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SPRUCE MOUNTAIN WIND, LLC
Site Location of Development Act//Natural Resources Protection Act
Spruce Mountain Wind Project

ORDER UNDER APPEAL

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION
AUGUSTA, ME 04333

DEPARTMENT ORDER

IN THE MATTER OF

SPRUCE MOUNTAIN WIND LLC	) SITE LOCATION OF DEVELOPMENT ACT
Woodstock, Oxford County	) NATURAL RESOURCES PROTECTION ACT
SPRUCE MOUNTAIN WIND PROJECT	) FRESHWATER WETLAND ALTERATION
L-24838-24-A-N	) WATER QUALITY CERTIFICATION
L-24838-2G-B-N (approval)	) FINDINGS OF FACT AND ORDER

Pursuant to the provisions of 38 M.R.S.A. Sections 481 et seq. and 480-A et seq., and Section 401 of the Federal Water Pollution Control Act, the Department of Environmental Protection has considered the application of SPRUCE MOUNTAIN WIND LLC with the supportive data, agency review comments, public comments and submission, and other related materials on file and FINDS THE FOLLOWING FACTS:

1. PROJECT DESCRIPTION:

A. Summary: The applicant submitted an application for permits under the Site Location of Development Act (Site Law) and the Natural Resources Protection Act (NRPA) on January 19, 2010. The applications were accepted by the Department for processing on February 1, 2010. The applicant proposes to construct a 20-megawatt (MW) wind energy development, known as the Spruce Mountain Wind Project, in Woodstock, Maine. The project site is located north of Cushman Road and south of Shagg Pond Road. The proposed development consists of ten, 2.0 megawatt (MW) turbines with associated turbine pads; a 7,200 linear foot access road leading from Shagg Pond Road to the ridgeline; a 11,300 linear foot access road connecting the turbines; a 1,750-square foot operations and maintenance building and 6,890 linear feet of 34.5 kV above-ground transmission line, on Spruce Mountain. The access road will begin on Shagg Pond Road. The proposed project is shown on a set of plans prepared by Patriot Renewable and EMS entitled "Spruce Mountain Wind Project" and dated June 17, 2010. The electrical transmission line and collector system are shown on a set of plans by RLC Engineering, with various titles, and dated December 15, 2009.

The project will create 7.7 acres of new impervious area and 8.7 acres of new developed area. The proposed Spruce Mountain Wind Project meets the definition of an expedited wind energy development set forth in 35-A M.R.S.A. §3451 (1)(4).

1.) Wind Turbines: The applicant proposes to erect 10 Gamesa G-90 wind turbines, each of which is capable of generating 2.0 MW. The turbines will be constructed

in a south to northeast array along the ridgeline of Spruce Mountain. Each turbine is approximately 256 feet (78 meters) from the ground to the center of the hub; the total height from the ground to the tip of a fully extended blade is approximately 403 feet (123 meters).

2.) Turbine Pads: The turbines will be constructed on 10 turbine pads. The construction of each turbine pad will result in the development of between one acre and 1.8 acres. The developed area for each turbine pad will include a 13 foot diameter turbine foundation pedestal with a surrounding 25 foot wide gravel ring, and a 50 foot by 80 foot crane pad constructed of compacted gravel or processed rock. The remaining developed area of each pad will be used as an equipment laydown area. The laydown areas will be allowed to re-vegetate; however, the turbine foundations and crane pads will remain as impervious area. Impervious area associated with each turbine pad will range between 7,056 square feet and 3,920 square feet in size. The total impervious area associated with the 10 turbine pads is approximately 1.3 acres.

3.) Access Roads and Crane Paths: The applicant proposes to construct approximately 3.5 miles of access roads and crane paths. The primary access to the site for component delivery will be from Shagg Pond Road. The access road for the project will begin at Shagg Pond Road and will be approximately 24 feet wide. Along the ridgeline and between the turbine sites, the crane path will be constructed of gravel and will be 32 feet wide to allow for the large construction equipment to assemble the turbines. As shown on the plans, the crane path width will be reduced to 12 feet by either loaming and seeding the area or placing erosion control mulch over the excess road width after the construction of the turbines and the removal of the crane. The impervious area created in the course of the construction of the access roads and the crane paths will be approximately 15 acres. The impervious area will be reduced to approximately eight acres after construction of the wind turbines.

4.) Electrical Transmission lines: Power from the 10 turbines will be collected in a 34.5 kV underground collector line buried within the ridgeline access road shoulder. The underground electrical collector line will transition to an above ground transmission line in the vicinity of the southernmost turbine (turbine 1) and continue above ground mounted on wood poles for approximately 6,890 feet, traversing the southwest side of the mountain to Cushman Road. Once it reaches Cushman Road, it will continue 2.8 miles along Cushman Road, Route 26 and Route 232, in the existing road right-of-way to the existing Woodstock Substation. Central Maine Power Company will construct this section of transmission line located in the road right-of-way. The transmission line project located within the existing utility right-of-way along the road, which is not part of this permit application because no upgrades are necessary. The 6,890 linear feet of the transmission line leading from the turbines to the public road is being reviewed in this application proceeding.

5.) Operations and Maintenance (O&M) Building and Associated Structures: The proposed wind energy development will include a 1,750 square foot operations and maintenance building with associated gravel parking area, a well, and a septic system. The O&M building will be located at the base of the access road, near its intersection with Shagg Pond Road. The O&M building is designed to accommodate up to six employees and will include an 8,000-square foot parking area with seven parking spaces. Adjacent to the O&M building will be a 42,000-square foot, gravel equipment laydown area. The equipment laydown area will be revegetated after project construction. The O&M building and parking area will result in the creation of 8,575 square feet of permanent impervious area.

6.) Meteorological Towers: Currently, there are two temporary meteorological towers on the project site. The applicant proposes to keep one tower, located at the site labeled T-4 (turbine 4) on the plans, up and operating for up to two years after the project starts operating. The other tower will be removed during project construction.

The applicant is also seeking approval under the Natural Resources Protection Act (NRPA) for impacts to freshwater wetlands and streams. The applicant proposes to permanently fill 5,718 square feet of freshwater wetlands during the construction of the access and crane roads, temporarily alter an additional 7,835 square feet of freshwater wetlands during the construction of the transmission line, and permanently convert 19,663 square feet of forested wetlands to scrub shrub wetlands with the construction and maintenance of the electrical transmission line. The applicant also proposes to cross a total of 13 streams for the construction of the access road, the crane road along the ridge line, and the transmission line. Nine of these streams are NRPA regulated streams. The remaining four streams are federal jurisdictional waters of the United States only, and are regulated by the US Army Corps of Engineers (USACOE) pursuant to the Department's 401 Water Quality Certification. The applicant proposes to cross three streams on the access road. Six streams will be crossed by the transmission line.

The applicant submitted an NRPA Permit by Rule (PBR #49555) notification under the Section 10 standards of Chapter 305 of the Department's regulations. This PBR application is for the crossings of two streams along the access road and three stream crossings along the transmission line. The Department accepted PBR #49555 on February 2, 2010. The applicant is requesting a waiver, pursuant to Chapter 305 §10(13), to allow the streams along the transmission line to be crossed outside of the recommended PBR work window (July 15 to October 1). Specifically, it requested the option to do the stream crossings during the winter months. The Department approved the request.

B. Current Use of Site: The site of the proposed project is the north-south ridgeline of Spruce Mountain and nearby areas. The site is currently forested. There are several existing logging roads on the mountain as well as an abandoned mine. Adjacent uses include residential homes, seasonal camps and timber lands. Little Concord Pond and

Bald Mountain State Park are located nearby. During the project review, Department staff inspected the project site and the nearby area on three separate occasions.

C. Public Interest: While the application was being reviewed, the Department received numerous comments from the general public, primarily from residents of the areas surrounding the project. These persons are "interested persons," as defined in Department Rules, Chapter 2(1)(I), for the purposes of this application review.

In consideration of the level of public interest in wind power projects, the Department held a public meeting pursuant to 38 M.R.S.A. §345-A (5). The purpose of this meeting was to provide interested parties and the general public with an opportunity to comment on the application and submit information into the Department's record. The Department held the public meeting on March 25, 2010 at the Woodstock Elementary School in the Town of Bryant Pond, Maine. Nine members of the public offered comments or asked questions at the meeting. The Department accepted all of the information that was presented into the record at the public meeting and subsequently received additional letters and documents regarding specific aspects of the proposed project during the application review period.

D. Comments on the Draft Order: The Department issued a draft order for public comment on September 15, 2010. The general comment period on the draft order closed on September 22, 2010. Because of the amount of information submitted by interested parties during the review of the draft order, the Department left the record open specifically to allow the Department and its review agents to evaluate and comment on the information submitted by interested parties. On September 28, 2010 the Department opened the record for interested parties to submit comments on the Department's review of the material submitted during the five day draft order comment period. The Department officially closed the record September 30, 2010. The Department's responses to comments on the draft order are discussed in the appropriate findings below.

2. TITLE, RIGHT OR INTEREST:

To demonstrate that it has sufficient title, right or interest in the property proposed for development, as required in Chapter 2 (11)(D) and Chapter 372(9) of the Department's rules, the applicant submitted copies of deeds, easements, leases, easement options, and purchase options between the applicant and the property owners of the proposed project site, including the transmission line that will be constructed on the project site. The application includes deeds which show that the property owners who are leasing to the applicant have ownership over the parcels which are subject to the leases. The applicant submitted copies of one executed setback and sound easement, one executed 40-year lease, and one-executed 20-year lease with an additional 10-year option. Still pending are two purchase options and one easement option for the proposed transmission line. In total, the applicant will own 1,340 acres and lease an additional 1,539 acres.

The Department finds that the deeds, easements, leases, easement options, and purchase options submitted by the applicant demonstrate a right to reasonable use of the property and adequate duration and terms for the proposed project and its associated uses sufficient for the processing of this application. Therefore, the Department finds that the applicant demonstrated adequate title, right or interest in all of the property which is proposed for development or use provided that executed and recorded copies of the two deeds for properties currently under purchase options and one executed transmission easement are submitted prior to the start of construction.

3. FINANCIAL CAPACITY:

The total cost of the project is estimated to be $37,000,000. The applicant submitted a letter from Sovereign Bank, dated August 23, 2010 indicating that it has executed a term sheet with the applicant to provide financing for the proposed project in the amount of 35,000,000. The bank will close on the loan upon proof of the applicant's receipt of all necessary permits. The applicant also submitted a letter from Darmody, Merlino & Co LLP, a certified public accountant, stating that the applicant has access to stockholder equity in excess of $50,000,000 as of December 31, 2009. Finally, the applicant submitted a letter signed by the sole owner of Spruce Mountain Wind LLC, Jay M. Cashman, stating that financing for the project will be a combination of financing from himself and a loan from Sovereign Bank. This letter represents that prior to execution of the loan, Mr. Cashman will provide to the applicant all necessary financing from his personal assets.

The Department finds that the applicant has demonstrated adequate financial capacity to comply with Department standards provided that, prior to the start of construction, the applicant submits evidence that it has finalized and received the described loan or initial distribution from Sovereign Bank or other financial institution authorized to do business in Maine, and final documentation of the receipt of the remainder of the financing from Mr. Cashman in accordance with 38 MRSA §484(1) and Chapter 373(1), to the Bureau of Land and Water Quality (BLWQ) for review and approval.

4. TECHNICAL ABILITY:

The applicant provided resume information for key persons involved with the project. The applicant retained the services of several consulting firms to assist in the design and engineering of the project. These firms and their involvement in the proposed project are as follows:

- Tetra Tech EC, Inc. (Tetra Tech) – natural resources assessment, historic archaeological resources, noise modeling, permitting
- Terrence J. DeWan and Associates – visual impact analysis
- Engineering and Management Services – stormwater management and plans
- RLC Engineering – electrical engineering/plans
- Phillips Ecoservices – Soils
- Dave Marceau – Wastewater Management

The Department finds that, based on the applicant's experience and the professional consultants it retained to prepare the application, the applicant has demonstrated adequate technical ability to comply with Department standards.

5. NOISE:

To address the Site Law criterion pertaining to provisions for the control of noise, 38 MRSA §484 (3), and the rules adopted thereunder, Chapter 375 §10, the applicant submitted a sound level study as Section 5 of the application. The sound level study was conducted by Tetra Tech Inc. (Tetra Tech) to model expected sound levels from the proposed Spruce Mountain Wind project and to compare the model results to operational standards pursuant Chapter 375 §10. The Department hired an independent noise expert, EnRad Consulting (EnRad), to assist the Department in its review of this aspect of the application.

The Spruce Mountain Wind project must comply with Department regulations applicable to sound levels from construction, routine operation and routine maintenance. Chapter 375 §10 applies hourly sound level limits ($L_{Aeq\text{-}Hr}$) at facility property boundaries and at nearby protected locations. Chapter 375 §10 (G)(16) defines a protected location as "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 sound 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 dBA in the daytime (7:00 a.m. to 7:00 p.m.) and 60 dBA in the 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 60 dBA daytime (7:00 a.m. to 7:00 p.m.) and 50 dBA nighttime (7:00 p.m. to 7:00 a.m.). Where the daytime pre-development ambient hourly sound level is equal to or less than 45 dBA and/or nighttime ambient hourly sound level is equal to or less than 35 dBA, the Department's strictest "Quiet Location" limits of 55 dBA daytime and 45 dBA nighttime apply.

Due to the rural nature of the site, Department standards require that applicants meet the "Quiet Location" limits, the Department's most restrictive sound limits. The applicant proposes to operate the project in compliance with these limits as set forth in Chapter 375 §10 (H) (3) (1). For such Quiet Locations, the hourly sound level limits for routine operation are 55 dBA daytime (7:00 a.m. to 7:00 p.m.) and 45 dBA nighttime (7:00 p.m. to 7:00 a.m.). In Quiet Locations, nighttime limits at a protected location apply at the property line of the protected location or up to 500 feet from sleeping quarters when the property line is greater than 500 feet from a dwelling.

The Town of Woodstock (Woodstock) also has regulations pertaining to noise from developments. Woodstock's noise ordinance sets sound level limits by land use zone and time of day. Woodstock granted a waiver to the applicant that allows for sound pressure limits of up to 50 dBA at most of the residential property boundary during the nighttime hours of 10:00 p.m. to 7:00 a.m. Woodstock granted a waiver to the applicant to allow for sound pressure limits of up to 55dBA in two areas on a residential property boundary, Lot 8 on the Town of Woodstock's Tax Map 9, on the eastern limits of the project. Woodstock concluded that the higher sound level limit is appropriate for residential property line receptor locations because the applicant proposes to meet the Department's noise regulations for all residential structures located on abutting properties.

The abutting property on the north side of the project is an active timber lot with no structures and is subject to a permanent conservation easement that does not allow for future development. The applicant submitted a copy of the easement option on the abutting parcel, which includes provisions to (1) locate a turbine closer to the property line than 1.5 times the maximum turbine height, (2) emit sound levels higher than local or state regulations would permit (if applicable) and (3) cast shadows or flicker on the property. The property is identified as Lot 4 on the Town of Woodstock's Tax Map 13. The applicant does not propose to exceed the Department's noise standards as set forth in Chapter 375 §10 at the property line with this parcel.

A. Sound Level Modeling. The applicant's noise consultant, Tetra Tech, developed a sound level prediction model to estimate sound levels from operation of the proposed project. The acoustic model was developed using the CADNA/A software program performing calculations in accordance with a generally recognized standard for estimating the propagation of sound in the environment which is published 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 used area topography and wind turbine locations based on USGS topographic information and project design for entry into CADNA/A.

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 warrantied Gamesa G90 maximum sound power output of 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. The wind turbine sound power emission was modeled as an idealized point source in place of a distributed area source.

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EnRad, the Department's noise consultant, reviewed the information provided by the applicant. In a technical review memorandum dated June 23, 2010, EnRad found the proposed noise model, which included a 2 dBA manufacturer uncertainty (International Electrotechnical Commission Standard, IEC 61400-11) insufficiently conservative to ensure compliance with the Department's noise regulations at the nearest protected locations. EnRad offered a number of additional conservative model assumptions that might be incorporated by the applicant to meet the Department's requirements.

As a result of EnRad's review memorandum and a subsequent meeting with the Department, the applicant, Tetra Tech and EnRad, the applicant submitted "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. In this response, Tetra Tech elected to add an additional 3 dBA to the specified sound power levels of each turbine to allow for uncertainty in the sound propagation modeling calculations. As a result, the applicant proposes to operate the turbines at full sound power output of 110 dBA (105.0 + 5 dBA safety factor) between the hours of 7:00 a.m. and 7:00 p.m. The applicant also proposes to operate several turbines in a noise restricted mode during the nighttime hours to meet both the Department's standards (in bold in the table below) 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 the manufacturer, Gamesa, to operate at the reduced noise levels outlined in Table 1.

