VERMONT

State of Vermont
Department of Public Service
112 State Street
Drawer 20
Montpelier, VT 05620-2601
http://www.publicservice.vermont.gov

[phone] 802-828-3167
[fax] 802-828-2342
[tty] 800-734-8390

April 4, 2011

Mrs. Susan M. Hudson, Clerk
Vermont Public Service Board
112 State Street – 4th Floor
Montpelier, Vermont 05620

Re: Docket No. 7628

Dear Mrs. Hudson:

Enclosed for filing with the Public Service Board are an original and six copies of the reply brief of the Department of Public Service (DPS).

Sincerely,

John Beling

cc: Service list

STATE OF VERMONT
PUBLIC SERVICE BOARD

Docket No. 7628

Joint Petition of Green Mountain Power Corporation, Vermont Electric Cooperative, Inc. and Vermont Electric Power Company, Inc. for a Certificate of Public Good pursuant to 30 V.S.A. § 248, to construct up to a 63 MW wind electric generation facility and associated facilities on Lowell Mountain in Lowell, Vermont and installation or upgrade of approximately 16.9 miles of transmission line and associated substations in Lowell, Westfield and Jay, Vermont.

REPLY BRIEF OF THE VERMONT DEPARTMENT OF PUBLIC SERVICE

April 4, 2011

TABLE OF CONTENTS

I. INTRODUCTION

In its initial brief ("DPS Brief") filed March 21, 2011, the Department of Public Service ("DPS" or the "Department") set forth its analysis of the 30 V.S.A. § 248 criteria which are at issue in this proceeding. Fundamentally, the Department supports approval of the Project, with conditions.

In this brief, the Department addresses an issue raised by a number of intervenors which is also the subject of a post-CPG inquiry by the Board in the *Georgia Mountain Community Wind* ("*Georgia Mountain*") case – safety setbacks from property lines.[1] The Department believes that the Board should adopt a property line setback of 1.1 times the total height of the tower[2] from property lines, but that site-specific, risk-based setbacks should be permitted where the developer cannot meet that standard.

In addition, the Department responds to the Petitioners' arguments regarding the Obstacle Collision Avoidance System ("OCAS"). The Department recognizes that approval of the system is not guaranteed, and believes that the Petitioners should have the opportunity to present an alternative lighting mitigation plan, subject to Department review and Board approval, if they fail to obtain FAA approval for the OCAS.

II. THE BOARD SHOULD IMPOSE A RISK-BASED SETBACK REQUIREMENT

A. *Georgia Mountain*

In its Final Order in *Georgia Mountain*, the Board stated:

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[1] A number of intervenors have also proposed setbacks for noise-related impacts. The Department believes that the Board's noise standards are sufficiently protective of public health and that noise-related setbacks are not necessary. In addition, safety setbacks from occupied structures and/or high use areas are not at issue in this docket and are not addressed in this brief.

[2] Measured when the rotor blade is extended vertically from the tower at its highest point height.

> [T]he testimony presented by [Petitioner] indicates that ice throw could impact neighboring landowners and that turbine collapse, while rare, can occur. Accordingly, a wind turbine with its base set as close as one rotor radius from the property line of an adjoining property owner has the potential to impact that owner. Furthermore, while the Board may impose conditions on [Petitioner] to prevent public safety risks on its property, the Board does not have the authority to impose similar conditions (for example, signs to warn snowmobilers of potential ice throw) on adjoining landowners. For this reason, we conclude that a condition requiring [Petitioner] to place the turbines a reasonable distance away from a property line is appropriate to mitigate potential public safety risks associated with ice throw and collapse. Further, we note that other state and local public agencies have addressed potential public health and safety impacts of wind turbines by establishing setbacks based on the size of the turbine, including the blades.

In re Georgia Mountain Community Wind, Dkt.7508, Order dated 6/11/2011 at 32-33.

As examples, the Board cited wind turbine setback requirements from Monterey California (two times the total height of the turbine from any property line, five times its height from the right-of-way line of any public road, and one and one quarter times its height from any habitable structure) and Cohocton, New York (setback for non-industrial turbines from property lines 1.5 times height; industrial height plus 100 feet from property lines, roads, and power lines, and must also be at least 1,500 feet removed from any residences or areas normally used by the public). *Id.* at 33, n.36.

In the post-CPG hearing, an intervenor presented testimony demonstrating that setback requirements generally range from 1.1 to 1.5 times the total height of the turbine, which is defined as the total height of the tower when the rotor blade is extended vertically from the tower at its highest point. *See* Prefiled Testimony of Scott McClane dated January 12, 2011 ("McClane pf.") in *Georgia Mountain*. The Department has reviewed Mr. McClane's testimony and exhibits and agrees that this is the general range for wind turbine setbacks, though it notes that there are jurisdictions with far shorter setback requirements. *See* Supplemental Prefiled Testimony of John L. Zimmerman dated November 22, 2010 ("Zimmerman pf.") in *Georgia Mountain* at 14.

In *Georgia Mountain*, the Petitioner has urged the Board to use a "science-based risk analysis" in determining the appropriate setback for that project. Zimmerman pf. at 2-3. The Petitioner relies principally on the analysis performed by its consulting engineer on the risks of ice throw and ice drop. *See* Prefiled Testimony of Marc LeBlanc dated November 22, 2010 ("LeBlanc pf.") in *Georgia Mountain*; Pet. Exh. ML-2.

