hr}$) at a development's property boundaries and at nearby protected locations. Chapter 375 §10 (G) (16) defines protected locations to include "any location accessible by foot, on a parcel of

land containing a residence or approved subdivision...." In addition to residential parcels, protected locations include but are not limited to schools, state parks, and designated wilderness areas.

The hourly equivalent level resulting from routine operation of a development is limited to 75 dba at any development property boundary as outlined in Chapter 375 § 10 C (1) (a) (i). The hourly equivalent sound level limits at any protected location varies depending on local zoning or surrounding land uses and existing (pre-development) ambient sound levels. At protected locations within commercially or industrially zoned areas, or where the predominant surrounding land use is non-residential, the hourly sound level limits for routine operation are 70 dab daytime (7:00 a.m. to 7:00 p.m.) and 60 dba nighttime (7:00 p.m. to 7:00 a.m.). At protected locations within residentially zoned areas or where the predominant surrounding land use is residential, the hourly sound level limits for routine operation are lower, 60 dba daytime and 50 dba nighttime. Where the daytime pre-development ambient hourly sound level is equal to or less than 45 dba and/or the nighttime ambient hourly sound level is equal to or less than 35 dba, lower limits known as quiet location limits apply. For such "Quiet Locations", the hourly sound level limits for routine operation are 55 dba daytime and 45 dba nighttime. In all cases, nighttime limits at a protected location apply at the property line of a protected location or up to 500 feet from sleeping quarters when the property line is greater than 500 feet from a dwelling.

**1. The Sound Level Prediction Model and Noise Reduction Operation Mode**

The appellants argue that the licensee's modeling software CADNA/A (operating in ISO 9613-2) was not designed for wind turbines or sound sources at a height of a ridgeline. They contend that the inadequacy of this model for predicting this type of noise is supported in scientific literature and that concerns about using the CADNA/A model were acknowledged by the Department's noise expert.

The appellants object to the Department's approval of a wind project when the predicted noise levels are near or at the limits set forth in Chapter 375 (10). The appellants argue that predicted sound levels below or further below the standards should be required to protect the local population and that there is an inadequate margin for error. Of greatest concern to the appellants is the prediction for noise levels at receptor 12, at which the licensee's sound level modeling predicts that, operating in the noise reduction mode, noise will be 45 dba 500 feet from the residence. The appellants argue that in real world conditions, the noise reduction operation mode to be utilized at night will not work as predicted.

The licensee's noise consultant, Tetra Tech, developed a sound level prediction model to estimate sound levels from operation of the proposed project, submitted as section five of the application. The sound level study predicts expected sound levels from the proposed project and compares the model results to the operational standards in Chapter 375 (10), the Site Law Rules. Based on the rural nature of the site, the licensee applied the quiet limits of 55 dba daytime and 45 dba nighttime at all nearby protected locations in accordance with Chapter 375 §10 (H) (3) (1).

The licensee's sound level prediction model was developed using the CADNA/A software program performing calculations in accordance with generally recognized standard for estimating the propagation of sound in the environment promulgated by the International Standards Organization (ISO) as Chapter 9613-2, *Attenuation of Sound During Propagation Outdoors*. CADNA/A uses three dimensional terrain, proposed wind turbine characteristics and locations plus environmental factors to calculate outdoor sound propagation from the wind turbines. Tetra Tech calculated sound levels for simultaneous operation of ten Gamesa G90 2.0MW wind turbines at all ten prospective turbine locations. Tetra Tech's modeling assumptions include: omni-directional downwind propagation, all wind turbines operating at maximum sound power levels concurrently, manufacturer's specifications plus 2dBA (International Electrotechnical Commission Standard IEC 61400-11), current warranteed Gamesa G90 maximum sound power output 105.0dBA, ground absorption factor of G = 0.5, spherical divergence from hub level sources, atmospheric absorption (10°C with 70% relative humidity), and a three-dimensional analysis of screening by topography and obstacles. To build additional conservatism in the model, Tetra Tech excluded any sound absorption effects from foliage. Each wind turbine was modeled as a point source at multiple heights extending from the bottom to the top of the rotor swept area. The results of the acoustic model were plotted on a vicinity site plan that shows residential parcels in relation to the project area where the most restrictive sound level limits apply in relation to the predicted sound output expected to be generate by the facility. The results of the licensee's model indicated that the project would be in compliance with Chapter 375 (10) at the protected locations.

The Department retained the services of a third party noise expert, EnRad Consulting (EnRad), to review the sound level study that was submitted by the licensee. Based on comments received from EnRad, the Department requested that the licensee revise its sound level prediction model to add an additional 3 dba to the specified sound power levels of the turbines to allow for uncertainty in the sound level modeling calculations and measurements.

The requested revision is reflected in a document entitled "Spruce Mountain Wind Project: DEP Application Number L-24838-24-A-N and L-24838-2G-B-N - Response to June 23, 2010 Peer Review of Noise Study" dated July 15, 2010. With the revision of the model, the licensee incorporated the 3dBA uncertainty factor. As a result of the revised modeling, the licensee proposed to operate several turbines (turbines 6-11) in a noise reduction operation mode during nighttime hours (from 7pm to 7am) to meet both the Department's standards and the Town of Woodstock's ordinance. The remaining turbines will operate at full sound power output during nighttime hours. Turbines 6-11 will be "locked" by being programmed by the manufacturer, Gamesa, to operate at the reduced noise levels. With the selected turbines operating in noise reduction operation mode, the noise level at the closest protected location will be 45 dba.

In comments dated July 23, 2010 EnRad stated that the Spruce Mountain Wind Project noise assessment is technically correct according to standard engineering practices and done in accordance with Chapter 375 (10), the Department's Noise Regulation. EnRad also stated that the licensee's predicted project operational noise was determined with the use of computer modeling based on internationally accepted algorithms (ISO-9613.2). EnRad noted that the licensee's acoustic model makes the conservative assumptions which are the standard

methodology: all wind turbines operating continuously and concurrently at maximum manufacturer rates sound levels under omni-directional, downwind conditions (worst-case conditions).

In response to the appeal, the licensee noted that the noise prediction modeling software and methodology used for this project is the same as that used in three other wind power projects that have been approved by the Department and appealed to the Board. In regards to the greater margin of safety requested by the appellants, the licensee stated that as a result of EnRad's review, Tetra Tech incorporated conservative modeling assumptions to assure compliance with the Department's noise regulations, including adding a 3dBA above the manufacturer's recommended safety factor. As a result of the addition of the 3dBA, the project will operate specific turbines in noise reduction operation mode at nighttime. Noise reduction operation is accomplished by reducing the power output of a turbine, namely by slowing the rotors, to assure compliance with the regulations.