Table 1

Turbine #	Nightime Hours 7:00 p.m. – 10:00 p.m.	Nightime Hours 10:00 p.m. – 7:00 a.m.
6		2.8 dBA reduction
7		2.8 dBA reduction
8		1.8 dBA reduction
9	**2.8 dBA reduction**	**2.8 dBA reduction**
10	**2.8 dBA reduction**	**2.8 dBA reduction**
11	**1.8 dBA reduction**	**1.8 dBA reduction**

Sound levels from wind turbine operation were modeled in the area surrounding the proposed project site. Twenty-two residential receiver points in the vicinity of the proposed project were selected by the applicant as representative of where the Department's most restrictive quiet area nighttime limits apply. The sound limits do not apply on land which will be purchased or leased as it is considered to be part of the project site, nor do they apply on parcels for which the applicant has submitted noise easements from the landowner. The 22 receiver points are the relevant locations closest to the wind turbines, in the northeast direction towards Shagg Pond, where sound levels have the greatest potential to exceed sound limits.

A summary of Table 1 in Tetra Tech's July 15, 2010 response to comments is presented below and labeled Table 2. Tetra Tech's analysis indicates that the sound pressure levels will be in compliance with the Department's quiet areas standard.

Table 2

Receptor	Closest turbine*	Distance from 500 foot buffer to closest turbine (feet)	Sound Pressure Levels (dBA) 7am-7pm	Sound Pressure Levels (dBA) 7pm- 10pm	Sound Pressure Levels (dBA) 10pm-7am
1	11	4137	40	38	38
2	11	4685	39	38	37
3	11	4813	40	38	38
4	11	4531	40	38	38
5	11	4879	39	38	37
6	11	4432	40	38	38
7	11	3169	40	38	37
8	11	2749	42	40	40
9	11	2940	41	39	39
10	11	2103	43	41	41
11	11	2195	44	42	42
12	10	1686	47	45	45
13	11	3832	40	38	38
14	11	3740	40	38	38
15	11	4446	39	38	37
16	11	4806	39	38	37
17	11	2982	40	38	38
18	11	3081	41	39	38
19	11	3356	40	38	38
20	11	4003	39	37	37
21	11	4741	40	38	38
22	11	3845	40	38	38

*The applicant originally considered installing either 11 General Electric 1.5sle wind turbines or a combination of 9 or 10 Gamesa G87 and G90 2.0 MW wind turbines. Therefore the original noise modeling was done using 11 locations. Subsequently, the applicant decided to construct the project utilizing 10 Gamesa G90 wind turbines, one in each of the 11 locations with the exception of turbine location 4. All of the applicant's analysis and modeling was done using the specifications for the Gamesa G90 wind turbines.

EnRad reviewed the revised model and submitted additional comments dated July 23, 2010. EnRad stated that, with the additional 3 dBA safety factor and the resulting adjustment of having specified turbines operating in reduced sound power mode as described in Table 1 above, the proposed project will comply with the Department's noise standards.

In its response to EnRad's June 23, 2010 comments, Tetra Tech stated in its July 15, 2010 comments, that the original sound model incorporated an acceptable level of conservatism and that the additional 3 dBA safety factor requested by the Department is unnecessary. However, for the purposes of obtaining a permit, it is willing to make the

concession to operate some of the turbines in reduced sound power mode as required by the inclusion of the additional safety factor in the model. The applicant further stated that it will work with the Department in designing and executing an operational sound monitoring program, and that any post-construction sound monitoring plan will include provisions to demonstrate compliance with some or all of the six turbines, listed in Table 1, set in normal operating mode, without reduced sound power restrictions. If the applicant can demonstrate compliance with the Department's noise standards in normal operating mode, it may apply for a modification of its permit to remove or change the conditions in the permit imposing those restrictions. The applicant proposes to monitor sound levels within one year following such permit modification to ensure that the Department's noise standard continues to be met.

B. Short Duration Repetitive Sound (SDRS). Chapter 375 §10(G)(19) defines short duration repetitive sound as "a sequence of repetitive sounds which occur more than once within an hour, each clearly discernible as an event and causing an increase in the sound level of at least 6 dBA on the fast meter response above the sound level observed immediately before and after the event, each typically less than ten seconds in duration, and which are inherent to the process or operation of the development and are foreseeable." Tetra Tech reviewed two studies regarding the occurrence of SDRS, one entitled "The Assessment and Rating of Noise from Wind Farms" by the Working Group on Noise from Wind Turbines, ETSU Report for the United Kingdom Department for Trade and Industry dated September 1996, and another report entitled, "Research into Aerodynamic Modulation of Wind Turbine Noise: Final Report" by the University of Salford dated July 2007.

In its memorandum dated June 23, 2010, EnRad requested further information from the applicant regarding the potential for SDRS at the project site. In response to this request, the applicant submitted a memorandum dated July 14, 2010 from RSG Inc. RSG Inc. is a firm with noise experts experienced in evaluating noise impacts from mobile and industrial sources, including wind energy projects. In the July 14, 2010 memorandum, RSG Inc. stated that it reviewed data collected from the project site based on the site terrain, expected wind sheer, and expected wind turbulence. It further stated that, while it is not possible at this time to calculate the extent of SDRS at Spruce Mountain, its analysis indicates that the project site characteristics are not conducive to common occurrences of SDRS.

Based on the above mentioned studies and the memorandum from RSG Inc., Tetra Tech concluded that the project will not produce noise that falls within the category of SDRS as defined in the Department's Rules.

EnRad reviewed the information supplied by the applicant and stated that the project is not anticipated to generate SDRS sounds on a regular basis.

C. Tonal Sound. According to Chapter 375 §10.G (24), a regulated tonal sound occurs when the sound level in a one-third octave band exceeds the arithmetic average of the sound levels in the two adjacent one-third octave bands by a specified dB amount

based on octave center frequencies. Chapter 375 requires that 5 dBA be added to the observed level of any defined tonal sounds that result from routine operation of a development. The Sound Level Assessment submitted by the applicant states that the Gamesa G90 2.0MW turbine performance specifications and measurements of operating turbines indicate that the applicable tonal thresholds contained in Chapter 375 §10.G (24) are not likely to be exceeded. Therefore, the Assessment determined that the Gamesa G90 2.0MW wind turbines are not expected to generate regulated tonal sounds as set forth in Chapter 375.

EnRad reviewed the information supplied by the applicant and stated that the applicant's conservative predictive modeling findings are well within the Department's standards for tonal sound.

Interested Parties. Interested parties, including a group of local concerned citizens calling themselves Friends of Spruce Mountain, submitted comments and information regarding sound levels from the proposed project. Specifically, concerns were raised relative to the potential health effects of low frequency sound from wind turbines, the sufficiency of the background studies and modeling submitted by the applicant, the breadth of the Department's standards for noise, and whether the proposed project would generate SDRS. The applicant submitted additional materials on these issues in response to the submittals of the interested parties.

Human Health Effects. Interested parties raised concerns regarding potential human health effects from wind turbine noise, particularly infrasound low frequency sound less than 250 Hz from wind turbines. Infrasound is sound that is generally considered to be less than 20 Hz, the normal limit of human hearing. Interested parties submitted several papers to the Department, including one entitled "Responses of the Ear to Infrasound and Wind Turbines" by Alec Salt of the Cochlear Fluids Research Laboratory, Washington University in St. Louis.

The Maine Center for Disease Control (MCDC) within the Department of Health and Human Services (DHHS) reviewed the materials submitted by interested parties pertaining to potential health effects associated with wind turbine sound. The MCDC issued a report titled "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 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 DEP on this issue.

The Department has considered the reports of two recent scientific literature reviews relating to wind turbine sound and health effects. The first was prepared by Exponent, Inc. for the Wisconsin Public Service Commission and 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 was prepared for the American Wind Energy Association (AWEA) and Canadian Wind Energy Association (CWEA) by a panel of seven medical and acoustic experts and 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. 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:

- 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 anticipation of concerns 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 (NNG) 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) 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.

The MCDC reviewed the 2009 WHO report and commented that, given the differences in the measurements, the 45 dBA standard would presumably be in the range of, and likely close to if not less than, the WHO target limit.

Based on its review of all of the material submitted regarding the potential health effects of wind turbines, the Department finds that compliance with Chapter 375 §10 is likely to ensure that there are no adverse health effects due to the proposed project.

Post-construction Monitoring Program. To confirm that the modeling and predictions submitted by the applicant and deemed reasonable by the Department correctly predicted sound levels and that the project continues to meet the noise standards reflected in this permit over time, the applicant must conduct post-construction sound level monitoring, to

be submitted to the Department on an annual basis for the first five years of operation, and then once every fifth year until the project is decommissioned. After compliance is proved in reduced sound power operation mode, the applicant may file an application for an amendment of this permit with the Department to demonstrate compliance with some or all of turbines 6-11 set in the normal operating mode without reduced sound-power restrictions.

1. Compliance will be demonstrated when the required operating/test conditions have been met for twelve 10-minute measurement intervals at each monitoring location.
2. Measurements must be obtained during weather conditions when wind turbine sound is most clearly noticeable, i.e. when the measurement location is downwind of the development and maximum surface wind speeds are less than or equal to 6 mph with concurrent turbine hub-elevation wind speeds sufficient to generate the maximum continuous rated sound power from the five nearest wind turbines to the measurement location. [Note: These conditions occur during inversion periods, usually between 11:00 p.m. and 5:00 a.m.] Measurement intervals affected by increased biological activities, leaf rustling, traffic, high water flow or other extraneous ambient noise sources that affect the ability to demonstrate compliance must be excluded from reported data. The intent is to obtain 10-minute measurement intervals that entirely meet the specified criteria. A downwind location is defined as within 45° of the direction between a specific measurement location and the acoustic center of the five nearest wind turbines.
3. Sensitive receiver sound monitoring locations must be positioned to most closely reflect the representative protected locations for purposes of demonstrating compliance with applicable sound level limits, subject to permission from the respective property owner(s).
4. Meteorological measurements of wind speed and direction must be collected using anemometers at a 10-meter height above ground at the center of large unobstructed areas and generally correlated with sound level measurement locations. Results must be reported, based on 1-second integration intervals, and be reported concurrently with hub level and sound level measurements at 10 minute intervals. The wind speed average and maximum should be reported from surface stations. Department concurrence on meteorological site selection is required.
5. Sound level parameters reported for each 10-minute measurement period must include A-weighted equivalent sound level, 10/90% exceedance levels and ten 1-minute 1/3 octave band linear equivalent sound levels (dB). Short duration repetitive events should be characterized by event duration and amplitude. Event frequency is defined as the average event frequency +/- 1SD and amplitude is defined as the peak event amplitude minus the average minima sound levels immediately before and after the event, as measured at an interval of 50 ms or less, A-weighted and fast time response, i.e. 125 ms. For each 10-minute measurement period, short duration repetitive sound events must be reported by percentage of 50 ms or less intervals for each observed amplitude integer above 4 dBA. Reported measurement results must be confirmed to be free of extraneous noise in the respective measurement intervals to the extent possible and in accordance with paragraph 2 above.

6. Up to three compliance locations must be determined in consultation with the Department and be fully operational prior to commissioning of the facility.

Compliance data collected in accordance with the assessment methods outlined above for representative locations selected in accordance with this protocol must be gathered and submitted to the Department at the earliest possible opportunity after the commencement of operation, with consideration for the required weather, operations, and seasonal constraints, but no later than six months after commencement of operation, unless additional time is approved by the Department. Subsequently, compliance data for each location must be submitted to the Department for review and approval on an annual basis for the first five years of operation, and then once every fifth year until the project is fully decommissioned.

Complaint response. In light of concerns raised regarding the investigation of sound related complaints at similar facilities, the applicant must establish a permanent compliance monitoring station at each of the compliance locations approved by the Department in accordance with paragraph 6 above. Compliance data must be collected at each of the approved locations 24 hours per day, 7 days per week during all periods when the facility is in operation beginning on the first day of operation and continuing until the decommissioning of the facility. The applicant must set up a toll free complaint hotline designed to allow concerned citizens to call in a noise related complaint 24 hours per day, 7 days per week. The hotline number must be clearly noticed to all abutting property owners and posted in prominent locations around the project site and within the town of Woodstock municipal offices. When a complaint is received, the applicant must, within 48 hours of receipt of the complaint, collect the complainant information (name, location, time of complaint etc.) and the recorded sound, meteorological and operational data from the appropriate compliance monitoring location, and submit that information to the Department for analysis. The Department will screen the complaints and send those that indicate the potential for non-compliance with the terms and conditions of this Order to a third-party sound consultant contracted by the Department specifically for the review of noise related complaints. The applicant will be responsible for the reimbursement of all costs incurred by the Department in the review of any noise related complaint.

The Department finds that the sound modeling techniques used by the applicant are in keeping with standard industrial sound modeling protocols; nevertheless, to confirm that the modeling accurately predicted sound levels and to ensure that the standards are met, both initially and on an ongoing basis, the Department finds that the applicant must implement the post-construction monitoring program, including complaint response, and the additional requirements recommended by EnRad as described above. Upon a finding of non-compliance by the Department, the applicant must take short term action immediately to adjust operations to reduce sound output to acceptable levels under Chapter 375 (10). Within 60 days of a determination of non-compliance by the Department, the applicant must submit, for review and approval, a compliance plan that proposes actions to bring the project into compliance at all the protected locations surrounding the development. This compliance plan must include, among other strategies, consideration and analysis of how potential turbine shutdown scenarios may

bring the project into compliance with the terms of this permit. The Department will review any such compliance plan and may require additional mitigation or alternative measures. If immediate actions to bring the project into compliance with the applicable noise standards are not taken or are not successful while the process of generating and obtaining approval of a longer term plan is taking place, the Department may take such enforcement action as it finds appropriate to ensure compliance with the Site Law, applicable provisions of Chapter 375(10), and this permit.

In response to the Department's draft decision, the Friends of Spruce Mountain submitted several exhibits for the Department's consideration. These exhibits are listed in Appendix A and attached to this Order. Several other interested parties also submitted exhibits for the Department's consideration. All but one of those submissions were included in the Friends of Spruce Mountain exhibits: G. Leloudas, W.J. Zhu, J.N. Sørensen, W.Z. Shen, and S. Hjort, "Prediction and Reduction of Noise from a 2.3 MW Wind Turbine" Journal of Physics: Conference Series 75(2007) 012083.

In response to the exhibits listed in Appendix A, the applicant submitted several exhibits and the Friends of Spruce Mountain submitted one additional exhibit, listed in Appendix B.

EnRad reviewed the exhibits listed in Appendix A & B and commented that the submissions do not change its conclusions regarding the proposed project.

MCDC reviewed the exhibits listed in Appendix A and commented that, based upon its examination of the submitted articles, its conclusions regarding the potential health effects of wind power projects have not changed.

Considering the information submitted in the application, review comments of that material, the submission from the Friends of Spruce Mountain and other interested parties, the submissions from the applicant and comments by the Department's review agents regarding the submissions from Friends of Spruce Mountain and the applicant, the Department finds that the proposed project will meet the applicable standards of Chapter 375 (10), including tonal sound and SDRS, and that the applicant has made adequate provision for the control of excessive environmental noise from the proposed project, provided that (1) the applicant operates the project with three turbines operating in reduced sound power mode as shown in Table 1; (2) the applicant submits the compliance locations for review and approval to the Department prior to operation; (3) the compliance locations are fully operational prior to the commissioning of the facility; (4) the applicant implements the complaint protocol outlined above; and (5) the applicant submits sound level monitoring reports in accordance with the post-construction monitoring program described above.

6. SCENIC CHARACTER:

In order to assess the potential scenic impact of the Spruce Mountain Wind project on resources of state and/or national significance, the applicant submitted a visual impact

assessment (VIA) of the project area which was prepared by Terrence J. DeWan and Associates, dated January 2010. This study focused on the viewshed within an 8-mile radius of one or more of the proposed turbine locations.

Title 35-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…Title 38 § 484 (3) or § 480-D the Department shall determine, in the manner provided in subsection 3, whether the development significantly compromises views from a scenic resource of state or national significance such that the development has an unreasonable adverse effect on the scenic character or existing uses related to scenic character … . 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…Title 38, § 484 (3).

Title 35-A § 3452 (2) provides in pertinent part that:

> The [Department] shall evaluate the effect of associated facilities of a wind energy development in terms of potential effects on scenic character and existing uses related to scenic character in accordance with…Title 38 § 484 (3), in the manner provided for development other than wind energy development if the Department determines that application of the standard in subsection 1 to the development may result in unreasonable adverse effects due to the scope, scale, location or other characteristics of the associated facilities. An interested party may submit information regarding this determination to the Department for its consideration. The Department shall make a determination pursuant to this subsection within 30 days of its acceptance of the application as complete for processing.

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 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). The proposed project is subject to the expedited wind energy development standards outlined above and, to the extent applicable, 38 M.R.S.A. § 484 (3).

In accordance with Title 35-A § 3452 (4), the Department requires an applicant to conduct a visual impact assessment within a three mile radius of the proposed project. Although not specifically required by the Department, the applicant elected to also

review potential visual impacts in the area between three and eight miles of the proposed project. Title 35-A §3451 (9) requires that a scenic resource of state or national significance be an area or place owned by the public or to which the public has a legal right of access. The applicant's visual assessment identified the following scenic resources of state or national significance as defined pursuant to Title 35-A §3451(9):

1.) National Natural Landmarks. The VIA found no National Natural Landmarks within an eight mile radius of any turbine or associated project facilities.

2.) Historic Resources. The applicant conducted historic resource surveys, which indicated that there are eight properties on the National Register of Historic Places within eight miles of the Project area.

- **Dreamhome** is located on Bryant Pond in Woodstock and is of local historical significance, 4.8 miles away from the project site. This is a private residence with no public access. Four turbines will be visible from this location.
- **First Universalist Society Church** is located in West Sumner and is of local historical significance, 5.9 miles away from the project site. During periods of leaf off, this property will have views of two turbines. This is a privately owned building, but is still active as a church during the summer months when local clergy, summering in the area, serve on a rotating basis. The building is closed in the winter.
- **Whitman Memorial Library** is located in Bryant Pond, Woodstock, 4.2 miles away from the project site. The project is not visible from this location.
- **Greenwood Cattle Pound** is located in Greenwood, 7.1 miles away from the project site. The project is not visible from this location.
- **Rumford Point Congregational Church** is located in Rumford, 7.8 miles away from the project site. The project is not visible from this location.
- **Arthur L. Mann Memorial Library** is located in West Paris, 7.4 miles away from the project site. The project is not visible from this location.
- **Stearns Hill Farm** is located in West Paris, 7.4 miles away from the project site. The project is not visible from this location. This is a private residence with no public access.
- **Greenwood Town Hall** is located in Greenwood, 6.9 miles away from the project site. The project will not be visible from this location.

3.) National or State Parks. There are two State Parks within an eight mile radius of any turbine or associated project facilities.

- **Little Concord Pond/Bald Mountain** is a large tract of undeveloped park land, in excess of one square mile, owned by the Department of Conservation, Bureau of Parks and Lands (BPL). It contains Little Concord Pond and Bald Mountain, and has marked trails with a 700 foot elevation gain leading to an open lookout on Bald Mountain. The view from Bald Mountain includes two existing communication towers on Spruce Mountain, limited residential development on and in the vicinity of Shagg Pond, and several local roads. The property was acquired by the State of Maine in 1990. The closest turbines will be approximately 1.4 miles away from the lookout. All ten turbines will be visible

from the overlook. Portions of the ridge road and the clearings around the closest turbines will also be visible from the overlook. Recreational uses include hiking.

- **Speckled Mountain** is a 64 acre parcel on the west side of Speckled Mountain. It includes part of the Bald/Speckled Mountain trail. The view from the first overlook (which is on state owned land) includes Shagg Pond, Concord Pond, the structures and conductors within the existing transmission line, roads, the New Page Mill in Rumford and the existing communication towers on Spruce Mountain. The property was acquired by the State of Maine in 1990. The second overlook (which is on private property) includes views of Little Concord Pond. All ten turbines, some of the ridge road and associated clearings will be visible from both overlooks. Recreational uses include hiking.

4.) Great Ponds. There are six great ponds located within an 8-mile radius of the project site that are listed in "Maine's Finest Lakes, the Results of the Maine Lakes Study" published by the Maine State Planning Office or "Maine Wildlands Lakes Assessment" published by the Maine Land Use Regulation Commission, pursuant to 35-A M.R.S.A. § 3451 (9)(D).

- **Abbotts Pond** is 32 acres in size and is located in Sumner. It is listed as an outstanding scenic resource. It is undeveloped. There are no public trails on the property. The shoreline is forested. It is located 1.7 miles away from the project site. The northwestern shoreline will have partial views of seven turbines. Recreational use of the pond includes fishing, nature study and hiking.
- **Little Concord Pond** is 30 acres in size and located in Woodstock. It is listed as a significant scenic resource. It is accessible by a foot trail and is surrounded by over a square mile of land that has been acquired by the Bureau of Parks and Lands. The western side of the pond is limited to fly-fishing only and is accessible by All-terrain vehicle trails and hiking trails. It is located 1.2 miles away from the project site and the northeastern side of the pond will have partial views of three turbines. The eastern side of the pond will have some views of the access road. Recreational uses of the pond include fishing and hiking.
- **Shagg Pond** is 64 acres in size and located in Woodstock. It is listed as a significant scenic resource. There are 16 residences located around the pond, mostly on the north, south and west sides. Shagg Pond is known for its views of Bald Mountain and Speckled Mountain. It is located 0.9 miles away from the project site. The northern end of the pond will have views of seven turbines. A newly improved boat ramp on the south end of the pond provides public access. The project will not be visible from the boat ramp. Recreational uses of the pond include boating, fishing and swimming.
- **Labrador Pond** is 115 acres in size and located in Sumner. It is listed as a significant scenic resource. The western shoreline is marshy and undeveloped, the eastern shoreline is developed with local roads and 16 residences. There is an informal boat launch at the southern end of the pond. It is located 6.6 miles away from the project site and most of the pond will have views of ten turbines. There is no public boat launch on the pond. Recreational uses of the pond include boating, fishing, swimming and snowmobiling. There are several viewing opportunities of the pond from Labrador Pond Road and Valley Road.

- **Little Labrador Pond** in Sumner is listed as a significant scenic resource. It is located 7.1 miles away from the project site and will not have any views of the project.
- **Joes Pond** in Rumford is listed as a significant scenic resource. It is located 7.5 miles away and will not have any views of the project.

5.) Scenic Rivers. The VIA found no designated Scenic River or Stream segments within eight miles of the project.

6.) Scenic Viewpoints or Trails. The VIA found no scenic viewpoints on state public reserved land or on a trail used exclusively for pedestrian use that the Department of Conservation designated by rule adopted in accordance with Title 35-A §3457, with the exception of the trail on Bald Mountain and Speckled Mountain discussed above under State Parks.

7.) Scenic Turnouts. The VIA found no scenic turnouts off a public road designated as a scenic highway by the Maine Department of Transportation within eight miles of the proposed project.

8.) Scenic Viewpoints located in the Coastal Area. The applicant's VIA states that the project is approximately 66 miles from the coastal area and is outside of the zone of visibility.

The applicant's VIA concludes that the proposed project has been sited in an area with relatively few scenic resources of state or national significance. Within an eight-mile radius of the project site, the most significant scenic resources are the views from several ponds: Little Concord Pond, Shagg Pond, Abbotts Pond and Labrador Pond, and the views from Bald Mountain and Speckled Mountain. The anticipated visual impact on Little Concord Pond and Abbotts Pond is described by the applicant as insignificant. The applicant states that after analyzing several potential locations for wind turbine placement in the Spruce Mountain vicinity, it selected sites which meet the primary energy generating objectives while minimizing potential visual impacts to scenic resources and residential areas, particularly at distances less than three miles. Finally, the VIA concludes that the associated facilities for the project (transmission lines, O&M building, and related improvements) will have limited impact on views from scenic resources of state or national significance and that they will not be of a location, character, or size to cause an unreasonable adverse visual affect on the scenic character of the study area.

Because of the number of scenic resources near the project site and with potential views of the project site, the Department hired a third party expert, James F. Palmer of Scenic Quality Consultants, to review the Scenic Character section of the application and provide the Department with 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, Department staff consulted with Scenic Quality Consultants regarding public use of Little Concord Pond/Bald Mountain State Park and what might be the user's expectations of the area. Because BPL did not have use data for the Bald Mountain and Speckled Mountain parcels, the Department requested that the applicant conduct a user survey at the top of Bald Mountain, in a location that had a view of the proposed project. The Bald Mountain site was chosen because it has the most prominent views of the project. The survey was developed by Market Decisions, a research firm, with input from the applicant and Scenic Quality Consultants. The survey was conducted May 29 and 30, Memorial Day weekend. Questions were asked of adult hikers, including some while hikers were looking at a visual simulation of the proposed project. The interviewer also noted how many boats were visible on Shagg Pond at hourly intervals both days. The survey, the results of the survey, and the visual simulation shown to interviewees are presented 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 (both adults and children) were noted on the top of the Bald Mountain over the course of the two days and 15 adults were interviewed (children were not interviewed). The interviewer noted a total of five boats on Shagg Pond during the survey period.

Scenic Quality Consultants analyzed the data presented in the Research Report and stated in its June 2010 Project Review that "Five people indicated that they would "feel good" about the proposed project because the project was an indication of Maine taking positive steps to provide itself with clean energy." Three people indicated that the view already has significant negative elements, including housing ("giant log cabin"), radio towers, and the nearby ski area. Two people mentioned the negative affect of turbine noise. Half of the people interviewed indicated that the turbines would not significantly affect their experience with comments such as that it was "not so bad, it's not a power plant," "nothing aesthetically offends me," or "doesn't affect [my experience] at all." These comments suggest that many people disconnect this particular type of impact from enjoying their experience of being on Bald Mountain.

Scenic Quality Consultants continued to interpret the Research Report results. Seven respondents indicated they had a local connection. This group tended to rate the existing condition photograph higher and the photosimulation lower than the other respondents. The result is that they see a greater apparent scenic impact due to the proposed turbines. Six people indicated their reason for being on Bald Mountain had something to do with the view. The seven people who hike more than two weeks per year tend to be less likely to return if the turbines are built. In general, visitors thought that the proposed turbines would have little effect on their recreation experience.

During the course of the VIA review, and as a result of questions asked by Scenic Quality Consultants, the applicant 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 with potential visibility (except Speckled Mountain) on May 7, 2010. It also

reviewed the geographic information system data used for the VIA and conducted additional analysis, including a standard visibility analysis using ArcMap software and the visual simulations provided in the VIA were compared to a three-dimensional ArcScene model to determine representational accuracy.

Scenic Quality Consultants stated in its review that the applicant's VIA evaluated 8 of 16 identified significant resources within 8 miles of the project. The applicant stated that the other eight significant resources fall outside the project's topographic viewshed and will not have views of the proposed project due to the change in elevation of the local terrain. After conducting its own review of the proposed project, Scenic Quality Consultants concurred that the other eight sites will not have views of the project.

The June 2010 Project Review document by Scenic Quality Consultants thoroughly evaluated each scenic impact under the Evaluation Criteria described in Title 35-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 uses, (6) effect on continue uses and enjoyment, (7) and scope and scale of project views. Table 6 in the June 2010 Project Review rates the scenic impact evaluation criteria by severity and summarizes the impacts for each scenic resource. The following is a summary of the overall scenic impact rating found in the June 2010 Project Review by Scenic Quality Consultants (labeled Table 3 for the purposes of this Order):

Table 3.

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

The June 2010 Project Review concludes with: "This review considers how the criteria and standards in Maine's Wind Energy Act can be integrated into a standard visual impact assessment (VIA) process. The Wind Energy Act establishes some useful limits: (1) facilities seen from eight miles away or further are insignificant; and (2) only impacts to eight types of state or nationally significant scenic resources need to be considered. However, the Wind Energy Act also requires consideration of the extent, nature and duration of affected public uses of the scenic resources and viewer expectations, information that is not readily available." Scenic Quality Consultants included in its analysis the standard VIA organization that involves describing: (1) Project Description, (2) Landscape Character, (3) Visibility Analysis, (4) Significant Scenic Resources, (5) Public Use and Expectations, (6) Evaluation of Potential Impacts, and (7) Mitigation."

The June 2010 Project Review concluded that overall, the Spruce Mountain Wind Project Visual Impact Assessment clearly addresses the criteria and standards established by the Wind Energy Act. "The visibility analysis uses data that are coarser than the data most commonly used. However, this does not appear to create any major misrepresentations. This VIA identifies all significant scenic resources within eight miles of the wind turbines, as specified by the Wind Energy Act."

Scenic Quality Consultants conducted fieldwork and additional analyses as part of the project review. These analyses confirm that the primary potential scenic impacts will be to Bald Mountain in Little Concord Pond/Bald Mountain State Park and Speckled Mountain State Park. The simulations were compared to visualizations and generally found to be accurate, except for the photosimulation from Shagg Pond, which was corrected.

Department staff visited the project area three times throughout the project review, including visiting: Labrador Pond, Little Concord Pond, Shagg Pond, Little Concord Pond/Bald Mountain State Park and the First Universalist Society Church. 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 located on the top of Spruce Mountain.

Interested parties raised concerns regarding the potential views of the proposed project from Little Concord Pond/Bald Mountain State Park, Speckled Mountain State Park, and the 6 lakes listed in the "Maine's Finest Lakes" study. The Department's consultant conducted an exhaustive review of the data submitted by the applicant as well as the requested user survey, conducted a site visit and concluded that the potential views from three locations reach a visual impact severity of Low-Medium; no locations reach the level of High Severity, which would be required (but may not be sufficient) for the impact to be considered Unreasonably Adverse. Department staff also visited the area specifically to evaluate the view of the project from Little Concord Pond/Bald Mountain State Park and from the lakes identified in the VIA.

During the review of the Draft Order, several interested parties commented that the views from Concord Pond will also be affected by the proposed project and were curious as to why those impacts were not reviewed by the Department.

The VIA included a description of the Concord Pond area, photos of existing conditions and a photosimulation of the proposed project from the shoreline of Concord Pond. Concord Pond is approximately 135 acres in size and is located 1.1 miles away from the project site. Concord Pond will have views of nine turbines. Portions of the access road may be visible from certain sections of the pond. The shoreline of Concord Pond is developed with residential homes and camps. Pursuant to 35-M.R.S.A. §3451(9), the Legislature directed that the "Maine's Finest Lakes" study, published by the Executive Department, State Planning Office in 1989, be used as a tool to determine whether a great pond is designated as a scenic resource of state or national significance during the review of a wind energy development. Concord Pond is not listed on the "Maine's Finest Lakes" study. Therefore, Concord Pond is not considered a scenic resource of state or national significance and in accordance with Title 35-A § 3452, and a 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 Title 38 § 484(3).

Based on the information presented in the VIA, the design of the proposed project, the applicant's user survey, review comments from Scenic Quality Consultants, the Department's site visits, comments raised by interested parties, and in consideration of the evaluation criteria pursuant to 35-A M.R.S.A. § 3452 (3), the Department finds that the applicant has made reasonable accommodation to fit the development into the natural environment and that no aspect of the project will have an unreasonable adverse effect on the scenic character, or existing uses related to scenic character of scenic resources of state or national significance, or other existing uses in the area.

7. WILDLIFE AND FISHERIES:

The applicant submitted the results of a series of ecological field surveys conducted by Tetra Tech, including avian and bat surveys, wetland delineations, rare, threatened, and endangered species surveys, and vernal pool surveys within the project area. In its preparation of the application Tetra Tech consulted with the Department and other natural resource review agencies, including the Department of Conservation, Maine Natural Areas Program (MNAP), the Maine Department of Inland Fisheries and Wildlife (MDIFW) and the U.S. Fish and Wildlife Service (USFWS) and the USACOE. The applicant also contacted the Natural Resources Council of Maine, the Nature Conservancy, the Maine Audubon Society, the Conservation Law Foundation, and the Appalachian Mountain Club to give an overview of the project, talk about ongoing studies, answer questions, and respond to concerns.

Tetra Tech conducted avian and bat surveys during the spring migration, summer residency and fall migration period of 2009. The purposes of the studies 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.

Surveys were targeted to provide data to help assess the project's potential to impact birds and bats; rare, threatened and endangered (RTE) plants and animals; breeding amphibians; and wetlands. The scope of the surveys were based on a combination of developing standard methods employed within the wind power industry for pre-construction surveys, regulatory requirements, and guidance provided by the Department, USFWS, MDIFW and USACOE. Avian and bat mortality through direct or near collisions with wind turbines are two of the possible wildlife impacts that could occur as a result of the proposed project.

The applicant stated that, once constructed, the turbines and associated facilities are anticipated to pose little threat to terrestrial wildlife.