The licensee also argue that the appellants' contentions regarding the accuracy of the sound prediction model have been proven wrong by actual compliance monitoring data from the Stetson Wind Project, which used the same model inputs as this project. The licensee submitted the findings of the Stetson Wind Project monitoring to the Department during the review of the project in a letter from Tetra Tech to EnRad dated July 15, 2010. The licensee contends that the Stetson monitoring report demonstrates that this sound prediction model, on average, over-predicts sound levels by 2-3 dba at the protected locations.

The Board has considered the information contained in the permitting record, the arguments of the appellants, and the licensee's response to the appeal. The Board finds that the licensee's sound prediction model is appropriate and incorporates standard methodologies and modeling assumptions, that the licensee incorporated an adequate safety factor into the model and that the regulations do not prohibit the operation of wind turbines in noise reduction operation mode to meet the standards contained in the Department's Noise Regulations. The Board finds that the results of the licensee's revised sound level study indicate that sound levels following the proposed noise reduction operation mode of the Spruce Mountain Wind Project will meet the Department's nighttime 45 dba hourly equivalent limit at all protected locations. Results also indicate that sound levels during the daytime while operating at full sound power will be from 8 to 16 dba below the 55 dba hourly equivalent limit. Based on the conservative assumptions built into the model, including the addition of 3dBA over and above the turbine manufacturer's recommended margin of safety of 2dBA, and based on the Stetson results of actual operation noise being below that which was predicted using this same model, the Board finds that the applicant has demonstrated that, with its proposed turbines, numbered 6-11, operated in the noise reduction mode at night, will meet the standards of section 10.

**2. Short Duration Repetitive Sound.**

Chapter 375 (10) requires a penalty of +5 dba to be added onto predicted noise levels in a sound level prediction model if Short Duration Repetitive Sounds (SDRS) are predicted to occur. SDRS are a sequence of sound events, each clearly discernible, that cause an increase of 6 dba or more in the sound level observed before and after an event. SDRS events are

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typically less than 10 seconds in duration and occur more than once within an hour. SDRS are commonly associated with the thumping noise associated with operation of turbine blades. In its June 23, 2010 review of the licensee's sound level model, EnRad requested that the licensee submit information regarding the potential SDRS for the Gamesa G90 wind turbines under worse-case meteorological conditions. The licensee submitted a memorandum from Resource Systems Group, Inc. (RSG) stating that the site characteristics at Spruce Mountain are not conducive to the production of SDRS. In its July 23, 2010 review of the licensee's sound level study, EnRad concluded that SDRS is not expected to be a common occurrence based on the scientific literature and the evidence from RSG, Inc. Therefore the Department did not require that the project incorporate the 5 dba penalty outlined in Chapter 375.10(G) (19) for when SDRS occurs.

The appellants assert that the licensee's sound level model did not accurately predict potential short duration repetitive sounds (SDRS). In a review of the licensee's sound level study, the appellant's noise expert, E-Coustic Solutions, states that two current studies of SDRS from operating wind turbines show that SDRS are commonly in the range of 5-6 dba and can exceed 10-15 dba. The studies the appellants point to are titled "Effects of the Wind Profile at Night on Wind Turbine Sound" by G. P. Van de Berg and "Wind Turbine Acoustics" by Harvey H. Hubbard and Kevin P. Shepard. The appellants submitted copies of these studies to support their argument.

In response to the appeal, the licensee states that the project was reviewed by board certified noise control engineer (certified by the Institute of Noise Controlled Engineering), Kenneth Kaliski of Resource Systems Group Inc. (RSG), who indicated that the characteristics of the project site, namely the variable elevation of the terrain, are not conducive to common occurrence of SDRS. RSG also stated that post-construction sound monitoring for the project would evaluate whether SDRS was occurring and adjustments could be made if they did occur.

As a precaution, the Department required the licensee to follow a post-construction monitoring program and implement a sound level complaint response protocol as outlined in Finding 5 of the Department's Order. If the licensee's post-construction compliance data indicates that the Spruce Mountain Wind Project is not in compliance with Department noise standards, including SDRS, the licensee is required to submit a revised operations plan that demonstrates that the project will be in compliance with Chapter 375 (10) at all protected locations.

The Board has considered the information contained in the permitting record, the arguments of the appellants, and the licensee's response to the appeal. The studies submitted by the appellants are not exclusive to the topic of SDRS and indicate that there are variables that impact whether SDRS will occur and to what degree. The Board finds the licensee's submission regarding SDRS, which is based on specific site characteristics to be credible. The Board finds that SDRS are not expected to occur at the project site. The Board agrees that the Department's requirement of post-construction monitoring, inclusive of SDRS, is an adequate safeguard should the predictions prove inaccurate. If SDRS is occurring during operation of the project, the licensee must revise the operation plan to be in compliance with Chapter 375 (10).

**3. Line Source vs. Point Source Analysis.**

The appellants argue that the licensee should have used a line source analysis instead of a point source analysis in its model to accurately predict noise. A line source is defined as a source of noise that emanates from a linear geometry and is comprised of multiple point sources. Line source calculations measure sound propagation perpendicular to a row (line) of wind turbines, giving effect to the combined noise from the line that radiates in a cylindrical manner (directed) as opposed to a spherical manner (like a ripple in a pond). Roadway noise is an example of a linear source of noise. A point source is a single localized source.

The appellants argue that the decay rate of a line source is 3 dba for every doubling of distance and that the decay rate of a point source is 6 dB for every doubling of distance. During the application review process E-Coustic Solutions reviewed the licensee's sound level study on behalf of the appellants. E-Coustic Solutions states that the appropriate decay rate for ridge mounted turbines is 3 dB. Based on the results of E-Coustic Solution's review and the difference in decay rates, the appellants assert that if the licensee's sound level study had used line source calculations rather then point source calculations, then the Department's Section 10 noise limits would be exceeded.

In response to the appeal, the licensee states that the appellant's argument regarding the point source sound prediction model used by the licensee has been considered by the Board during previous appeals of wind power projects and the Board has found that it is appropriate to model the turbines as a line source.