A. Significant Vernal Pools. Tetra Tech conducted vernal pool surveys of the project area during the amphibian breeding season (April and May) in 2009 and 2010. The 2009 vernal pool field surveys covered an expanded survey area and evaluated a number of alternative layouts for project facilities so that the least impact alternative could be identified. Seventeen resources were identified within the expanded field survey area: 10 of these resources were classified as potential vernal pools (PVPs) and seven were classified as amphibian breeding areas (ABAs). PVP's have the physical characteristics of NRPA-regulated vernal pools but are only classified as significant vernal pools if they also meet the biological criteria identified in Chapter 335, the Department's Significant Wildlife Habitat Rules. Amphibian breeding areas do not meet the physical characteristics of NRPA regulated vernal pools and therefore are not regulated under Chapter 335 as significant wildlife habitats. However, these pools may still support pool-breeding amphibians and therefore may be regulated by the USACE. Based on egg mass counts within PVPs, three pools (PVP11, PVP12, and PVP13) were determined to have the requisite egg mass counts for classification as significant vernal pools pursuant to Chapter 335. In order to avoid impacts to these significant vernal pools and their regulated adjacent terrestrial habitats (located within 500 feet of the vernal pool spring high water line), project alternatives that could potentially impact these pools were discarded and removed from further consideration during the design phase of the project. All three of these significant vernal pools are located more than 2000 feet from the current proposed project work limits.

Due to project design modifications that occurred following the 2009 amphibian breeding season surveys, Tetra Tech resurveyed portions of the project area in April and May 2010 to ensure complete field survey coverage for both vernal pools and their protected adjacent terrestrial habitats. The results of the 2010 vernal pool field surveys were filed with the Department and MDIFW on June 2, 2010 and identified three additional PVPs in the project area. MDIFW reviewed the results of both vernal pool surveys and confirmed three of the twenty vernal pools surveyed (PVP11, PVP12 and PVP13) meet the criteria for significant wildlife habitat in accordance with Chapter 335. All of these pools have

been avoided during the design phase of the project and are located more than 2000 feet from the proposed project work limits. The significant vernal pools PVP11 and PVP13 are located on land that is currently leased by the applicant for development purposes but will not be leased after construction of the project. PVP 12 is located on a parcel owned by another party, adjacent to the project site. Based on the survey results and the revised design layout, development on the proposed project will not occur within significant vernal pool habitat.

B. Inland Waterfowl and Wading Bird Habitat. The proposed project area does not contain Inland Waterfowl and Wading Bird Habitat mapped by MDIFW in areas proposed for wind turbines, access roads, collector lines, and associated structures

C. Deer Wintering Areas. The proposed project area does not contain any MDIFW mapped Deer Wintering Areas in areas proposed for wind turbines, access roads, collector lines, and associated structures.

D. Rare, Threatened, and Endangered (RTE) Species. Tetra Tech conducted an RTE species survey for plant and animal species within the project area. In addition to that survey, bird and bat surveys conducted in 2009 also included investigations for RTE species or Species of Special Concern on the project site.

MDIFW reviewed the submitted avian and bat surveys. MDIFW stated that according to the applicant's survey data, the following bird species, which are Species of Greatest Conservation Need as outlined in Maine's State Wildlife Action Plan, passed through the project area: scarlet tanager, veery, wood thrush, black and white warbler, blackburnian warbler, black throated green warbler, cap may warbler, chestnut sided warbler, northern parula, prairie warbler, barred owl, and olive sided flycatcher. Three Species of Special Concern in Maine were also observed in the studies: northern harrier, bald eagle, and white-throated sparrow.

Two peregrine falcons and one golden eagle, both State Endangered Species, were observed during the applicant's fall raptor migration study. MDIFW commented that there are no known peregrine falcon eyries within the project area, but there are current and historic eyries located within 10 miles of the site. The most active eyrie in the area is at Buck's Ledge, located above North Pond in Woodstock.

MDIFW stated that according the to applicant's survey data, two bat Species of Special Concern, the hoary bat and the silver haired bat, were observed utilizing the project site during the surveys.

For terrestrial species, Tetra Tech conducted surveys for the roaring brook mayfly, an Endangered Species, and the northern spring salamander, a species of Special Concern, as recommended by MDIFW. Surveys were conducted in consultation with MDIFW staff during the 2009 field season. Roaring brook mayflies were not found in the project site and habitats surveyed were determined marginal for the species. Northern spring salamanders were found within four streams on site (OS93, AS69, TS12, and TS18).

One of these streams (AS69) will be crossed by the proposed access road. The applicant proposes to span this stream with an arch culvert which will maintain the natural substrate and lessen any potential impacts to the northern spring salamander habitat. Two streams (TS12 and TS18) will be temporarily crossed using timber mats bridges for the construction of the proposed transmission line. Clearing for the transmission line will be 50 feet in width. The access road near the O & M building, the O & M building itself, and portions of the laydown yard will be located within 250 feet of the fourth stream (OS93).

MDIFW recommended that the applicant follow management guidelines developed by MDIFW's Reptile and Invertebrate Group to avoid and minimize adverse impacts to the northern spring salamander and its habitat. The guidelines include maintaining a 250-foot undisturbed buffer adjacent to any stream with known occurrences of the northern spring salamander. Department staff, an MDIFW wildlife biologist and the applicant held a meeting to discuss MDIFW's concerns with respect to the northern spring salamander habitat on July 28, 2010. As a result of the Department's and MDIFW's concerns with respect to the northern spring salamander habitat, Tetra Tech submitted a response letter dated July 30, 2010 that set forth proposed project modifications intended to minimize alterations adjacent to northern spring salamander habitats. These design modifications minimize the clearing associated with the access road and as a result reduce project related alteration within 250 feet of stream OS93. The applicant submitted plans to protect a 250-foot buffer on each side of the four streams that were documented to support northern spring salamanders. Two of these streams (OS93, AS69) are included in the applicant's proposed conservation easement area, where disturbance will be restricted through the execution of deed covenants. The applicant will limit forestry activities within the 250-foot buffer on these streams as follows: a no-cut and no-disturbance zone within 25 feet of the streams and limited cutting within 25 to 250 feet of the streams, maintaining at least 60-70% forest canopy cover in these areas. The other two streams (TS12 and TS18) are located on property that is not owned or controlled by the applicant, except where the streams cross through the 100-foot transmission line easement corridor.

To further enhance protection of northern spring salamander habitat, the applicant proposes to restore and permanently block access to an existing gravel parking area located within 250 feet of stream OS93. The applicant also proposes to actively revegetate the construction laydown area located adjacent to the O & M building by planting a mix of deciduous and coniferous trees, no less than three feet tall, at 25 feet on center. Planting will be done during stabilization and restoration activities on the project site. MDIFW reviewed the revised proposal and stated that the proposed measures will adequately protect the northern spring salamander.

E. Migratory Birds, Bats, and Raptors. Tetra Tech used a MERLIN avian radar system to automatically and continuously record bird and bat activity in the vicinity of the proposed project area during both the spring 2009 migration and the fall 2009 migration. During 2009, Tetra Tech also conducted a spring and a fall raptor migration survey, a spring breeding bird survey, a spring and fall migrant stopover survey, and a spring and

fall bat acoustic survey. Based on the results of those surveys, Tetra Tech observed that flight height and flight direction data indicate that the majority of migratory birds are flying at a height sufficient to avoid the proposed turbines and blades. Tetra Tech also observed that the diurnal raptor surveys indicated that passage rate of raptors is low compared to other sites in the area, and the acoustic bat survey suggests that bats utilize the area at low densities and that no definitive increase in bat activity at the project site occurred as a result of large-scale migration.

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. As described above, the applicant conducted routine monitoring of raptor activity during fall and spring. MDIFW stated that the survey data indicates that most raptors were observed traveling along the side slopes of the mountain and along the valleys where thermals are more likely to develop. MDIFW stated 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 more vulnerable at this site once it is operational. Raptor populations are longer lived species with lower reproductive potential, and would be less able to absorb mortality at turbines than passerines, thus it is important to collect valid post-construction data to help evaluate the actual impact on raptors at the project site. MDIFW further commented that the clearings developed at the turbine site may attract raptors more likely to feed on small mammals and birds in the open, which could lead to higher potential for raptor mortality at an operational site. This potential problem needs to be considered during post-construction survey methodology and subsequent operational guidelines if a turbine caused greater than expected mortality of raptors.

Data from other parts of the country indicate that tree-roosting bats are the most vulnerable types of bats at industrial wind developments. In Maine, this would include the red bat, the hoary bat, and the silver haired bat. The data from the applicant's surveys indicates that both the hoary bat and the silver haired bat had a low occurrence of use at the site. The extent of bat use of the site in the spring is low compared to limited data at other Maine sites and the average at most sites in the country. The fall survey data indicated that another bat Species of Special Concern may have been at the project site, the small footed myotis. MDIFW stated that based on the limited data in Maine and extensive data elsewhere, late August and early September coincides with the greatest period of bat use. During this time of year, bats are traveling to local hibernacula or migrating out of the region for the winter.

Additionally, MDIFW stated that bats are most frequently active one hour before sunset to one hour after sunrise. They are most active at those times when foraging on insects, when wind speeds are less than six meters per second. Other conditions that seem to correlate with peak activity include those periods immediately before and after the passing of low pressure storm fronts and periods of temperature inversions in which cooler air and low clouds and fog at lower elevations may force bats to forage in more favorable conditions at higher elevations. This information can help predict conditions in which the potential of bat mortalities would increase during the operation of an industrial wind development.

Lighting of wind turbines is another issue that may have implications on bat behavior. Lighting is required by the Federal Aviation Administration (FAA). This required lighting would include red or white strobes with a three-second pause, operating only between sunset and sunrise, on selected towers (approximately every half mile) within the entire array. Though the data is limited at this point, the FAA lighting requirements do not appear to 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 that would likely be attractive to bats.

Clearings developed at turbine sites may be attractive to bats since insect prey would be more numerous. Insects may be attracted to the opening itself and/or any heat produced by the turbine nacelle. MDIFW recommended that the turbine nacelles be insulated as much as practical to minimize insect attraction. It has been suggested that the turbine monopole itself may attract bats that perceive it as a potential roost site. Noise, both audible and ultrasonic, may attract bats to the turbine site. Low pressure produced in the vortex of turbine blades has been implicated in the death of bats without contact between the blade and the bat. This is known at barotrauma. Since the echolocation used by many species of bats is most effective within 10 meters, death by direct contact or barotrauma is possible since reaction time may not permit avoidance. 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 mortalities.

MDIFW found the survey methodology to be appropriate and the results credible and consistent with its knowledge of and expectations for this site. MDIFW commented that additional pre-construction studies at this site are not necessary, but recommended that the applicant conduct post-construction monitoring of bird and bat mortalities as discussed below.

F. Post-construction Monitoring. MDIFW requested that the applicant be required to implement a post-construction bird and bat mortality monitoring plan. Tetra Tech proposes to conduct two non-consecutive years of post-construction mortality surveys within the first five years of project operation. Surveys will include carcass searches, searcher efficiency trials and scavenger removal assessments in order to determine avian and bat mortalities. Surveys will be conducted between April 1 and November 1. Before

commencing field work, the applicant proposes to contact MDIFW to determine appropriate search intervals, appropriate number of turbines to be surveyed, and to discuss any other logistical constraints related to scavenger removal and searcher efficiency trials. The first round of surveys will take place within the first year after the project is fully operational. Tetra Tech proposes to review the findings with MDIFW and make adjustments for the second survey, which will most likely occur during year three or four of operation.

In its review comments, MDIFW stated that there are several logistical difficulties in surveying for bird and bat carcasses at this type of site. The survey transects will be difficult to access and the dense tree cover throughout the ridge would likely prevent any turbine caused mortalities from reaching the ground. Carcasses that reach the ground may be projected beyond the survey transects under certain conditions and thus not be counted, though carcass surveys at the operational Mars Hill Wind site indicated that few were found outside the cleared turbine apron. Additionally, carcasses that reach the ground may be fed upon and/or removed by scavengers and thus not be counted. MDIFW further stated that despite the quality of the methodology, it is expected the results will underestimate mortality. The survey methodology takes these issues into consideration and corrects for them as much as possible.

The applicant proposes a post-construction monitoring program that would include two surveys per week at five of the 10 proposed turbines during the spring and fall and one survey per week at five turbines during the summer to commence in the first year of operation. MDIFW stated that Year 3 surveys would be preferred over Year 4 surveys. At this time, the site would have been developed for three years. It would also indicate any problems that need to be addressed more quickly. MDIFW further recommended the surveys be conducted on all ten turbines. This would be consistent with the methodology employed at the Mars Hill site. The post-construction survey is necessary to gather actual data for this site and will help to address the need for additional data for Maine sites in general. The survey results will be evaluated by MDIFW staff and the applicant, and if necessary, MDIFW may recommend one or more adaptive management guidelines in an effort to minimize wildlife mortalities at one or more turbine sites. These could include operational curtailments during periods of high mortality risk and/or temporary or permanent shutdown of individual turbines. MDIFW expects to meet with the applicant prior to the operation of any turbines at the project site to review and approve the post-construction survey methodology.

Based on recent research findings, and based on MDIFW's review of the survey results, if the Department determines that unexpected adverse effects to wildlife are occurring, measures that may be required include, but are not limited to:

(1) Modified Operations. If a turbine is found to be causing unreasonable adverse impacts as determined by the Department in conjunction with MDIFW, the Department may require suspending operation for periods determined by the Department to be of highest risk, provided there is a basis to expect that a non-operating turbine will pose less risk than an operating turbine. For example, if

impacts were occurring at night during certain periods of fall migration, the Department may require that the applicant modify the operation of the turbine during those high-risk nights.

(2) On-Site Habitat Management. The applicant may be required to conduct habitat management measures in the vicinity of the turbines to modify wildlife behavior and reduce the risk of impacts. Any such measures may be required by the Department in consultation with MDIFW in response to specific concerns or impacts that are related to habitat factors. Examples include, but are not limited to, modifying the type or extent of vegetation cover, forest openings, perching and nesting sites, or cover for prey species.

(3) Habitat Protection. The applicant may be required to provide appropriate compensatory mitigation for wildlife impacts such as the protection or enhancement of wildlife habitat with functions and values similar to that impacted by the project. The Department in consultation with MDIFW will determine the need for and appropriateness of any compensatory mitigation.

The post-construction monitoring plan must include a survey of raptor activity associated with the proposed project. The post-construction monitoring plan, including the survey protocol and its implementation method, must be developed in consultation with MDIFW, and must be inclusive of both migratory and non-migratory raptor movement periods. It may be adjusted in the future depending on the type and severity of observed impacts, cost benefit considerations, and practicality. Additional measures may be considered by the Department depending on future research findings.

Prior to the start of operation, the applicant must submit a finalized post-construction monitoring protocol to the Department for review and approval.

G. Other Wildlife. Interested parties commented that Canada lynx, which is a federally threatened species, have historically used the project area. MDIFW stated that the project site is south of the known range for Canada lynx, and that it has not documented lynx in the project area.

MDIFW stated that it is difficult to assess the landscape level impact to habitat or wildlife populations. The mixture of softwoods and hardwoods stands at various ages found on Spruce Mountain is utilized by a variety of birds and mammals. Currently, this habitat is not rare in Maine. Other than a few ski areas statewide, higher elevation habitat is not permanently developed in this state. Spruce Mountain is located within a 20,685-acre undeveloped block of land in Woodstock, the largest undeveloped block of land within the town of Woodstock. Species that benefit from large blocks of undeveloped land include moose, bear and bobcat. Fragmentation can have negative local and cumulative impacts on wildlife. MDIFW commented that the applicant's proposed conservation easement to permanently protect approximately 1,000 acres of the property and the applicant's tangible benefit donation to further preserve undeveloped land in the region

will ensure that wildlife continue to thrive in the area. Tangible benefits are further discussed in Finding 25.

Based on the Department's review of the information submitted in the application, and MDIFW's review comments, the Department finds that the proposed project will not unreasonably harm any significant wildlife habitat, unreasonably disturb wildlife, or unreasonably affect the use of the site by the subject wildlife, provided that (1) the applicant submits a finalized post-construction avian, bat, and raptor post-construction monitoring protocol to the Department for review and approval prior to the beginning of operation of the Spruce Mountain Wind Project; (2) post-construction monitoring is performed by the applicant at all ten turbine locations; and (3) the applicant constructs the project in accordance with the letter from Tetra Tech dated July 30, 2010 which includes provisions to protect northern spring salamanders.

H. Streams and associated fisheries. There are nine waterways that meet the NRPA's definition of a stream in the project vicinity. The proposed access road will cross three streams. The applicant proposes to construct the three stream crossings utilizing arch culverts (a culvert with no bottom) appropriately sized so that there will be no excavation of the stream channel or its banks. The proposed transmission line will cross six streams. During construction of the transmission line, the applicant proposes to utilize protective mats or timber mat bridges to cross the streams. The clearing for the proposed transmission line will be 50 feet in width. The applicant requested permission to construct the transmission line during the winter months and has subsequently requested a waiver of the traditional stream crossing window of July 15 to October 1.

A fishery biologist from MDIFW reviewed the project and stated that these streams are likely to support wild brook trout. MDIFW recommended that all permanent stream crossings with in-stream work, excepting arch culverts and timber mats that completely span the stream and its banks, be constructed between July 15 and October 1 (during the low-flow period) of any calendar year. In-stream work outside the recommended window may disrupt the wild brook trout's spawning movements and activities, and erosion of sediment into the streams can impact eggs and fry submerged beneath the gravel from the fall to spring. MDIFW further stated that winter construction of the transmission line is acceptable provided the streams are matted and that erosion controls are utilized in accordance with the Department's Best Management Practices for Erosion and Sedimentation Control.

Based on the Department's review of the information submitted in the application and MDIFW's review comments, the Department finds that the proposed project will not unreasonably harm fisheries habitats provided that all in-stream work is conducted from July 15 – October 1. Permanent stream crossings using arch culverts and timber mat bridges that completely span the stream and its banks are not in-stream work and are therefore not restricted to this construction period.

8. HISTORIC SITES AND UNUSUAL NATURAL AREAS:

Historic Sites: Tetra Tech conducted a Phase 0 Archaeological Reconnaissance Survey and Phase 1 Prehistoric Archaeological Investigation with shovel tests and a photographic record. Tetra Tech also conducted a Historical Architecture Reconnaissance Survey within eight miles.

A. Surveys. In Section 8 of the application, the applicant submitted the results of Phase 0 Archaeological Reconnaissance Survey entitled "Phase 0 Archaeological Reconnaissance Survey Report: Spruce Mountain Wind Project, Town of Woodstock, Oxford County, Maine," prepared by Tetra Tech dated October, 2009, and revised December, 2009. Tetra Tech conducted documentary research at the Maine Historic Preservation Commission (MHPC), and conducted field surveys of the project site. There are no previously recorded prehistoric sites or surveys conducted within a minimum three mile radius around the project study area, nor are there any prehistoric sites eligible for nomination or listed in the State or Nation Register of Historic Places located within the project area of potential affect. A pedestrian archaeological survey (visual assessment and walkover) identified four areas of potential prehistoric archaeological sensitivity that may be subject to adverse impacts due to the proposed project. No prehistoric or historic artifacts or possible indications or prehistoric features were observed during the Phase 0 pedestrian archaeological survey for the project. As a result, Phase 1 Archaeological Investigations were conducted in only the four identified areas. No historic period artifacts or any indications of prehistoric or historic cultural features were recovered from any of the four areas.

B. Historic Architecture Survey. A historic architecture survey was conducted in accordance with the requirements of Section 106 of the National Historic Preservation Act of 1966. The report and analysis of the historic architecture was prepared by Tetra Tech, dated January 2010, and is in the application in Appendix 8-2. This survey was conducted for an eight mile radius of the proposed wind turbines. The survey found no historic properties that would be directly impacted by the proposed project. The Tetra Tech survey identified five properties in the survey area that are listed in the National Register of Historic Places: the Greenwood Cattle Pound in Greenwood, the Congregational Church in Rumford Point, the First Universalist Society of West Sumner in Sumner, Stearn's Hill Farm in West Paris, and Dreamhome in Woodstock. Based on the results of the visual impact assessment conducted by TJD&A and discussed in section 6 above, Tetra Tech concluded that the proposed project would have no impact on these five properties. The survey assessed potential indirect effects for three properties that were determined eligible for the National Register of Historic Places and 27 properties that are potentially eligible for listing in the National Register. MHPC requested additional information to determine eligibility of 17 additional properties. In response to MHPC's request, Tetra Tech requested that the Department interpret the requirements of Chapter 375 § (11). Tetra Tech argued that the Department's historic standards do not regulate eligible structures. Subsequently, the Department determined that the applicant would not be required to identify all eligible historic structures within the vicinity of

the proposed project. Based on that determination, Tetra Tech did not provide the additional information to MHPC. MHPC accepted the Department's interpretation and further stated that, based on the information provided, including visual simulations of the project as it relates to those historic properties that are either listed in the National Register of Historic Places or that were previously determined to be eligible for listing, there will be no historic properties (architectural or archaeological) adversely affected by the proposed project.

Based on the Department's review of the survey information submitted in the application and MHPC's review comments, the Department finds that the proposed development will not have an adverse effect on the preservation of any historic sites either on or near the project site.

Unusual Natural Areas: To determine if unusual natural areas, including rare, threatened, and endangered (RTE) species occur within the scope of the project, the applicant consulted with the Maine Natural Areas Program (MNAP). In a letter dated July 19, 2009, MNAP stated that there are two rare natural communities in the area, a Maple/Basswood/Ash Forest and Birch/Oak Rocky Woodland. MNAP requested that the applicant survey the areas and provide mapping and documentation to MNAP.

Tetra Tech completed field investigations in 2009. The two communities were identified outside of the proposed project area, approximately one mile east and down slope of the project area. MNAP stated in a letter dated March 22, 2010, that there are no rare or unique botanical features in the vicinity of the project area.

Based on its review of the applicant's rare communities survey, the Department finds that the proposed development will not have an adverse effect on any unusual natural areas either on or near the development site.

9. BUFFER STRIPS:

The applicant proposes to maintain vegetated buffers for stormwater management, phosphorus control, and waterbody protection. Buffers for the proposed project include three different types of buffers: no-disturbance buffers around roads and turbines, a corridor buffer, and waterbody buffers at streams and other wetland crossings. The vegetation cutting practices which have been proposed to preserve and maintain buffers include no cutting, limited and selective clearing, and mechanized clearing combined with selective use of herbicides.

1. Access Road, Crane Path, and Turbine Buffers. The applicant stated that typically, a 250-foot to 300-foot radius around each turbine is cleared, resulting in a circular impact. For this project the applicant has proposed a design which minimizes the clearing, resulting in smaller, irregularly-shaped openings. The applicant has maximized the use of relatively level terrain on the ridge to minimize cut and fills slopes on the road shoulders. In addition all the workspace in the vicinity of the towers, up to the turbine foundations will be loamed, seeded and re-vegetated following construction. The

applicant proposes to place approximately 1,000 acres of land under a conservation easement, which will allow for sustainable timber harvesting but will prevent further development. This conservation land will create a buffer strip that will help create a visual screen and will provide some stormwater runoff treatment, which is discussed in Finding 11.

2. Transmission Line Buffers. The area within the electrical transmission line corridor will require vegetative cutting to meet line safety and reliability goals. The applicant proposes to employ a Vegetation Management Plan (further described below) in accordance with the Department's *Minimum Performance Standards for Transmission Line Corridors* and ISO-New England safety standards to control the growth of vegetation along the transmission line. Transmission line corridor construction and maintenance procedures will provide for the retention of low ground cover to the greatest extent practicable during construction, restoration and stabilization of areas affected by construction, and ongoing maintenance activities with the intention of promoting long-term growth of low vegetation.

3. Stream Buffers. The applicant proposes to maintain a 100-foot undisturbed buffer adjacent to Class A, AA, Outstanding river segments, or rivers, streams, or brooks containing Threatened or Endangered species. Other streams will have a minimum setback of 25 feet. The project was designed to maintain a 100-foot setback from waterbodies for pole placement. The use of herbicides will be prohibited within all waterbody buffers and within 25 feet of any wetlands with water visible at the surface. Additionally, no refueling or maintenance of equipment will be performed within waterbody buffer areas. Because of concerns raised by MDIFW, the applicant proposes to maintain a 250-foot buffer on all four streams that support the northern spring salamander, except for the buffer intrusion described in Finding 7 (D).

4. Wetlands. The applicant proposes to minimize clearing of vegetation in wetland areas and within the habitat areas of any amphibian breeding areas (these areas do not meet the requirements to be considered Significant Vernal Pools but they may still support the breeding activities of some amphibians). The proposed project will not impact any Significant Vernal Pools.

Vegetation Maintenance Plan. The applicant submitted a vegetation maintenance plan (VMP) (Appendix 10-1 of the application) entitled "Spruce Mountain Wind Project: Post-Construction Vegetation Management Plan" last revised July 23, 2010. The plan summarizes vegetation maintenance methods and procedures that will be utilized by the applicant for the transmission line corridor, and describes maintenance requirements and restrictions associated with waterbody crossings. Because of concerns raised by MDIFW and the Department's review of information submitted by the applicant, the Department recommends that herbicides are not used to maintain vegetation within 250 feet of the two streams (labeled TS18 and TS12 on the plans), located on the transmission line corridor, that support northern spring salamander. The 250 foot no-herbicide zone must be marked in the field with signs clearly prohibiting the use of herbicides.

The Department finds that the applicant has made adequate provision for buffer strips provided that the applicant complies with the post-construction VMP submitted in the application with the addition of a 250 foot no-herbicide zone around the two streams located within the transmission line corridor that support the northern spring salamander, and that all visual screening buffers, stormwater treatment buffers and the buffer around the northern spring salamander streams are permanently marked on the ground pursuant to Chapter 500 Stormwater Management rules prior to the start of construction. Further, prior to the start of operation, the applicant must record buffer deed restrictions and the proposed 1,000 acre conservation easement with the Registry of Deeds for the subject parcels. The deed restrictions must be consistent with Chapter 500 Stormwater Management Rules and have attached a plot plan for the parcels, drawn to scale, that specifies the location of all buffers on the parcels. The applicant must submit a copy of the recorded deed restrictions, including the plot plans, to the Department within 60 days of the recording.

10. SOILS:

The applicant submitted Class B High Intensity and Class L Linear Soil Surveys for the proposed project site prepared by Phillips Ecoservices and Gartley and Dorsky Engineering and Surveying Inc. and dated October 22, 2009. These reports are contained in Section 11 of the application and concluded that the soils are generally appropriate for the proposed construction activities.

The Department of Agriculture's state soil scientist (Soil Scientist) reviewed the proposed project. The Soil Scientist visited the project site several times, paying particular attention to the proposed location and construction of the proposed access road and ridge road. The Soil Scientist recommended constructing the roads to utilize additional "rock sandwiches." Rock sandwiches are areas where the road is constructed on angular rock with the result that surface water is allowed to pass under the road as sheet flow. Ditches are not utilized. Overflow culverts are installed under the road and spaced so that they can alleviate any pressure if there is a blockage of the structures by debris. The Soil Scientist also evaluated wetlands in the vicinity of the proposed access and ridge road and recommended that the applicant realign the proposed access road to minimize cuts and fills. One particular area had been identified by Tetra Tech as a freshwater wetland and the access road had been moved uphill to avoid it. The Soil Scientist conducted an evaluation of the wetland area and determined that it was a "problem area" in that it contained both hydric and non-hydric soils due to oxygenated groundwater. As a result of this determination and under the direction of the Soil Scientist, Tetra Tech modified the wetland boundary. The applicant redesigned the access road so that it passes through this area, thereby avoiding a significant cut and fill on the site.

The Soil Scientist also walked the route the boring equipment took up the mountain during March of 2010 to conduct exploratory work. He recommended that the applicant take immediate actions to repair the disturbed soils in the path of the boring equipment. The applicant met with the Soil Scientist on site and prepared a plan to repair the area

based on the Soil Scientist's input. The applicant conducted the restoration work in July 2010 with the oversight of a Department approved third party inspector. The third party inspector visited the project site several times and filed reports with the Department. The repair work is now stable and in good condition to handle rainfall events.

All of the soils reports were reviewed by staff from the Division of Environmental Assessment (DEA) of the BLWQ. DEA also reviewed a blasting plan submitted by the applicant, which outlines the proposed procedures for blasting in the area of the turbine foundations, the proposed access roads in areas requiring significant cut, and underground power line trenches. The applicant proposes to balance cuts and fills on the project site and reuse as much material as possible. DEA noted that during construction, the applicant may encounter areas of reactive rock on the project site because it is known to occur in the Spruce Mountain area. Reactive rock is not suitable for reuse in foundations, footings or other structures because it loses its structural integrity and will crumble. The applicant submitted a plan for the mitigation of potential adverse effects of any potential reactive rock encountered during construction and reused on the project site. DEA stated that this plan is consistent with previous work submitted to the Department and is acceptable. Because DEA stated that recognition of potential reactive rock encountered during construction is the most significant element of the plan, the applicant proposes to consult with a geologist during project construction to insure proper identification of the reactive rock.

Interested persons contend that the proposed blasting will negatively impact their water supply wells. The applicant submitted a letter from Richard Groll, an Industrial Seismologist, dated May 7, 2010. Mr. Groll reviewed the blasting plan for the proposed project and stated that "the proposed blasting operations at the site will not cause damage to surrounding structures or water wells. The scale of blasting required at this site is commonly employed within 50 feet of occupied dwellings and working water supply wells without causing damage. The blasting process is highly refined and scientific." In addition, the applicant proposes to conduct a pre-blast survey of all structures within a 2,000 foot radius of all areas to be blasted. All property owners with an active well within the pre-blast survey area will be offered a water quality test prior to commencement of the blasting activities. The applicant further stated that at this time, it does not believe that there are any structures or wells within 2,000 feet of the areas they expect will require blasting. Regardless, they will perform a complete survey prior to blasting.

The applicant submitted a blasting plan prepared by Maine Drilling and Blasting. This blasting plan and the letter from Richard Groll were reviewed by a geologist from DEA. DEA stated that they believe the proposed blasting will not negatively affect water supply wells in the area and that the applicant's proposal to do a pre-blast survey of any structures and wells within 2,000 feet of any blasting area is appropriate. DEA recommended that the plan for any sampling or testing of water supply wells be submitted along with the blast plan for review and approval. DEA further recommended that all water-quality, water yield or any other data related to water supply wells, collected during the pre-blast surveys be submitted to the Department.

Prior to any blasting on the project site, the applicant must submit a pre-blast survey of any structures and wells within 2,000 feet of any blasting area, including all water quality data, water yield data or any other data related to water supply wells, to the Department for review and approval. All blasting must be conducted in compliance with the provisions set forth in 38 M.R.S.A. § 490-Z (14) (Performance Standards for Quarries).

The Department finds that the applicant has submitted sufficient evidence that the soils on the project site present no limitations to the proposed project that cannot be overcome through standard engineering practices provided that, prior to any blasting on the project site, the applicant submits a pre-blast survey, including all water quality data, water yield data or any other data related to water supply wells, to the Department for review and approval.

11. STORMWATER MANAGEMENT:

The construction of the proposed project will create 24.18 acres of impervious area and 25.16 acres of developed area. The applicant proposes to re-vegetate all but 8.67 acres of developed area and 7.69 acres of impervious area once construction is complete. The proposed 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. None of these watersheds are listed as either a Lake Most at Risk from New Development or an Urban Impaired Stream in Chapter 502 of the Department's rules. The applicant submitted a stormwater management plan based on the basic, general, and flooding standards contained in Department Rules, Chapter 500. Under the general standards, the applicant utilized the phosphorous methodology to address impacts to Big Concord Pond and Shagg Pond. Stormwater quality treatment will be achieved with various buffers. Stormwater flooding mitigation will be achieved with flow distribution through the use of road side buffers, ditch turnout buffers, and a treatment berm.

A. Basic Standard:

(1) Erosion and Sedimentation Control: The applicant submitted an Erosion and Sedimentation Control Plan (Section 14 of the application) that is based on the performance standards contained in Appendix A of Chapter 500 and the Best Management Practices outlined in the Maine Erosion and Sediment Control BMPs, which were developed by the Department. This plan and plan sheets containing erosion control details were reviewed by the Division of Watershed Management (DWM) of the BLWQ. DWM commented that the applicant's erosion control plan is an acceptable plan and a good starting point for providing erosion control protection during construction. However, based on site and weather conditions during construction, additional erosion and sedimentation control measures may be necessary. Regular inspection by a professional engineer will also be necessary to assure proper implementation and maintenance of the proposed erosion control measures, and the identification of any additional measures that may be needed.

Given the size and nature of the project site, the applicant must retain the services of a third party inspector in accordance with the Special Condition for Third Party Inspection Program, which is attached to this Order. The inspecting engineer should make weekly visits to the project site and report on the erosion and sedimentation controls, and any problems encountered during the inspections, and recommend corrective measures if any must be taken. During construction, any area of instability or erosion must be corrected immediately and maintained until the site is completely stabilized or vegetation is established.