The Department prepared a Questions & Answers document, issued concurrently with the Department's Order, in response to questions received at the public meeting and additional questions asked of the Department during the review of the application. The Department consulted with its independent noise expert, EnRad to answer many questions regarding noise, including "why doesn't the DEP require a line source analysis?" In response to that question, the Department stated that EnRad has "thoroughly examined this issue and concluded that point source (spherical wave fronts) models appropriately represent sound pressure levels (LAeq), tonal and short duration repetitive sound (SDRS) for the proposed wind turbine project within the region of the Department's compliance. Perpendicular to a linear segment of turbines there is a region where the cumulative effect can be approximated by a line source (readily observed from the applicant's submissions)." In its review of the licensee's sound level study dated July 23, 2010 EnRad stated that the Spruce Mountain Wind Project noise assessment is technically correct according to standard engineering practices and done in accordance with Chapter 375 (10), the Department's Noise Regulation.

The Board has considered the licensee's noise study contained in the permitting record, the arguments and evidence submitted by the appellants, the licensee's response and the analysis provided by the Department's noise expert. Based on the analysis provided by the Department's expert, the Board finds that the licensee's sound prediction model based on a point source analysis is appropriate and was done in accordance with Chapter 375 (10).

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**4. Ground Level Absorption and Atmospheric Stability.**

The appellants argue that the licensee used a ground absorption value of 0.5 in its sound prediction model but the proper setting for ground absorption is 0. The appellants state that the licensee also failed to factor atmospheric stability into the model. Atmospheric stability occurs at night when the land cools and vertical air movement disappears; in such circumstances the wind can be calm on the ground but continue to blow at hub height. In support of their argument that atmospheric stability should be considered, the appellants submitted a study by Clifford Schneider, entitled "Accuracy of Model Predictions and the Effects of Atmospheric Stability on Wind Turbine Noise at Maple Ridge Wind Power Facility, Lowville NY – 2007." In his report, Mr. Schneider concludes that wind sounds are more noticeable under such conditions because atmospheric stability can amplify noise levels.

In comments dated July 23, 2010, the Department's noise consultant, EnRad, stated that the addition of 3 dba to the specified sound power levels of the turbines by the licensee is adequate to account for uncertainty in the sound level modeling calculations with respect to both ground absorption and atmospheric stability.

The Board has considered the information contained in the permitting record, the arguments of the appellants, and the licensee's response to the appeal. The Board finds that the licensee's sound prediction model, with the additional 3dBA safety margin built in, adequately predicts sound levels including the influence of the factors of ground absorption and atmospheric stability, and that the model is appropriate and was done in accordance with Chapter 375 (10).

**5. Health Effects.**

The appellants argue that the Department failed to consider the adverse health effects of nighttime noise. The appellants offer the affidavit of Dr. Michael Nissenbaum, an expert on the medical effects of exposure to excessive wind turbine noise. Dr. Nissenbaum states that the proposed wind turbines will be sited too close to residents in the proximity of the Spruce Mountain Wind Project and he expects that the residents at nine receptor sites will experience the same or similar health effects as residents living within 3,500 feet of the Mars Hill Wind Project. The appellants also point to several published papers which state that prolonged noise exposure is a serious threat to human health, especially when it results in sleep interruption during the nighttime hours. The appellants contend that the 2009 World Health Organization's *Night Time Noise Guidelines for Europe* (WHO Guidelines) states that sleep disturbances from noise occur at sound levels between 30 to 40 dba. The appellants state that the WHO Guidelines further state that there is evidence that noise induced sleep disturbances is viewed as a health problem and that sleep disturbances lead to further consequences for health and well-being. The WHO Guidelines recommend that noise levels at night should not exceed 40dBA during the night. The appellants recognize that the WHO Guidelines do not specifically address wind turbine noise but contend that their general nature should not detract from the significance of its findings.

The appellants state that wind turbine noise is more annoying than other industrial noise sources at the same sound pressure because wind turbine noise is often characterized by a pulsating noise, a blade swish called amplitude modulation. In addition, wind farms are often located in quiet, rural settings where pre-existing ambient noise levels are low. The appellants also contend that wind turbine noise is more annoying than other industrial sources because of its low frequency content.

The appellants express concern that the required noise reduction operation mode approved at the Spruce Mountain Wind Project is a warning the excessive noise will be generated by the project at this location. The appellants expect that is likely that Spruce Mountain Wind Project will cause annoyance, sleep disturbances and secondary adverse health impacts. The appellants request that the Board take steps to assure that the Spruce Mountain Wind Project will not cause adverse health effects because of excessive noise.

During review of the applications, interested parties stated their concern and submitted several scientific papers stating that low frequency sound emitted from wind turbines is linked to annoyance, sleep disturbance and other secondary adverse health effects.

In its analysis of this issue, the Department reviewed a report prepared by the MCDC entitled "Wind Turbine Neuro-Acoustical Issues" dated June, 2009, which reviewed a variety of materials relating to the sound impacts of wind turbines. In that report, the MCDC 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." The MCDC also reviewed the recent health impact-related reports submitted by interested parties to this project and found that these submissions did not alter its earlier analysis and comments to the Department on this issue.

The record includes the reports of two recent scientific literature reviews relating to wind turbine sound and health effects. The first, prepared by Exponent, Inc. for the Wisconsin Public Service Commission, is titled "Evaluation of the Scientific Literature on the Health Effects Associated with Wind Turbines and Low Frequency Sound" and is dated October 20, 2009. The second, prepared for the American Wind Energy Association (AWEA) and Canadian Wind Energy Association (CWEA) by a panel of seven medical and acoustic experts, is titled "Wind Turbine Sound and Health Effects, An Expert Panel Review," and is dated December 2009. Both of these reports support the MCDC's findings with regard to health impacts from wind turbine noise.

The Exponent Inc. report concludes in part: "It is clear that some people respond negatively to the noise qualities generated by the operation of wind turbines, but there is no peer-reviewed, scientific data to support a claim that wind turbines are causing disease or specific health conditions. Annoyance regarding the wind turbines is an elusive factor that could underlie a majority of the health complaints being attributed to wind turbine operations."

The AWEA/CWEA panel reached consensus on the following conclusions:

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- There is no evidence that the audible or sub-audible sounds emitted by wind turbines have any direct adverse physiological effects.
- The ground-borne vibrations from wind turbines are too weak to be detected by, or to affect, humans.
- The sounds emitted by wind turbines are not unique. There is no reason to believe, based on the levels and frequencies of the sounds and the panel's experience with sound exposures in occupational settings, that the sounds from wind turbines could plausibly have direct adverse health consequences.