Erosion control details will be included on the final construction plans and the erosion control narrative will be included in the project specifications to be provided to the construction contractor. Prior to the start of construction, the applicant must conduct a pre-construction meeting to discuss the construction schedule and the erosion and sediment control plan with the appropriate parties. This meeting must be attended by the applicant's representative, Department staff, the design engineer, the contractor, and the third-party inspector.

(2) Inspection and Maintenance: The applicant submitted a maintenance plan that addresses both short and long-term maintenance requirements. This plan was reviewed by DWM. The maintenance plan is based on the standards contained in Appendix B of Chapter 500. The applicant will be responsible for the maintenance of the stormwater management system.

(3) Housekeeping: The proposed project will comply with the performance standards outlined in Appendix C of Chapter 500.

Based on DWM's review of the applicant's erosion and sedimentation control plan and the maintenance plan, the Department finds that the proposed project meets the Basic Standards contained in Chapter 500(4)(A) provided that the applicant conducts a pre-construction meeting and retains a third-party inspector to oversee project construction.

B. General Standards:

The applicant's stormwater management plan includes general treatment measures that will mitigate for the increased frequency and duration of channel erosive flows due to runoff from smaller storms, provide for effective treatment of pollutants in stormwater, and mitigate potential temperature impacts. Mitigation for the non-linear portion of the project (the O&M building) is being achieved by using an alternative buffer design that DWM has reviewed and approved in accordance with Chapter 500 § (4)(B)(2). DWM stated that the applicant proposes to utilize a forested buffer with an additional treatment berm constructed on the re-vegetated portion of the crane path and access road. Though the natural slope is greater than the standard buffer table allows, DWM stated that the additional treatment berm will improve the buffer's efficiency sufficiently to meet the standard buffer treatment requirement. DWM further commented that buffer treatment in this case is preferable to the use of more physical treatments such as soil filters or ponds.

The proposed access roads meet the definition of "a linear portion of a project" in Chapter 500 and the applicant is proposing to provide stormwater treatment for 77.49% of the volume from the impervious area and 77.49% of volume from the developed area. The Department finds that both the linear portion of the project and the non-linear portion of the project will meet the standards of Chapter 500.

Because of the proposed project's location partially within the watersheds of Big Concord Pond and Shagg Pond, stormwater runoff from the portion of the project site in these lakes' watersheds will be treated to meet the phosphorus standard outlined in Chapter 500(4)(C). The applicant's phosphorus control plan was developed using methodology developed by the Department and outlined in "Phosphorus Control in Lake Watersheds: A Technical Guide for Evaluating New Development". For this project, the permitted phosphorus export is 2.435 pounds of phosphorus per year (lbs/yr) to Big Concord Pond and 0.444 lbs/yr to Shagg Pond. The applicant proposes to remove phosphorus from the project's stormwater runoff by utilizing the stormwater treatment methods discussed above and incorporating limited disturbance buffers in the locations depicted in the design drawings. The Department finds that the proposed stormwater treatment will be able to reduce the export of phosphorus in the stormwater runoff equal to the maximum permitted phosphorus export for the project site.

The forested, limited disturbance stormwater buffers will be protected from alteration through the execution of a Declaration of Restrictions. The Declaration of Restrictions must have attached to it a plot plan, drawn to scale, that specifies the location of the buffers. The applicant proposes to use the deed restriction language contained in Appendix G of Chapter 500. The Declaration of Restrictions must be recorded prior to the start of operation, and the applicant must submit a copy of the recorded deed restriction including the plot plan to the Department within 90 days of its recording. Prior to initiating work in an area, the location of forested buffers must be permanently marked on the ground. Methods of marking the ground must include, but are not limited to, a combination of field flagging and clearly marked permanent signage.

The stormwater management system proposed by the applicant was reviewed by, and revised in response to, comments from DWM. After a final review, DWM commented that the proposed stormwater management system is designed in accordance with the Chapter 500 General Standards. DWM recommended that the applicant retain the services of a professional engineer to inspect the construction and stabilization of the road ditch turnouts and buffer treatment berm to be built on the site. Inspections must consist of weekly visits to the site to inspect each turnout and the berm from initial ground disturbance to final stabilization. If necessary, the inspecting engineer will interpret the turnouts' and the berm's location and construction plan for the contractor. Once the turnouts and the berm are constructed and stabilized, the inspecting engineer will notify the Department in writing within 14 days to state that the turnouts and the treatment berm have been completed. Accompanying the engineer's notification must be a log of the engineer's inspections giving the date of each inspection, the time of each inspection and the items inspected on each visit.

Based on the stormwater system's design and DWM's review, the Department finds that the applicant has made adequate provision to ensure that the proposed project will meet the Chapter 500 General Standards provided that the applicant adheres to the required protocol for inspections of the ditch turnouts and treatment berm, that the buffers are permanently marked on the ground, and a copy of the recorded deed restrictions are submitted to the Department as outlined above.

C. Flooding Standard: The applicant is proposing to utilize a stormwater management system 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. DWM reviewed the analysis of the watersheds involved in the proposed project for potential flooding impacts. DWM stated that the applicant'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. The evidence shows that the weighted curve number for each subwatershed will exhibit a negligible change. This change is well within the model tolerances and does not take into consideration the redistribution of flows in the buffer areas that will lengthen the time of concentration for all the watersheds. DWM further stated that for this project the model indicates that the project meets 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.

The following minor adjustments may be made during construction without advance notice to the Department provided they do not impact regulated resources and are reflected in the final as-built drawings: changes that result in a reduction in impact and/or footprint (such as a reduction in clearing or impervious area, and elimination of structures or a reduction in structure size); location of a structure within the identified clearing limits; the type of foundations used; additional drainage culverts, level spreaders or rock sandwiches; changes to culvert size or type provided that the culvert does not convey a regulated stream and that the hydraulic capacity of the substitute culvert is greater than or equal to that of the original; and changes of up to 10 feet in the base elevation of a turbine vertically up or down as long as the change in elevation does not result in new visual impacts or changes to the stormwater management plan. Additionally, the following minor adjustments may be made upon prior approval by the third party inspector or Department staff and do not require a revision or modification of the permit but must be reflected in the final as built drawings: minor changes that do not increase overall project impacts or project footprint and which do not impact any regulated resources as long as any new areas of impact have been surveyed for environmental resources and do not affect other landowners. These changes include adjustments to horizontal or vertical road geometry that do not result in changes to the stormwater management plan; a shift of up to 100 feet in a turbine clearing area; and adjustments to culvert locations based on field topography.

Other modifications not exempt from licensing requirements by statute or rule require written approval before the modification may be undertaken.

Based on the system's design and DWM's review, the Department finds that the applicant has made adequate provision to ensure that the proposed project will meet the Chapter 500, Flooding Standard for channel limits and runoff areas, and peak flow from the project site.

The Department further finds that the proposed project will meet the Chapter 500 standards for: (1) easements and covenants; (2) management of stormwater discharges; (3) discharge to freshwater or coastal wetlands; and (4) threatened or endangered species.

12. GROUNDWATER:

The applicant submitted the Maine Geological Survey, "Significant Sand and Gravel Aquifers" map for the Mount Zircon Quadrangle, which encompasses the proposed project site. There are no mapped significant sand and gravel aquifers on the project site. The Maine Geological Survey data indicates that the nearest aquifer is located along the south side of Concord Pond to the north of the project. A single drilled well is proposed to serve domestic water needs at the project's O&M building.

Spill Prevention, Control, and Countermeasures (SPCC) plan. The applicant submitted a final SPCC plan for the operation of the facility entitled, "Spill Prevention, Control and Countermeasures Plan" prepared by Tighe & Bond and dated July 2010. The applicant stated that the potential sources of groundwater contamination during construction will be fuel and hydraulic and lubricating oils used in the operation of vehicles and construction equipment. The SPCC plan includes general operational requirements, storage and handling requirements, and training requirements to prevent spilling of oil, hazardous materials or waste. The SPCC plan also sets out spill reporting and cleanup requirements should such an event occur. No herbicides will be used, stored, mixed, or transferred between containers within the stream buffer areas, and no refueling of equipment will be allowed in these buffers. Prior to any construction, site preparation, or maintenance, the applicant must flag the boundaries of any such setbacks in the field. All staff must receive suitable training to recognize and comply with these setback markers and requirements. Prior to any application of herbicides or other use of chemicals or petroleum products during maintenance of the transmission line, the transmission line right-of-way must be checked for any new construction that would require establishment of setbacks for herbicides or other use of chemicals or petroleum products, and any such setback must be clearly flagged in the field.

DEA reviewed the applicant's proposals for protecting groundwater and recommended that installation of the well and wastewater disposal system in accordance with the proposed plans should be confirmed after construction.

The Department finds that the proposed project will not have an unreasonable adverse effect on ground water quality provided that, prior to operation, the applicant submits to the BLWQ for review a site drawing showing the location of the O&M building well and confirming the wastewater disposal field was constructed at the approved location.

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13. WATER SUPPLY:

The proposed project will not require water supply for the operation of the wind turbines or the electrical equipment. The only anticipated demand for water will be at the O&M building. The O&M building will house a maximum of six staff and will provide bathroom facilities and potable water for those staff. The applicant anticipates that 90 gallons/day will be required to provide for these staff. An individual well will be drilled on-site to supply potable water to the O&M building.

The applicant states that non-potable water will be needed for dust abatement. This water will not be withdrawn from groundwater sources or from rivers or streams. The applicant proposes to use a tanker truck to bring water to the site from local lakes. The department finds that the proposed amount of withdrawal is not anticipated to have any impact on lake water levels.

The applicant's proposals for water supply have been reviewed by DEA, which commented that it had no objection to the applicant's proposals.

Based on the materials in the application and DEA's review, the Department finds that the applicant has made adequate provision for securing and maintaining a sufficient and healthful water supply.

14. WASTEWATER DISPOSAL:

The applicant stated that the only potential generation of wastewater would be from the domestic water needs at the proposed O&M building. The applicant submitted a design for a subsurface wastewater disposal system designed to handle wastewater from up to six employees. This equates to approximately 90 gallons of wastewater per day. There will be no commercial or industrial wastewater generation associated with the proposed project.

The applicant submitted a subsurface wastewater disposal system design (HHE-200 form) dated November 2, 2009, and prepared by David L. Marceau, a licensed professional site evaluator. The applicant also submitted the soil survey map and report discussed in Finding 10. The design of the wastewater disposal system complies with the Subsurface Wastewater Disposal Rules. The wastewater disposal system will be built on suitable soils adjacent to the O&M building, a minimum of 100 feet from the water supply well.

The applicant's proposal for wastewater disposal was reviewed by DEA, which found the proposal to be adequate. Based on the materials submitted and DEA's comments, the Department finds that the proposed wastewater disposal system will be built on suitable soil types.

15. SOLID WASTE:

The development of the site and construction of the turbines will generate approximately 210 cubic yards of construction debris, packaging materials, and associated wastes. All construction and demolition debris generated will be disposed of at the Juniper Ridge Landfill, which is in substantial compliance with the Department's Solid Waste Management Regulations of the State of Maine. By letter dated October 29, 2009, Juniper Ridge Landfill stated that the landfill has the capacity to accept this construction waste. This facility is located in Alton, Maine.

All marketable trees located in the footprint of the proposed turbine pads and roads will be harvested and sold for timber or pulp. Non-marketable wood waste will be processed and used as mulch on the site. Stumps will only be removed where necessary for placement of a structure or for proper matting or travel. Stumps will be buried on-site in an area of less than one acre.

Solid waste produced during operation of the proposed project is expected to be limited to general office waste from the O&M building. The applicant has contracted with Pine Tree Waste Services, which will haul the office waste to Maine Energy in Biddeford, Maine.

The Department's Bureau of Remediation and Waste Management reviewed the applicant's proposal for solid waste disposal, and stated that the proposal is adequate. Any change in these plans would require the approval of the Department. Based on the above information and the Bureau of Remediation and Waste Management review, the Department finds that the applicant has made adequate provision for solid waste disposal.

16. FLOODING:

The applicant does not propose to construct any structure within a flood zone. As discussed in Finding 11, the Department has reviewed the applicant's plans for stormwater management and found that the project is unlikely to have any adverse impact on downstream flooding. Based upon the nature of the project and the fact that no part of it is located in a flood zone, the Department finds that the proposed project is unlikely to cause or increase flooding or cause an unreasonable flood hazard to any structure.

17. WETLAND IMPACTS:

Tetra Tech conducted the applicant's surveys to locate wetland and waterbody resources on the Spruce Mountain Wind Project site and summarized the results of that work in Section 7 of the Site Law application and Section 6 of the NRPA application. The surveys addressed the project area including: the proposed access road, the crane road located along the ridgeline, the turbine pads and the area around the pads, the electrical transmission corridor, the laydown area and the O&M building. The results of these surveys are summarized as follows:

- Fifty-one wetlands were identified within the project area. Of these wetlands, 26 were classified as palustrine emergent wetlands, 16 were classified as palustrine forested wetlands, and 6 were classified as palustrine scrub shrub wetlands.
- Nine streams were identified on the project site.
- Three significant vernal pools were identified on the project site. As discussed in Finding 7(A) MDIFW review the results of the applicant's survey and identified three significant vernal pools on the project parcel. The significant vernal pools are located more than 2,000 feet from the proposed work area. The proposed project will not impact any significant vernal pools or their habitats.

Freshwater Wetland Impacts. The applicant proposes to permanently fill 5,718 square feet of forested freshwater wetlands for the construction of both the access road and the crane road and to temporarily alter 7,835 square feet of freshwater wetlands during the construction of the transmission line. All equipment involved with the construction of the transmission line will work on frozen ground and/or construction mats when in wetlands. The applicant also proposes to convert 19,663 square feet of forested wetlands to scrub shrub wetlands for operation of the transmission line. Maintenance of the transmission line right-of-way will be in accordance with the applicants VMP and the Department's *Minimum Performance Standards for Transmission Line Corridors.*

Stream Impacts. The applicant proposes to cross 9 NRPA regulated streams during the construction of the project. The applicant proposes to cross three streams on the access road with arch culverts that will completely span the stream channels. The proposed transmission line will cross six streams. During construction of the transmission line, the applicant proposes to utilize protective mats or timber mat bridges to cross the streams. The clearing for the proposed transmission line will be 50 feet in width. The applicant requested permission to construct the transmission line during the winter months and has subsequently requested a waiver of the traditional stream crossing window of July 15 to October 1. To minimize impacts to fisheries, the applicant proposes to implement the proposed VMP and impose a 250 foot riparian stream buffer width along the four streams that support northern spring salamanders as discussed in Finding 7. Also as discussed in Finding 7, MDIFW recommends that all permanent stream crossings, except for arch culverts which completely span the stream and its banks, be constructed between July 15 and October 1. MDIFW further stated that winter time construction of the transmission line is acceptable provided the streams are matted and that erosion controls are utilized in accordance with the Department's Best Management Practices.

Chapter 310 of the Department's rules interprets and elaborates on the NRPA criteria pertaining to wetlands and waterbodies, such as streams. The rules guide the Department in its determination of whether a project's impacts would be unreasonable. A proposed project would generally be found to be unreasonable if it would cause a loss of wetland area, functions and values and there is a practicable alternative to the project that would be less damaging to the environment. Each application for a wetland alteration permit must provide an analysis of alternatives in order to demonstrate that a practicable alternative with less impact does not exist.

A. Avoidance. Tetra Tech prepared an alternatives analysis for the proposed project which was submitted as sections 7, 8 and 9 of the NRPA application. This analysis addresses multiple factors that were considered in the selection of the site. These factors include quality of the wind resource, geography, compatibility with existing land uses, costs and logistics of delivering power to market, and environmental impacts. The application states that efforts to avoid wetland impacts in the planning of this project included shifting the locations of turbine pads, shifting the location of the transmission line corridor, and moving the O&M building to a location farther away from a stream that supports northern spring salamanders. Overall, the applicant proposes to permanently fill 5,718 square feet of freshwater wetlands during the construction of the access and crane roads and temporarily alter an additional 7,835 square feet of freshwater wetlands with the construction of the transmission lines. The access roads require three permanent stream crossings and two temporary stream crossings, the crane road will require two wetland crossing, and the transmission line will cross six streams. Approximately 19,663 square feet of forested freshwater wetlands will be permanently converted to scrub shrub wetlands with the installation and maintenance of the electrical transmission line.

B. Minimal Alteration. The amount of wetland and waterbodies to be altered must be kept to the minimum amount necessary for meeting the overall purpose of the project. In the areas where wetland impacts could not be avoided, the applicant minimized wetland impacts by using various techniques. Some techniques used to minimize impacts included narrowing road shoulders where possible and modifying cut and fill slopes on both roads and turbine pads. The applicant maximized buffers to allow larger riparian areas between roads and turbine pads and the wetland areas. The applicant also designed roads through some areas to ensure that they crossed at the most narrow point of the wetland and would have minimal effect on the larger wetland area's function.

C. Compensation. In accordance with Chapter 310 5(C)(6)(a)(ii), compensation is not required for impacts associated with the proposed project, because the applicant is proposing to permanently alter less than 15,000 square feet of freshwater wetland.

Based on the Department's review of the wetlands and waterbodies surveys and the proposed layout of the project as shown on plans submitted by the applicant, the Department finds that the applicant has avoided and minimized wetland and waterbody impacts to the greatest extent practicable, and that the proposed project represents the least environmentally damaging alternative that meets the overall purpose of the project provided that the applicant implements the VMP contained in the application.

18. AIR QUALITY:

The applicant stated that the project's construction activities may cause temporary effects on air quality in the form of exhaust from construction vehicles and dust from unpaved

roads. However, the applicant contends that the effects will be minimal due to the location of the proposed project in a rural setting and the limited duration of construction in any one place. The applicant stated that routine maintenance of the transmission line will not create significant emissions from maintenance vehicles and will be similar to emissions currently produced by maintenance of other existing transmission lines.

Dust created by construction equipment is anticipated in the project area. Where dust may be a nuisance to neighbors, the applicant proposes to treat areas with water. Treatment will be on an as-needed basis as ordered by the resident engineer. The construction entrance will have crushed stone pads that will limit dust and mud tracking. Dust is not anticipated to be an issue along the transmission line right-of-way.

The applicant does not propose using a rock crusher on the project site during the construction of the proposed project; however, if a rock crusher is required to be utilized on site, the applicant must insure that the crusher is licensed by the Department's Bureau of Air Quality and is operated in accordance with that license.

The Department finds that no significant source of air emissions has been identified with the exception of dust emissions as described above, and the proposals for limiting dust emission are adequate. If a rock crusher is utilized on site, the applicant must insure that the crusher is licensed by the Department's Bureau of Air Quality before it is used and will be operated in accordance with that license.

19. ODORS:

The applicant stated that the clearing and construction phase of the proposed project will not create significant odors, other than limited, short term odors from equipment exhaust. Clearing activity will be conducted with standard forestry equipment under controlled conditions. If burning of vegetation is anticipated, burning will be accomplished in compliance with local and state open burning requirements. Any brush burning will be supervised by a construction supervisor and environmental inspector.

The Department finds that the proposed project will not be a significant source of odors.

20. ALTERATION OF CLIMATE/WATER VAPOR:

The proposed project does not involve any significant sources of water vapor emissions.

21. ACCESS TO SUNLIGHT:

Chapter 375(13) recognizes that some existing structures utilize active or passive solar energy systems for purposes such as heating air or water, and that in those instances, it may be an unreasonable effect on existing uses to deny access to direct sunlight.

The applicant stated that there are no active or passive solar energy systems near the project area, as a result the proposed project will not negatively interfere with access to sunlight to support those energy systems.

Based on the applicant's submittal, the Department finds that the proposed project will not have an unreasonable effect on any existing solar energy uses.

22. SHADOW FLICKER:

In accordance with 38 M.R.S.A. § 484(10), an applicant must demonstrate that the proposed wind energy development has been designed to avoid unreasonable adverse shadow flicker effects. Shadow flicker caused by wind turbines is defined as alternating changes in light intensity caused by the moving blade casting shadows on the ground and stationary objects. Shadow flicker is the sun seen through a rotating wind turbine rotor. Shadow flicker does not occur when the sun is obscured by clouds or fog or when the turbine is not rotating. The spatial relationships between a wind turbine and receptor, as well as wind direction are key factors related to shadow flicker duration. At distances of greater than 1,000 feet between wind turbines and receptors, shadow flicker usually occurs where the rotor plane is in-line with the sun and receptor (as seen from the receptor), the cast shadows will be very narrow (blade thickness), of low intensity, and will move quickly past the stationary receptor. When the rotor plane is perpendicular to the sun-receptor "view line", the cast shadow of the blades will move within a circle equal to the turbine rotor diameter.

The applicant submitted a shadow flicker analysis as Section 26 of the application. The applicant utilized WindPRO, a wind modeling software program, to model expected shadow flicker effects on adjacent properties from the original 11 potential turbine locations. The applicant used historic sunshine data and wind data collected by the on site meteorological tower. The applicant assumed the worse case scenario, that all receptors face the turbine directly. Further, the analysis does not take vegetative screening into account between a turbine and a receptor.

The Department generally recommends that an applicant conduct a shadow flicker model out to a distance of 1,000 feet or greater from a residential structure. As represented in Section 5, Table 2 gives the distances between the nearest turbine and the location of nearby receptors. The nearest residential structure identified in the applicant's study was approximately 2,186 feet from the nearest turbine. The furthest receptor studied was approximately 5,379 feet from the nearest turbine. There were 22 potentially-impacted receptors identified in this range.

The applicant submitted an easement option on an adjacent parcel, Lot 4 on the Town of Woodstock's Tax Map 13, giving the applicant the right to cast shadows or shadow flicker from the proposed wind project onto the parcel. This property is undeveloped and actively managed as a timber lot.

Maine currently has no numerical regulatory limits on exposure to shadow flicker; however, the industry commonly uses 30 hours per year as a limit to reduce nuisance complaints. The applicant's analysis of twenty-two potential shadow flicker receptors, using historical and on site modeling assumptions indicated potential exposures between 3 hours and 14 hours, 13 minutes per year. The applicant stated that when vegetation is taken into consideration, actual impacts are expected to be less.

The Department finds that the shadow flicker modeling conducted by the applicant is credible, and based upon the proposed project's location and design and results of the shadow flicker analysis, the Department finds that the proposed project will not unreasonably cause shadow flicker to occur over adjacent properties.

23. PUBLIC SAFETY:

The proposed project will use Gamesa G90 2.0 megawatt wind turbine generators. The turbines have been certified by Germanischer Lloyd, a wind power product certification authority, to withstand Class IIIA wind gusts, as defined by the International Electrotechnical Commission Standard 61400-1 "Wind Turbine Generator Systems-Part 1: Safety Requirements." The Standard considers an extreme wind speed at hub height of 52.5 meters per second (117 miles per hour). The applicant submitted evidence that the Gamesa G90 wind turbine meets acceptable International safety standards in the form of a Statement of Compliance issued by Germanischer Lloyd dated April 16, 2009. The applicant also submitted a letter from Robert Cummings, a professional, licensed civil engineer, with the firm Engineering & Management Services Inc., dated April 23, 2010 stating that in his opinion the proposed project meets the required safety setbacks defined in M.R.S.A. § 3455.

The Department recognizes that locating wind turbines a safe distance away from any occupied structures, public road or other public use area is of utmost importance. In establishing a recommended safety setback, the Department considered industry standards for wind energy production in climates similar to Maine, as well as the guidelines recommended by certifying agencies such as Det Norske Veritas. Based on these sources, the Department recommends that all wind turbines be set back from the property line, occupied structures or public areas, at a minimum of 1.5 times the maximum blade height of the wind turbine. The maximum blade height of the Gamesa G90 is 403.4 feet from the ground to the tip of the fully extended turbine blade. Based on the Department setback specifications, the minimum setback distance to the nearest property line should be 605.1 feet. A review of the application indicates that all of the turbines except Turbine #3 are setback an adequate distance from the property boundaries. Turbine #3 is located only 174 feet from the closest property boundary. The parcel abutting Turbine #3 is a large, actively managed timber lot, described as Lot 4 on the Town of Woodstock's Tax Map 13, with a conservation easement that does not allow for any type of development. The applicant has submitted an option for an easement on this parcel to provide the necessary safety setback for Turbine #3. The easement option allows the applicant to place a turbine closer than 1.5 times the turbine height from the property boundary. All other safety setbacks will be met on the applicant's own parcel.

The Department finds that the applicant has provided documentation in the form of standards of compliance by the manufacturer and certification by an engineer that the wind generation equipment has been designed to conform to applicable industry safety standards and has demonstrated that the proposed development has been sited such that it will not present an unreasonable safety hazard to adjacent properties or adjacent property uses. The Department further finds that the applicant submitted sufficient evidence which demonstrates that the proposed project has been sited with appropriate safety related setbacks from adjacent properties and existing uses provided that prior to project construction, the applicant submits a copy of the recorded easement to the Department.

24. DECOMMISSIONING PLAN:

The Gamesa G90 wind turbine generators are designed and certified by independent agencies for a minimum expected operational life of 20 years. In order to facilitate and ensure appropriate removal of the wind generation equipment when it reaches the end of its useful life, the Department requires an applicant to demonstrate, in the form of a decommissioning plan, the means and methods by which decommissioning will be accomplished. The applicant submitted a decommissioning plan as Section 29 of the application. The decommissioning plan includes a description of the trigger for implementing the decommissioning plan, a description of work required, an estimate of decommissioning costs, a schedule for contributions to its decommissioning fund and a demonstration of financial assurance.

A. Description of trigger for implementation of decommissioning. The applicant states that the wind generation facility will be decommissioned when and if it ceases to generate electricity for a continuous period of twelve months. In the case of special circumstances such as force majeure event, the applicant may submit to the Department for review and approval, reasonable evidence that the project has not been abandoned and should not be decommissioned.

B. Description of work. The description of work contained in Section 29 of the application outlines how the turbines and other components of the proposed project will be dismantled and removed from the site. Pursuant to Department guidelines, subsurface components will be removed to a minimum of 24 inches below grade, facilities will be removed and salvaged, and disturbed areas will be re-seeded. At the time of decommissioning, the owner must submit a plan for continued beneficial use of any wind energy development component proposed to be left on-site to the Department for review and approval.

C. Cost estimates for decommissioning. The applicant stated that the total cost of decommissioning, minus salvage value is estimated to be $322,320. A detailed breakdown of decommissioning costs is included in Section 29 of the application.

D. Financial assurance. The applicant proposed that it will ensure that financial assurance for decommissioning costs will be fully established by year thirteen of

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operation. In addition, prior to year 13, the applicant will provide increasing levels of financial assurance according to the schedule outlined below in Table 4.

The applicant proposes 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 in place prior to the commercial operation date and will be increased 20% every three years until the financial assurance level reaches 100% of the total project decommissioning costs. The applicant stated that financial assurance will be in place at all times during the operation of the project according to the table below. The applicant proposes to reassess the estimated total decommissioning costs (decommissioning costs minus salvage value) prior to the end of years 6, 12, 18, 20 and each year thereafter. The updated estimated total decommissioning costs will be submitted to the Department for review and approval and the financial assurance will be adjusted to cover 100% of the revised total decommissioning costs.

Table 4.

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 applicant proposes to make the Department the obligee of any performance bond used to prove financial assurance. The Department will have the right to call the bond in the event of non-performance. The trigger for the Department's third party rights shall be the dissolution of the project's owner or if the project ceases to generate electricity for a continuous period of twelve months, as further described in (1) above. Upon decommissioning the site any remaining balance of the financial assurance will be returned to the applicant.

Interested persons commented that decommissioning costs should be fully funded as of the first day of operation. They also state that the applicant has overestimated the salvage values of the turbines. In response, the applicant stated that its decommissioning plan is partially funded on the first day of commercial operation and fully funded by year 13 of operation. 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. Gamesa wind turbines are independently certified to have a useful life of at least 20 years. The decommissioning fund will be fully funded 2 years before the end of the applicant's power sales obligation, and 7 years before the end of the

certified useful life. The applicant states that salvage values are calculated using actual turbine component weights and composition and current local market prices minus breakdown and transportation costs.

Based on the applicant's proposal outlined above, and in consideration of comments from interested persons, the Department finds that the applicant has made adequate provisions for demonstrating a decommissioning plan and a mechanism to execute the plan provided that the plan is implemented and that salvage values are reassessed every time the decommissioning costs are estimated in accordance with the schedule in Table 4 above.

25. TANGIBLE BENEFITS:

The applicant has submitted a description of the tangible benefits likely to be provided by the Spruce Mountain Wind Project as Section 28 of the application. In that description the applicant states that the project will provide significant tangible benefits to the State of Maine and to the host community of Woodstock, including economic benefits and environmental benefits.

The applicant states that the host community will benefit through a conservation easement of 1,000 acres on the project site, employment opportunities, the local purchase of materials and supplies, taxes paid on the project, the shared use of emergency equipment (specifically, a tracked snow-cat) and a proposed annual Community Benefit Fund payment. The applicant further describes the benefit as follows. The local host community and immediately surrounding areas can benefit through construction-related employment opportunities and the ancillary economic benefits of that construction activity. There will be the opportunity for direct jobs for activities such as tree clearing and excavation, and ancillary jobs in businesses that support construction such as lodging, restaurants, and fuel and concrete suppliers. Following the construction phase, Spruce Mountain Wind, LLC anticipates hiring two to three permanent employees to operate and maintain the facility.

The applicant states that the State of Maine in general will reap economic benefits from the estimated $37 million dollar project cost, a significant portion of which is expected to be spent on development, engineering, and construction-related activities provided by Maine firms. The applicant submitted a list of Maine businesses already engaged with the Spruce Mountain project.

The applicant also states that the project will increase energy diversity, thereby helping to reduce electric price volatility in Maine. The applicant states that the project will help Maine meet its commitments under the Regional Greenhouse Gas Initiative, which establishes limits for emissions associated with the generation of electricity, and that it will have the capacity to provide enough emission-free energy to power approximately 8,700 Mane households annually, with no air or water pollution and with no greenhouse gas emissions, a leading cause of global warming.

Community Benefits Fund. The applicant has agreed with the Town of Woodstock to establish a Community Benefits Fund. This fund would be used at the Town's discretion to provide direct economic benefits to its citizens. The applicant's proposed contribution to the community benefit fund will be at least $20,000 per year for 20 years and will be administered by the Town of Woodstock. The applicant states that the size of this fund may increase subject to availability of project resources. The Town of Woodstock submitted a letter to the Department dated February 23, 2010 accepting the proposed community benefit fund.

Interested parties contend that the tangible benefits of the project are inadequate and that public views from state trails will be negatively impacted by the proposed project. They requested that the applicant provide additional, local conservation lands. In response to these comments, in a letter dated June 8, 2010, the applicant increased its tangible benefits package to include a one time $80,000 payment to the Town of Woodstock to be used for solely for local land conservation.

The Department reviewed the concerns expressed by interested parties. Based upon consideration of all of the benefits proposed by the applicant, information in the record, and interested parties' comments, the Department finds that the applicant has demonstrated that the proposed project will provide significant tangible benefits to the host community and surrounding area pursuant to Title 35-A § 3454, provided that annual payments are made to the Town of Woodstock and that prior to the start of construction a one time $80,000 payment is made to the Town of Woodstock as described above.

BASED on the above findings of fact, and subject to the conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S.A. Sections 480-A et seq. and Section 401 of the Federal Water Pollution Control Act:

A. The proposed activity will not unreasonably interfere with existing scenic, aesthetic, recreational, or navigational uses.

B. The proposed activity will not cause unreasonable erosion of soil or sediment.

C. The proposed activity will not unreasonably inhibit the natural transfer of soil from the terrestrial to the marine or freshwater environment.

D. 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 provided that the applicant submits a post-construction monitoring program, that the applicant performs post-construction avian, bat and raptor monitoring at all ten turbine locations, that the applicant permanently protects the 250 foot buffer around the streams that support northern spring salamander located within the applicant's conservation easement

and restore an existing parking area and revegetate the laydown area, and that all in-stream work is conducted from July 15 – October 1, all as discussed in Finding 7.

E. The proposed activity will not unreasonably interfere with the natural flow of any surface or subsurface waters.

F. The proposed activity will not violate any state water quality law including those governing the classifications of the State's waters.

G. The proposed activity will not unreasonably cause or increase the flooding of the alteration area or adjacent properties.

H. The proposed activity is not on or adjacent to a sand dune.

I. The proposed activity is not on an outstanding river segment as noted in 38 M.R.S.A. Section 480-P.

BASED on the above findings of fact, and subject to the conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S.A. Sections 481 et seq.:

A. The applicant has provided adequate evidence of title, right or interest, financial capacity and technical ability to develop the project in a manner consistent with state environmental standards provided that, prior to the start of construction, (1) the applicant submits copies of the recorded deeds for property currently under purchase options and of the executed transmission easement as described in Finding 2; and of the executed sound and public safety easement as described in Findings 5 and 23 and (2) the applicant submits evidence that it has finalized and received the loan from Sovereign Bank or other financial institution authorized to do business in Maine and final documentation of the receipt of the remainder of the financing from Mr. Cashman as described in Finding 3.