In response to concerns expressed by interested parties, the Department asked EnRad to review and comment on the 2009 report issued by the World Health Organization (WHO) Regional Office for Europe, titled Night Noise Guidelines for Europe. EnRad stated that the WHO 2009 Nighttime Noise Guidelines for Europe parameter $L_{night,\ outside}$ should not be confused with Chapter 375 (10) "worst-case" hourly $L_{Aeq}$ design and compliance requirements. The $L_{night,\ outside}$ as defined in the Environmental Noise Directive (2002/49/EC) that was used for the 2009 WHO report, is an indicator summarizing the acoustic situation over a yearly average of night noise levels outside at the façade of a building, which does not directly compare with the MDEP "worst-case" hourly $L_{Aeq}$ at distances up to 500 feet from a protected location. EnRad reviewed the 2009 WHO report and explained that the metrics used by WHO and the DEP noise rules are vastly different, allowing no direct comparison. The WHO analysis involves the measurement of levels at the wall of the structures on properties near noise sources while the DEP noise rules require a more stringent methodology, measuring the sound levels at the property line of protected locations. In addition, the 40 dba guideline recommended by WHO is a yearly average level as opposed to the hourly sound level limit required by DEP regulations, another difference which makes the DEP requirements more protective. The MCDC also reviewed the 2009 WHO report and commented that, given the differences in the measurements, the Department's regulatory 45 dba standard would presumably be in the range of, and likely close to if not less than, the WHO target limit.

In response to the appeal, the licensee stated that the Department's Noise Regulations, Chapter 375 (10) do not include a specific health-based standard. The licensee points to the Exponent Inc. report, the AWEA/CWEA report and the MCDC report entitled "Wind Turbine Neuro-Acoustical Issues" dated June 2009 to argue that the project will not cause health impacts. The licensee further stated that the Department's Noise Regulations do not reference any specific type of development and that the fact they do not specifically address industrial grade wind projects is irrelevant.

The Board has considered the arguments of the appellants, the licensee's response to the appeal and the information on this issue contained in the permitting record. The appellants submitted several studies regarding the potential health impacts of noise as did the licensee. The Board recognizes that noise emitted from the proposed project has the potential to be heard at an audible level from protected locations and that noise generated by the project may be found to be an annoyance by some people. The reports submitted by the appellants generally are not peer reviewed and the circumstances studied in them are distinguishable from the facts of the proposed project. The Board finds the analysis by MCDC, the State's expert on health related matters, of the scientific literature regarding potential health impacts

of noise from wind turbines to be credible. The conclusions of the MCDC are echoed by the report prepared by Exponent, Inc. for the Wisconsin Public Service Commission, titled "Evaluation of the Scientific Literature on the Health Effects Associated with Wind Turbines and Low Frequency Sound" and dated October 20, 2009. Based on this evidence, and the evidence supporting the determination that the Department's noise limits will be met, the Board finds that the project is not anticipated to cause health impacts as a result of unreasonable noise produced by the project.

B. DECOMMISSIONING:

Appellants contend that the Department Order should be reversed because the Department failed to require the decommissioning for the project to be fully funded prior to the operation of the wind energy facility. The appellants also object to the deduction for scrap value in estimated decommissioning costs.

The Wind Energy Act directed the Department to specify submission requirements for the application of a wind power project regarding the decommissioning plans which would include a demonstration of current and future financial capacity that would be unaffected by the applicant's future financial condition to fully fund any necessary decommissioning costs commensurate with the project's scale, location and other relevant considerations, including, but not limited to, those associated with site restoration and turbine removal.

The Department specified an applicant's submission requirements on the Site Law application with a request for a demonstration that, upon the end of the useful life of the facility, the applicant will have financial assurance in place for 100% of the total cost of decommissioning, less salvage value. At the time of the filing of this application, the Site Law permit application stated that an applicant could propose securing financial assurance in phases, as long as complete financial assurance is in place a minimum of five years prior to the expected end of the useful life of the equipment.

The licensee submitted evidence that megawatt-scale wind turbines are designed and certified by Det Norske Veritas, a risk assessment and certification agency, for a minimum expected operational life of 20 years. The Gamesa G90 turbine selected for the Spruce Mountain Wind Project is a megawatt-scale technology and is certified as having at least 20 years of anticipated life.

The licensee proposed a decommissioning plan that provides that the funds for decommissioning costs will be fully reserved by year thirteen of operation. The licensee proposed to provide financial assurance in the form of a performance bond, surety bond, letter of credit, parental guaranty or other acceptable form of financial guarantee. The initial financial assurance levels (years 1 – 3) will be determined prior to the start of commercial operation and the amount will be increased 20% every three years until the financial assurance in place reaches 100% of the total project decommissioning costs. The licensee stated that financial assurance will be in place at all times during the operation of the project according to the table below. The licensee proposed to reassess the estimated net decommissioning costs (decommissioning costs minus salvage value) prior to the end of years 6, 12, 18, 20 and in the event that the project exceeds the expected 20 year lifespan,

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each year thereafter. Under the applicant's proposal, the updated estimated net decommissioning costs would be submitted to the Department for review and approval and the financial assurance would be adjusted to cover 100% of the revised total decommissioning costs.

Table 1. Financial Assurances pertaining to the Decommissioning Plan

| Year of Operation | Financial Assurance Level % of total project Decommissioning costs | Reassess Total Project Decommissioning Cost at end of period |
|---|---|---|
| 1 –3 | 20% | - |
| 4 – 6 | 40% | Yes |
| 7 – 9 | 60% | - |
| 10 – 12 | 80% | Yes |
| 13 – 15 | 100% | - |
| 16 – 18 | 100% | Yes |
| 19 - 21 | 100% | Yes |
| 21 end of life | 100% | Every year |

The licensee also proposed to make the Department the obligee of any performance bond used to prove financial assurance. The Department would have the right to call the bond in the event of non-performance. The trigger for the Department's third party rights would be the dissolution of the project's owner or if the project ceases to generate electricity for a continuous period of twelve months. Upon decommissioning the site any remaining balance of the financial assurance would be returned to the licensee. This plan for financial assurance for decommissioning was approved and incorporated into the permit issued by the Department.