B. The applicant has made adequate provision for fitting the development harmoniously into the existing natural environment and the development will not adversely affect existing uses, air quality, water quality or other natural resources in the municipality or in neighboring municipalities provided that the applicant operates the project with three turbines operating in reduced sound power mode as shown in Table 1 and submits the compliance locations for review and approval to the Department, that the compliance locations are fully operational prior to the commissioning of the facility, that the applicant implements the complaint protocol outlined above, and that the applicant submits sound level monitoring reports in accordance with the post-construction monitoring program, all as described in Finding 5; provided that the applicant complies with the post-construction VMP, herbicides are not used to maintain vegetation within 250 feet of the two streams (labeled TS18 and TS12 on the plans), the area is clearly marked in the field with signs clearly prohibiting the use of herbicides, and all visual screening buffers and stormwater treatment buffers are marked on the ground as described in Finding 9; provided all required deed restrictions are recorded and copies of

the recorded deed restrictions, including the plot plans, are submitted as described in Finding 11; and provided any rock crushers used on site are approved in accordance with Finding 18.

C. The proposed development will be built on soil types which are suitable to the nature of the undertaking and will not cause unreasonable erosion of soil or sediment nor inhibit the natural transfer of soil provided that the applicant submits a pre-blast survey as described in Finding 10.

D. The proposed development meets the standards for stormwater management in Section 420-D and the standard for erosion and sedimentation control in Section 420-C provided that the applicant holds a pre-construction meeting, hires a third-party inspector to oversee project construction, adheres to the required protocol for inspections of the ditch turnouts and treatment berm, permanently marks buffers on the ground and submit a copy of the recorded deed restrictions, all as described in Finding 11.

E. The proposed development will not pose an unreasonable risk that a discharge to a significant groundwater aquifer will occur provided that the applicant submits a site drawing showing the location of the O&M building well and confirming the wastewater disposal field location as described in Finding 12.

F. The applicant has made adequate provision of utilities, including water supplies, sewerage facilities, solid waste disposal and roadways required for the development and the development will not have an unreasonable adverse effect on the existing or proposed utilities and roadways in the municipality or area served by those services.

G. The proposed development will not unreasonably cause or increase the flooding of the alteration area or adjacent properties nor create an unreasonable flood hazard to any structure.

H. The proposed development will not significantly compromise views from a scenic resource of state or national significance such that the development will have an unreasonable adverse effect on the scenic character or existing uses related to scenic character of the area.

I. The proposed development will not unreasonably cause shadow flicker effects to occur over adjacent properties.

J. The proposed development will not present an unreasonable safety hazard to adjacent properties or adjacent property uses.

K. The applicant has made adequate provision and financial capacity to achieve decommissioning of the wind power facility.

L. The proposed development will provide significant tangible benefits to the host community and surrounding area, provided that the applicant implements the Community

Benefit Fund described in Finding 25 and makes a one time payment of $80,000 to the Town of Woodstock.

THEREFORE, the Department APPROVES the application of SPRUCE MOUNTAIN WIND LLC to construct a 20MW wind energy development project, known as Spruce Mountain Wind, located in the Town of Woodstock, as described above, SUBJECT TO THE FOLLOWING CONDITIONS and all applicable standards and regulations:

1. The Standard Conditions of Approval, a copy attached.

2. In addition to any specific erosion control measures described in this or previous orders, the applicant shall take all necessary actions to ensure that its activities or those of its agents do not result in noticeable erosion of soils or fugitive dust emissions on the site during the construction and operation of the project covered by this approval.

3. Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

4. The applicant or other responsible party shall, within three months of the expiration of each five-year interval from the date of this Order, submit a report certifying that the items listed in Department Rules, Chapter 500, Appendix B(4) have been completed in accordance with the approved plans.

5. Prior to the start of construction, the applicant shall provide copies of the recorded deeds for the two properties currently under purchase options and one executed easement for the transmission line corridor, and one executed sound and public safety setback easement to the Department for review.

6. Prior to the start of construction, the applicant shall submit evidence that it has finalized and received a loan from Sovereign Bank or other financial institution authorized to do business in Maine and final documentation of the receipt of the remainder of the financing from Mr. Cashman in accordance with 38 MRSA §484(1) and Chapter 373(1), to the Bureau of Land and Water Quality for review and approval.

7. The applicant shall operate the project with turbines 9, 10 and 11 operating in reduced sound power mode as shown in Finding 5, Table 1.

8. Prior to project operation, the applicant shall submit the sound level compliance locations for review and approval to the Department.

9. Prior to the commissioning of the facility, the sound level compliance locations shall be fully operational.

10. The applicant shall implement the sound level complaint response protocol outlined in Finding 5, including collecting data at permanently established compliance monitoring locations, 24 hours a day, 7 days per week during all periods when the facility is in operation, beginning on the first day of operation and continuing until the decommissioning of the facility. The applicant shall set up a toll free complaint hotline designed to allow concerned citizens to call in a noise complaint 24 hours a day, 7 days per week. The hotline number shall be clearly noticed to all abutters, posted in locations around the project site and at the Municipal Offices. When a complaint is received, the applicant shall collect the complainant information and recorded sound, meteorological and operational data from the appropriate compliance monitoring location and within 48 hours, submit that information to the Department. The applicant shall be responsible to reimburse the Department for all costs incurred by the Department in the review of any noise related complaint. If the Department finds that the project is not in compliance with this Order, the applicant shall take short term action immediately to adjust operations to reduce sound output to acceptable levels under Chapter 375 (10). Within 60 days of a determination of non-compliance by the Department, the applicant shall submit, for review and approval, a compliance plan that proposes actions to bring the project into compliance at all the protected locations surrounding the development.

11. The applicant shall submit sound level monitoring reports in accordance with the post-construction monitoring program described in Finding 5. If the Department finds that the project is not in compliance with this Order, the applicant shall take short term action immediately to adjust operations to reduce sound output to acceptable levels under Chapter 375 (10). Within 60 days of a determination of non-compliance by the Department, the applicant shall submit, for review and approval, a compliance plan that proposes actions to bring the project into compliance at all the protected locations surrounding the development.

12. Prior to operation of the project, the applicant shall submit a finalized post-construction avian, bat, and raptor post-construction monitoring protocol to the Department for review and approval.

13. The applicant shall permanently protect a 250-foot undisturbed buffer on both sides of two streams (OS93 and AS69) supporting northern spring salamanders and located within the conservation easement area, except for the intrusion associated with the access road and O&M building on stream OS93. Forestry shall be limited in these 250-foot buffers as follows: a no-cut and no-disturbance zone within 25 feet of the streams, and limited cutting within 25 to 250 feet of the streams, maintaining at least 60-70% canopy cover in these areas. To further protect the northern spring salamanders, the applicant shall restore an existing gravel parking area and actively revegetate the laydown area adjacent to the O&M building.

14. The applicant shall perform post-construction avian, bat and raptor monitoring at all ten turbine locations in accordance with a plan approved by MDIFW.

15. All in-stream work shall be conducted between July 15 and October 1.

16. The applicant shall comply with the post-construction VMP last revised July 23, 2010.

17. The applicant shall not use herbicides to maintain vegetation within 250 feet of the two streams (labeled TS18 and TS12 on the plans) and located within the 100 foot wide transmission line right-of-way. The 250 foot no-herbicide zone must be marked on the ground within the transmission line right-of-way with signs clearly prohibiting the use of herbicides in this area.

18. The applicant shall retain the services of a third-party inspector in accordance with the Special Condition for Third-Party Inspection Program, which is attached to this Order.

19. Prior to the start of construction, the applicant shall conduct a pre-construction meeting. This meeting shall be attended by the applicant's representative, Department staff, the design engineer, the contractor, and the third-party inspector.

20. Prior to the start of operation, the applicant shall execute and record all required deed restrictions and the 1,000 acre conservation easement with the Registry of Deeds, including the appropriate buffer (stormwater and stream) deed restrictions, the 250-foot buffer for northern spring salamanders all with attached plot plans, drawn to scale.

21. Prior to the start of construction, the location of all buffers (including natural resource buffers and stormwater buffers) shall be clearly marked in the field using durable signs and/or flagging that is visible to construction personnel. The location of protective buffers shall be marked on construction drawings and restrictions within these buffers shall be explained during the pre-construction meeting with the contractor. The applicant's environmental inspector will be responsible for ensuring signs are maintained and visible to construction personnel during the construction phase of the project. Locations of protective buffers will be permanently marked on the ground following the construction phase of the project.

22. The applicant shall submit a pre-blast survey identifying any structures and wells within 2,000 feet of any blasting area, including all water quality data, water yield data or any other data related to water supply wells, to the Department prior to any blasting on the project site for review and approval.

23. The applicant shall hire an engineer to inspect the construction and stabilization of the road ditch turnouts and buffer treatment berm. The applicant shall submit the inspecting engineer's report and notify the Department within 14 days of completion of the turnouts and treatment berm.

24. Within 60 days of the installation of the well and wastewater disposal field, the applicant shall submit a site drawing showing the location of both the O&M building well and the wastewater disposal field and a statement confirming that they were constructed at the approved location.

25. If a rock crusher is utilized on site, the applicant shall insure that the crusher is licensed by the Department's Bureau of Air Quality and is being operated in accordance with that license.

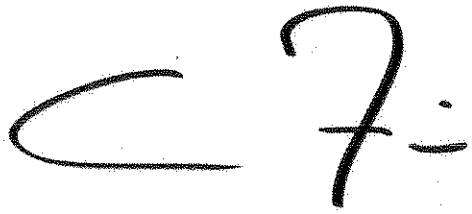
26. The applicant shall make annual payments, in the amount of $20,000, to the Town of Woodstock in accordance with the terms of the Community Benefit Fund.

27. The applicant shall execute the decommissioning plan as described in Finding 24 and the salvage values shall be reassessed every time the decommissioning costs are estimated in accordance with Table 4 of this Department Order.

28. Prior to the start of construction, the applicant shall submit proof of payment of the additional $80,000 tangible benefit to the Town of Woodstock.

THIS APPROVAL DOES NOT CONSTITUTE OR SUBSTITUTE FOR ANY OTHER REQUIRED STATE, FEDERAL OR LOCAL APPROVALS NOR DOES IT VERIFY COMPLIANCE WITH ANY APPLICABLE SHORELAND ZONING ORDINANCES.

DEPARTMENT OF ENVIRONMENTAL PROTECTION



This permit has been digitally signed by Andrew C. Fisk on behalf of Acting Commissioner Beth Nagusky. It is digitally signed pursuant to authority under 10 M.R.S.A. § 9418. It has been filed with the Board of Environmental Protection as of the signature da
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PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES...
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Appendix A

Objections of the Friends of Spruce Mountain to the Draft DEP Order Relating to Spruce Mountain Wind Project
Revised List of Exhibits
(9/20/10) revised (9/22/10)

I. SPECIAL EXHIBITS

1. Affidavit of Michael Nissenbaum, MD

2. Affidavit of Albert Aniel, MD

3. Report of Richard James

4. Notes of DEP Meeting on March 5, 2009

5. Response to FOAA Response (Emails between Dr. Dora Mills and the DEP)

5A. Maine Medical Associates Resolutions

II. ACCOUSTICAL EXHIBITS

6. C.E. Ebbing, "Applied Acoustics Handbook"

7. NASA Hubbard & Shepherd, "Wind Turbine Acoustics" (1990)

8. George W. Kamperman & Richard James, "The How to Guide to Siting Wind Turbines to Prevent Health Risks From Sound" (October 28, 2008)

9. Frank H. Brittain & Marlund E. Hale, "Some Limitations of Ray-Tracing Software for Predicting Community Noise from Industrial Facilities," NOISE-CON, Dearborn, Michigan (July 28-30, 2008)

10. G.P. van den Berg, "Effects of the Wind Profile at Night on Wind Turbine Noise" Journal of Sound and Vibration (2003)

11. G.P. van den Berg "Do Wind Turbines Produce Significant Low Frequency Sound Levels," 11th International meeting on Low Frequency Noise and Vibration and its Control.

12. G.P. van den Berg, "Perspective on Wind Turbine Noise," 19 News Letter of the Acoustical Society of America No. 3 (Summer 2009)

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13. Radek Kochanowski & Neil Mackenzie, "Atmospheric Stability Specific Noise Criteria and Noise Predictions for Wind Farms," Acoustics 2008, Victoria, Australia

14. Clifford Schneider, "Accuracy of Model Predictions and Effects of Atmospheric Stability on Wind Turbine Noise at Maple Ridge Wind Power Facility, Lowville, NY" 2007

15. Geoff Leventhall, "Low Frequency Noise. What We Know, What We do not Know and What We Would Like to Know"

III. HEALTH RELATED EXHIBITS

16. Maine State Planning Office Technical Assistance Bulletin #4 and Model Wind Energy Facility Ordinance August 27, 2009

17. Eja Pedersen and Kerstin Waye, "Perception and Annoyance Due to Wind Turbine Noise – a Dose – Response Relationship," J. Acoust. Soc. Am. 116 (2004)

18. Eja Pedersen and Kerstin Waye, "Wind Turbines-Low Level Noise Sources Interfering With Restoration?" Environmental Res. Lett. 3 (2008)

19. Eja Petersen, Frits van de Berg, Roel Bakker & Jelte Bouma, "Response to Noise from Modern Wind Farms in Netherlands," J Acoust. Soc. Am 126 (2), August 2009

20. Eja Pedersen, Kerstin Waye, "Wind Turbine Noise, Annoyance and Self-Reported Health and Well Being in Different Living Environments," Occupational Environmental Medicine (2007)

21. Eja Pedersen, "Effects of Wind Turbine Noise on Humans," Third International Meeting on Wind Turbine, Aalborg, Denmark 17-19 June 2009

22. Frits van de Berg, Eja Pedersen, Jelte Bouma and Roel Bakker "WINDFARM Perception, Visual and Acoustic Impacts of Wind Turbine Farms on Residents," June 3, 2008

23. Nina Pierpont, MD Wind Turbine Syndrome (excerpts)

24. Kerstin Waye, "Perception and Environmental Impact of Wind Turbine Noise" Inter-Noise 2009 (August 23-26 2009 Ottawa Canada)

25. Keith Sterling and Carmen Krogh, "Summary of Recent Research on Adverse Health Effects of Wind Turbines" 20 October 2009

26. World Health Organization, "Night Noise Guidelines for Europe" (2009)

27. World Health Organization, "Guidelines for Community Noise" (1999)

28. Dr. Christopher Hanning, "Wind Turbine Noise, Sleep and Health," April 2010

29. Brett Horner, et al, "Wind Energy Industry Acknowledgement of Adverse Health Effects," prepared by the Society for Wind Vigilance (January 2010)

IV. EXHIBITS RELATED TO VINALHAVEN

30. Fox Island Wind Power Project Sound Assessment, May 2009

31. September 9, 2010 Emails from Becky Blais to George Baker, et al.

V. EXHIBITS RELATED TO DECOMMISSIONING

32. Excerpts from Vermont Public Service Commission Order, *In re Deerfield Wind*, Dkt. No 7250, April 16, 2009

Appendix B

Submissions from Spruce Mountain Wind LLC and Friends of Spruce Mountain
September 30, 2010

Friends of Spruce Mountain

1. E-Coustic Solutions "Comments on Oakfield Wind Project" January 7, 2010

2. Email correspondence from R. Brown to Rick James dated January 7, 2010

Spruce Mountain Wind LLC

3. Letter from Tetra Tech EC Inc., to Dawn Hallowell "Spruce Mountian Wind Project, DEP#L-24838-24-A-N, #L-24838-2G-B-N Technical Response to Comments from the Friends of Spruce Mountain – Exhibit #3" September 30, 2010

4. Letter from Verrill Dana to Dawn Hallowell "Spruce Mountain Wind Project, DEP #L-24838-24-A-N, #L-24838-2G-B-N" dated September 30, 2010

5. Exhibit A "Response to FOSM Claims Regarding Sound Monitoring Results at Fox Island Wind Project"

6. W.David Colby, M.D., Robert Dobie, M.D., Geoff Leventhall, Ph.D., David M. Lipscomb, Ph.D., Robert J. McCunney, M.D., Michael T. Seilo, PH.D., Bo Søndergaard, M.SC. "Wind Turbine Sound and Health Effects An Expert Panel Review" December 2009

7. Chief Medical Officer of health (CMOH) Report "The Potential Health Impact of Wind Turbines" May 2010

8. The Springfield-Sangamon County Regional Planning Commission "The Effects of Wind Turbine Sound on Health" January 6, 2010