The appellants argue that decommissioning costs should be fully funded as of the first day of operation. They also contend that the licensee has over estimated the salvage values of the turbines. The licensee notes in response that the project's components will be under warranty during the initial 2-5 year operating period, and the project will have a contractual obligation to produce electricity for at least 15 years. The decommissioning fund will be fully funded 2 years before the end of the licensee's power sales obligation, and 7 years before the end of the certified useful life of the wind turbines. The licensee further stated that salvage values were calculated using actual turbine component weights and composition and current local market prices minus breakdown and transportation costs. During the application review process the licensee submitted a letter dated September 14, 2010, which included an itemized estimate of the current salvage values of project materials and a reiterated commitment to reassess the salvage values on a routine basis as described in Table 2, above.

The Board finds that it is reasonable to consider the salvage value of the project materials when estimating total decommissioning costs. The Board finds the license's evidence regarding salvage value credible and notes that contradicting evidence was not submitted by the appellants. The Board also finds that the financial assurance schedule required in the permit which provides 100% of decommission costs assured by year 13 of operation is

reasonable and consistent with the Department's guidance to applicants in the Site Law application.

C. SCENIC CHARACTER:

The appellants assert that the Department erred in its finding that the project would not have an unreasonable adverse effect on the scenic character, existing uses related to scenic character, or other existing uses in the area. They argue that the Department failed to evaluate the scenic impacts on and in the area of Concord Pond (commonly referred to as Big Concord Pond), that a comprehensive user survey of all scenic resources in the area should have been required and that the Department should have considered potential scenic impacts to other important locations such as homes, ponds and peaks. The appellants also argue that the wind farm will have a negative impact on tourism related to scenic values of the project area.

The Wind Energy Act, 35-A M.R.S.A. § 3452 (1), provides in pertinent part that:

> In making findings regarding the effect of an expedited wind energy development on scenic character and existing uses related to scenic character pursuant to…[the Site Law,] …or [the Natural Resources Protection Act,] … the [Department] shall determine, in a manner provided in subsection 3, whether the development significantly compromises views from a scenic resource of state or national significance. Except as otherwise provided in subsection 2, 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… [the Site Law.]

Title 35-A § 3452 (3) provides that:

> In making its determination pursuant to subsection 1, and in determining whether an applicant for an expedited wind energy development must provide a visual impact assessment in accordance with subsection 4, the [Department] shall consider:
>
> (A) The significance of the potentially affected scenic resource of state or national significance;
> (B) The existing character of the surrounding area;
> (C) The expectations of the typical viewer;
> (D) The expedited wind energy development's purpose and the context of the proposed activity;
> (E) The extent, nature and duration of potentially affected public uses of the scenic resource of state or national significance and the potential effect of the generating facilities' presence on the public's continued use and enjoyment of the scenic resource of state or national significance; and
> (F) The scope and scale of the potential effect of views of the generating facilities on the scenic resource of state or national significance, including but not limited to issues related to the number and extent of turbines visible from the scenic resource of state or national significance, the distance from the scenic resource of state or national significance and the effect of prominent features of the development on the landscape.
>
> A finding by the [Department] 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

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> energy project has an unreasonable adverse effect on the scenic character and existing uses related to scenic character of a scenic resource of state or national significance. In making its determination under subsection 1, the [Department] shall consider insignificant the effects of portions of the development's generating facilities located more than 8 miles, measured horizontally, from a scenic resource of state or national significance.

Title 35-A § 3452 (4) provides in pertinent part that:

> An applicant for an expedited wind energy development shall provide the [Department] with a visual impact assessment of the development that addresses the evaluation criteria in subsection 3 if the [Department] determines such an assessment is necessary in accordance with subsection 3. 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 [Department] 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…

The proposed Spruce Mountain Wind Project contains "generating facilities" including wind turbines and towers as defined by 35-A M.R.S.A. § 3451 (5) and associated facilities such as buildings, access roads, substations, and generator lead transmission lines as defined by 35-A M.R.S.A. § 3451 (1). Therefore, the proposed project and its associated facilities must be reviewed pursuant to the expedited wind energy development standards outlined above and, to the extent applicable, 38 M.R.S.A. § 484 (3) and § 480-D (1).

The licensee conducted a general visual impact assessment of all viewsheds of the proposed project. In accordance with 35-A M.R.S.A. § 3452 (3) & (4), the Department required that the applicant conduct a visual impact assessment within a three mile radius of the proposed project. Although not specifically required by the Department, the licensee also conducted a visual impact assessment within eight miles in recognition of the number and variety of scenic resources of state or national significance surrounding the project area. The licensee's visual impact assessment identified scenic resources of state or national significance as defined pursuant to 35-A §3451(9). The licensee's visual impact assessment discusses the potential impacts the project will have on scenic resources of state or national significance and it provides visual simulations of the views from those resources.

The Wind Energy Act provides that a great pond is a scenic resource of state or national significance, as defined by 35-M.R.S.A. §3451(9) (D), for the organized territory of the State if it is one of the 66 great ponds identified as having outstanding or significant scenic quality in the "Maine's Finest Lakes, the Results of the Maine Lakes Study" published by the Maine State Planning Office in October of 1989. For the unorganized territory of the State, the Wind Energy Act provides that a great pond qualifies as a scenic resource of state or national significance if it is one of the 280 great ponds designated as outstanding or significant from a scenic perspective in the "Maine Wildlands Lakes Assessment" published by the Maine Land Use Regulation Commission in June of 1987. There are six great ponds located within an 8-mile radius of the project site that qualify by virtue of their designation in the "Maine's Finest Lakes Study," or the "Maine Wildlands Lakes Assessment". The listed great ponds are:

Abbott's Pond, Little Concord Pond, Shagg Pond, Labrador Pond, Little Labrador Pond and Joe's Pond.

The appellants contend that potential visual impacts affecting Concord Pond and the homes surrounding it should have been considered and evaluated during the Department's review of the project. A photo-simulation of the project from Concord Pond was included in the licensee's visual impact assessment. The licensee's analysis is that the project will not result in negative impacts to the scenic character and related existing uses of the pond. Moreover, Concord Pond is not listed in the study of Maine's Finest Lakes. Therefore, the Board finds that Concord Pond is not within the definition of a scenic resource of state or national significance pursuant to the Wind Energy Act. The review of potential effects of an expedited wind energy development under the Wind Energy Act is focused on impacts to scenic resources of state or national significance and because Concord Pond has not been designated as such a resource, the licensee is not required to demonstrate that the development would not have an unreasonable effect on its scenic character or existing uses.

The appellants also contend that the Department should have given some consideration to the potential scenic impacts to other important locations such as homes, ponds and peaks not identified as significant by Title 35-A § 3451 (9). As these other locations are not scenic resources of state or national significance as set forth by the Wind Energy Act the applicant was not required to make a demonstration of no unreasonable effect on uses at those locations.

In accordance with 35-A M.R.S.A. § 3452 (1) and 38 M.R.S.A. §§ 480-D (1) & 484 (3) the Board finds that a general 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 and that only those resources designated as scenic resources of statewide or national significance are subject to review.

The Wind Energy Act includes as scenic resources of state or national significance property listed on the National Register of Historic Places, state parks, and scenic viewpoints on State public reserved land or on a trail that is exclusively used for pedestrian use. There are two state owned parcels of land within an eight mile radius of any turbine or associated project facilities, Little Concord Pond/Bald Mountain and Speckled Mountain, and eight historic properties.

Due to the number of scenic resources near the project site with potential views of the project, the Department hired an independent expert, James F. Palmer of Scenic Quality Consultants, to review the Scenic Character section of the application, attend the Department's public informational meeting, visit the site, review information submitted by the interested persons and supplemental evidence submitted by the licensee and to provide the Department with review comments. Scenic Quality Consultants submitted review comments to the Department in a document entitled "Review of Spruce Mountain Wind Project Visual Impact Assessment" dated June 11, 2010 (June 2010 Project Review).

During its review of the application, Scenic Quality Consultants sought information regarding public use and the user's expectations of the scenic resources of state or national significance as required by the Wind Energy Act 35-A M.R.S. § 3452 (3), however, it found that no state or local agency has compiled user data for any of the six ponds listed in the Maine's Finest Lakes study or any of the historic structures within eight miles of the project area.

Scenic Quality Consultants evaluated the scenic resources of state or national significance to determine which of those resources would be most amenable for the collection of information regarding the public's use and user's expectations. In order to conduct a user survey regarding a scenic resource, the surveyor needs to be stationed where the view of the project is prominent and in a location to which the public has legal rights of access. The scenic resources of state or national significance were prioritized in accordance with the scenic resource's proximity to the project, with the intent of surveying the closest scenic resource. Shagg Pond is 0.9 miles away from the project site and has a public boat ramp on its southern shore but the project is not visible from the boat ramp location. Little Concord Pond/Bald Mountain State Park is the closest scenic resource of state or national significance, with prominent views of the project area, and a publicly accessible trail located approximately 1.5 miles away from the project. The Department requested that the licensee conduct a user survey at the top of Bald Mountain, in a location that has a prominent view of the proposed project. With respect to the appellant's argument that user surveys should have been conducted at all scenic resources of state or national significance, the Department determined that some of the scenic resources lacked defined public access points and that it would be difficult to collect information regarding the public's use and users' expectations at every scenic resource of state or national significance within eight miles of the project site.

The user survey submitted by the licensee was developed and conducted for the licensee by Market Decisions, a research firm, with input from Scenic Quality Consultants. The survey was conducted May 29 and 30, Memorial Day weekend. Questions were asked of adult hikers, in some cases while the hikers were looking at a visual simulation of the proposed project. In an effort to understand the use of nearby Shagg Pond, the interviewer also noted how many boats were visible on Shagg Pond at hourly intervals on both days of the survey. The results of the survey and the visual simulation shown to interviewees are contained in a document entitled "Research Report. Spruce Mountain Wind Project Intercepts" prepared by Market Decisions and dated June, 2010 (Research Report). On the two days the survey was conducted, the weather was suitable for hiking. In all, 51 hikers (including adults and children) were observed on the top of the Bald Mountain over the course of the two days and 15 interviews were conducted. The interviewer noted a total of five boats on Shagg Pond during the two day survey period.

In its review comments, Scenic Quality Consultants analyzed the Research Report results. Seven respondents indicated they had a local connection. This group tended to rate the existing condition photograph higher and the photo simulation lower than the other respondents. That group sees a greater apparent scenic impact due to the proposed turbines. Six people out of the fifteen interviewed indicated their reason for being on Bald Mountain had something to do with the view. People who hike more than two weeks per year tend to

be less likely to return if the turbines are built. Half of the respondents thought that the proposed turbines would have little effect on their recreation experience.

During the course of the review, and in response to comments from Scenic Quality Consultants, the licensee submitted new visual simulations for Little Concord Pond and Abbotts Pond and revised the visual assessment for Shagg Pond. Scenic Quality Consultants visited each of the identified scenic resources within 8 miles of the proposed project on May 7, 2010. It also reviewed the geographic information system data used for the licensee's visual impact assessment and conducted additional analysis, including a standard visibility analysis using ArcMap software. The licensee's photo simulations were compared to a three-dimensional ArcScene model to determine representational accuracy. These analyses confirm that the primary potential scenic impacts will be to Bald Mountain in Little Concord Pond/Bald Mountain State Park and to Speckled Mountain State Park.

Scenic Quality Consultants evaluated each scenic impact under the Evaluation Criteria described in 35-A M.R.S.A. § 3452 in relation to the proposed project. The scenic impact criteria are: (1) significance of resource, (2) character of surrounding area, (3) typical viewer expectation, (4) development's purpose and context, (5) extent, nature and duration of affected uses, (6) effect on continued uses and enjoyment, (7) and scope and scale of effect of project views. The department's consultant, Scenic Quality Consultant, in its June 2010 Project Review, rated the scenic impacts by severity for each scenic resource. The following is a list of Scenic Quality Consultant's overall scenic impact ratings:

Table 2. Scenic Quality Consultant's Review - Table of Overall Scenic Impact Rating for the Spruce Mountain Wind Project

| Scenic Resource | Overall Scenic Impact |
|---|---|
| **Great Ponds** | |
| Abbotts Pond | Low |
| Joes Pond | None |
| Labrador Pond | Low |
| Little Concord Pond | Low |
| Little Labrador Pond | None |
| Shagg Pond | Low - Medium |
| **Historic Sites** | |
| Arthur L. Mann Memorial Library | None |
| Dreamhome | No Public Access |
| First Universalist Society Church | None |
| Greenwood Cattle Pound | None |
| Greenwood Town Hall | None |
| Rumford Point Congregational Church | None |
| Stearns Hill Farm | No Public Access |
| Whitman Memorial Library | None |
| **State Parks** | |
| Little Concord Pond/Bald Mountain | Low - Medium |
| Speckled Mountain | Low - Medium |

Department staff visited the project area three times during the project review, and specifically visited: Labrador Pond, Little Concord Pond, Shagg Pond, and Little Concord Pond/Bald Mountain State Park. The character of the area is rural. On Shagg Pond and Labrador Pond, camps are visible along the shoreline or through the trees. The east slope of Spruce Mountain, visible from Shagg Pond, Bald Mountain and Speckled Mountain, includes recently cut forests and a residential subdivision called the Eagles Nest. The views from Shagg Pond, Bald Mountain and Speckled Mountain include these intrusions and the two existing communications towers currently located on the top of Spruce Mountain.

In response to the appellants' arguments that potential visual effects from Concord Pond and the residences surrounding it, the licensee argues that many of the appellants' concerns reflect a misunderstanding of the applicable review criteria. The licensee argues that the Wind Energy Act limits the Department's review of scenic impacts to resources of state or national significance only and that the Department does not have the authority to consider the project's impacts on private camps, homes and private lands. The licensee contends that the user survey it submitted which was conducted on top of Bald Mountain and the review by Scenic Quality Consultants is credible assessments of the visual impacts on the pertinent resources and their use.

The Board agrees with the Department that it would be difficult and it is not necessary for the licensee to collect information regarding the public's use and users' expectations at every scenic resource of state or national significance within eight miles of the project site. The Board finds that the Wind Energy Act does not grant the Board the authority to consider the project's impacts on private camps and homes and private lands. The Board finds the licensee's submissions and analysis of potential visual impacts to the use of the pertinent resources to be an adequate assessment and a demonstration that the development will not significantly compromise the views from the pertinent resources. The Board also finds the review of the evidence and comments submitted on this issue by Scenic Quality Consultants to be credible. Therefore, based upon the evidence in the record, the Board finds that the licensee has adequately assessed the proposed project's potential visual impacts as set forth under the Wind Energy Act and has demonstrated that the project will not significantly compromise views from a scenic resource of state or national significance. The Board finds the Spruce Mountain Wind Project will not have an unreasonable adverse effect on the scenic character or existing uses related to scenic character of scenic resources of state or national significance.

D. WILDLIFE:

Appellants contend that the proposed development presents a risk to wildlife such as eagles, raptors, bats, and local flocks of migrating birds. During the processing of the application, interested parties commented that the proposed project will negatively affect raptors and other large birds that utilize the area. They noted the presence of golden eagles, peregrine falcons, and the possibility of a great blue heron rookery nearby.

In the application, the licensee submitted the results of a series of ecological field surveys conducted by Tetra Tech, including avian and bat surveys (completed during spring migration, summer residency and fall migration of 2009), wetland delineations, rare,

threatened, and endangered plant species surveys, and vernal pool surveys within the project area. The licensee stated that the purpose of the avian and bat surveys were to document avian and bat occurrences in the study area, to provide baseline information on the avian and bat communities around the project area and to facilitate a project design that minimizes potential environmental impacts.

The Department consulted with the Maine Department of Inland Fisheries & Wildlife (MDIFW) regarding the potential impacts to wildlife from the project. MDIFW staff visited the project site and attended the public informational meeting held by the Department on March 25, 2010. MDIFW found the licensee's survey methodology to be appropriate and the results credible and consistent with its knowledge of and expectations for this site. In its review comments, MDIFW stated that the avian surveys show the occurrence of twelve Species of Greatest Conservation Need as outlined in Maine's State Wildlife Action Plan, three Species of Special Concern, and two State Endangered Species in the project area. The licensee's bat surveys indicated that two Species of Special Concern utilize the project area.

The licensee's surveys included routine monitoring of raptor activity during fall and spring. The licensee's data noted bald eagles, peregrine falcons and one golden eagle near the project site. In its evaluation of the data, the licensee stated that it did not expect the project to negatively impact raptors. In its review comments, MDIFW stated that the survey data indicates that most raptors were observed traveling along the side slopes of Spruce Mountain and along the valleys where thermals are more likely to develop. MDIFW commented that results from the studies showed that both of the peregrine falcons observed were higher than the rotor-swept zone, and the golden eagle was not using the ridge where the turbines will be located; its flight path was over the valley and slopes of the mountain. MDIFW is not aware of any great blue heron rookeries in the area and the interested party mentioning the possibility did not specify where such a rookery is located.

MDIFW stated that the number of raptors observed at the site is not exceptional; however, the percentage observed within and below the rotor-swept zone does suggest that raptors may be vulnerable at this site once it is operational. Raptor populations are a long lived species with low reproductive potential, and would be less able to absorb mortality at turbines than other types of birds. MDIFW stated that the licensee's survey methodology was done using standardized practices and that the findings of the report are credible. MDIFW also stated that it is important to collect valid post-construction data to help evaluate the actual impact on raptors and other birds at the project site. MDIFW further commented that the clearings developed at the turbine site may attract raptors to feed on small mammals and birds in the open, which could lead to higher potential for raptor mortality at an operational site. MDIFW suggests that post-construction monitoring be required to ensure that there is not greater than expected mortality of raptors and other birds at the project site and that a permit condition should require subsequent operational changes or guidelines, to be approved by the Department, if any portion of the project causes unreasonable mortality of raptors and other birds.

The extent of bat use of the project site is low compared to other Maine sites and average compared to most studied sites around the country. MDIFW stated that during late August and early September, bats are traveling to local hibernacula or migrating out of the region for

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the winter. Additionally, MDIFW stated that bats are most frequently active one hour before sunset to one hour after sunrise. Bats are most active at those times when foraging on insects, when wind speeds are less than six meters per second. Turbines will be lit in accordance with Federal Aviation Administration (FAA) standards. Available data suggests that the FAA lighting requirements do not attract bats. MDIFW recommended that there be no source of steady lighting at the access point to the turbine monopole, as such a steady light would likely be attractive to bats. MDIFW recommended that the turbine nacelles, located at the top of the monopole, behind the blades, be insulated as much as practical to minimize insect attraction. MDIFW stated that because of the limited data regarding bats and wind turbine projects in Maine, it is difficult to assess the potential impacts to bats at the project site. As a result, MDIFW stressed the importance of post-construction monitoring and the ability to alter the operation of the facility, if necessary, to reduce bat mortalities.

MDIFW staff requested that the licensee submit a finalized post-construction avian, bat, and raptor monitoring protocol to the Department for review and approval prior to the beginning of operation of the Spruce Mountain Wind Project. MDIFW further recommended that post-construction monitoring be performed by the licensee at all ten turbine locations and include surveys for birds and bats. The permit issued requires the licensee to submit a post-construction avian, bat and raptor monitoring protocol, developed with input from MDIFW, prior to the beginning of operation of the project, and it requires post-construction monitoring at all ten turbine locations. The appellants argue that the proposed development will present a risk to wildlife such as eagles, raptors, bats and local flocks of migrating birds, however they did not submit any scientific studies contradicting the evidence submitted by the licensee.

The Board considered the licensee's surveys and report, the appellant's arguments, the licensee's response to those arguments and the review comments from MDIFW. The Board finds that the licensee's surveys were done in accordance with standard methodologies and are credible. Based upon the evidence in the record, the Board finds that the Spruce Mountain Wind Project as licensed by the Department, will not unreasonably harm any significant wildlife habitat, unreasonably disturb wildlife, or unreasonably affect the use of the site by the subject wildlife.

E. STORMWATER:

The appellants contend that the proposed development will adversely affect surrounding roads as a result of stormwater runoff from the project site.

The project includes approximately 24.2 acres of new impervious area and 25.2 acres of new developed area. Under the Stormwater Law impervious area is defined as the total area of a parcel that consists of buildings and associated constructed facilities or areas that will be compacted through design or use to reduce their permeability. Developed area is defined as all land areas that are stripped, graded, grubbed, filled, or excavated at any time. The project lies within the watershed of Big Concord Pond, Shagg Pond, and tributaries to the Concord River, Little Androscoggin River, and the west branch of the Nezinscot River. The licensee submitted a stormwater management plan based on the basic, general, and flooding standards contained in Department Rules, Chapter 500. Under the general standards, the licensee

applied the phosphorous methodology to address potential impacts to Big Concord Pond and Shagg Pond. Stormwater quality treatment will be achieved with various vegetated buffers. Stormwater flooding mitigation will be achieved with flow distribution through the use of road side buffers, ditch turnout buffers, and a treatment berm. The licensee also submitted an erosion and sedimentation control plan that is based on the performance standards contained in Appendix A of Chapter 500 and the Best Management Practices (BMPs) outlined in the Maine Erosion and Sediment Control BMPs, which were developed by the Department. The erosion and sedimentation control plan described measures to control erosion during and after construction.

The project will utilize a stormwater management system that is based on estimates of pre- and post-development stormwater runoff flows obtained by using Hydrocad, a stormwater modeling software that utilizes the methodologies outlined in Technical Releases #55 and #20, U.S.D.A., Soil Conservation Service and detains stormwater from 24-hour storms of 2-, 10-, and 25-year frequency.

The Department's Division of Watershed Management (DWM) reviewed the licensee's analysis of the watersheds for potential flooding impacts. DWM stated that the licensee's model shows the project's impact on the weighted curve number of each watershed and the subsequent impact to peak flows for these watersheds for the 25-year, 24-hour storm. DWM stated that the project will meet the flooding standard requirement of maintaining the pre-construction peak flows for the 2, 10 and 25 year, 24-hour storm at the property boundary.

DWM' s analysis concluded that the licensee's stormwater management system is acceptable and designed in accordance with the Chapter 500 Basic and General Standards. Moreover, DWM determined that the licensee made adequate provision to ensure that the Spruce Mountain Wind Project met the Chapter 500 Flooding Standard for channel limits and runoff areas, and peak flow of stormwater from the project site.

The appellants did not submit any studies or factual information contradicting the evidence submitted by the licensee nor did they state specifically why they believe that stormwater from the project site will negatively affect surrounding roads.

The Board has considered the information contained in the record and the arguments of the appellants. Based upon this evidence, the Board finds that the Spruce Mountain Wind Project meets the Basic, General, and Flooding Standards contained in Chapter 500 and is not likely to have an unreasonable adverse effect on the water quality of Big Concord Pond, Shagg Pond, tributaries of the Concord River, Little Androscoggin River, and the Nezinscot River. Furthermore, the Board finds the licensee has adequately made provisions for stormwater quality and quantity, and surrounding travel ways will not be unreasonably affected by peak flows of stormwater from the site of the proposed development.

7. OTHER CONSIDERATIONS:

Appellants contend that the proposed wind energy development will have unreasonable adverse impacts on the value of their property.

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The underlying Departmental Order found, pursuant to the Wind Energy Act, that the licensee demonstrated that the project would provide tangible benefits and that finding was not challenged by the appellants. The Board does not have authority to consider the issue of potential impacts to property values as a basis for determining whether permitting requirements have been satisfied under the applicable laws.

Based on the above findings, the Board concludes that:

1. The appellants filed a timely appeal.

2. The Board denies the request for a public hearing on this appeal.

3. The licensee's proposal to construct a 20 MW wind energy development, known as the Spruce Mountain Wind Project, in the Town of Woodstock meets the criteria for a permit pursuant to the Site Location of Development Act, 38 M.R.S.A. § 484, the Natural Resources Protection Act, 38 M.R.S.A §480-D, and the Wind Energy Act, 35-A M.R.S.A. §§ 3452-3455.

THEREFORE, the Board AFFIRMS the Department's approval of the permit applications filed by SPRUCE MOUNTAIN WIND, LLC to construct a 20 MW wind energy development, known as the Spruce Mountain Wind Project, in the Town of Woodstock, Maine, as described in Department Order #L-24838-24-A-N/L-24838-2G-B-N. The Board DENIES the appeal of the Friends of Spruce Mountain Inc., Scot and Thelma Kendall, Leo Bilodeau and Irene Chabot, Nathaniel Snow, Richard and Patricia Mabey, Richard Marasse, Robert and Joann Moulton, Daryl Routhier, Nate Ladd and Rob Roy, Kevin Corbett, Wendall Hall and Richard and Suzee Woods.

DONE AND DATED AT AUGUSTA, MAINE, THIS_____ DAY OF _____, 2011.

BOARD OF ENVIRONMENTAL PROTECTION

By: _____
Susan M. Lessard, Chair