In addition to the testimony and exhibits presented, the Board is also considering a technical document entitled "Technical Documentation – Wind Turbine Generator Systems – All Onshore Turbine Types," General Electric Energy, 2010. *See Georgia Mountain*, Exh. Board-1. This document contains a section entitled "Setback Considerations," which includes a table with recommended setback distances and which identifies "objects of concern within the setback distance." *Id.* at 6. The recommended setback distances range from 1.1 times blade length where icing is not present and no occupied structures are present to 1.5 times hub height plus rotor diameter where icing conditions are present. *Id.* The document further provides that if developers cannot meet the recommended guidelines, they should contact General Electric so that GE can perform a detailed safety review based upon a variety of site-specific factors. *Id.* at 6 - 7.

B. Consideration of Risk-Based Setbacks in Other States

The California Energy Commission has examined the issue of wind turbine setbacks based upon public safety concerns. *See* Larwood, Scott, and van Dam, C. P. (California Wind Energy Collaborative). 2006, *Permitting Setback Requirements for Wind Turbines in California.* California Energy Commission, PIER Renewable Energy Technologies. CEC - 500 - 2005 - 184. http://www.energy.ca.gov/2005publications/CEC-500-2005-184/CEC-500-2005-184.PDF ("CEC Report"). In the CEC Report, the authors reached the following

conclusions:

> Wind turbine setbacks vary by county. The counties typically base the setback on the maximum of a fixed distance or a multiple of the overall turbine height. A common setback is three times the overall turbine height from a property line.
>
> There is no evidence that setbacks were based on formal analysis of the rotor fragment hazard.
>
> The most comprehensive study of wind turbine rotor failures places the risk of failure at approximately 1 - in - 1000 turbines per year.
>
> The maximum range of a rotor fragment is highly dependent on the release velocity that is related to the blade tip speed. Tip speed tends to remain constant with turbine size; therefore, the maximum range will tend to remain constant with turbine size. In the analysis of rotor fragment trajectories, the most comprehensive models yielded results that showed the shortcomings of simpler methods. Overall, the literature shows the possibility of setbacks for larger turbines may be based on a fixed distance and not the overall height.

CEC Report at 2.

> The study contained the following recommendation:
>
> [A] comprehensive model of the rotor fragment hazard [should] be developed based on the results of the literature review. This tool would then be used with a variety of turbine sizes with the objective to develop risk - based setback standards.

Id.

Notwithstanding the above recommendation, there is no indication that California has undertaken this study.

Closer to home, Rhode Island and Massachusetts have also considered basing setbacks on risk-based analysis. The Rhode Island Department of Environmental Management ("RIDEM") cited the California study and concluded that:

> Until a scientific risk based standard is developed, DEM should consider a siting-criteria for placement of a wind turbine near property lines, permanent residential structures, roads and trails that would be 1.5 times the hub height plus the rotor radius.

Rhode Island Department of Environmental Management, 2009, *Terrestrial Wind Turbine Siting*

Report, http://www.dem.ri.gov/cleannrg/pdf/terrwind.pdf ("RIDEM Report") .

The Massachusetts Department of Energy Resources ("DOER") has drafted model bylaws for the siting of wind turbines. The proposed setback requirements in these models vary according to the type of bylaw at issue. For zoning which permits conditional use of wind energy facilities, DOER proposes setbacks for large wind turbines at:

> a distance equal to 3 times the overall blade tip height of the wind turbine from the nearest existing residential or commercial structure and the overall blade tip height from the nearest property line and private or public way.
>
> . . .
>
> The special permit granting authority may reduce the minimum setback distance as appropriate based on site-specific considerations, or written consent of the affected abutter(s), if the project satisfies all other criteria for the granting of a special permit under the provisions of this section.

Massachusetts Department of Environmental Resources, 2009, *Model Amendment to a Zoning Ordinance or By-law: Allowing Conditional Use of Wind Energy Facilities*, http://www.mass.gov/Eoeea/docs/doer/gca/wind-not-by-right-bylaw-May08-2009.pdf ("DOER Conditional Use Bylaw") at 10.

Where zoning allows for wind energy facilities as of right, DOER's model proposes setbacks for large wind turbines at:

> (a) a distance equal to the height of the wind turbine from buildings, critical infrastructure, or private or public ways that are not part of the wind energy facility; (b) three times (3x) the height of the turbine from the nearest existing residential structure; or (c) one point five times (1.5x) the height of the turbine from the nearest property line.
> . . .
>
> The Site Plan Review Authority may reduce the minimum setback distance as appropriate based on site-specific considerations, or written consent of the affected abutter(s), if the project satisfies all other criteria for the granting of a building permit under the provisions of this section.

Massachusetts Department of Environmental Resources, 2009, *Model Amendment to a Zoning*

Ordinance or By-law: Allowing Use of Wind Energy Facilities,

http://www.mass.gov/Eoeea/docs/doer/green_communities/grant_program/model_wind_bylaw.pdf ("DOER As of Right Bylaw") at 10.

Finally, currently pending before the Massachusetts Legislature is H. 01755, An Act Relative to Comprehensive Siting Reform for Land Based Wind Projects, http://www.malegislature.gov/Bills/187/House/H01775 ("Massachusetts Wind Bill"). In this legislation, Massachusetts is contemplating statewide siting requirements for wind turbines. The legislation assigns to the Energy Facilities Siting Board ("EFSB") the responsibility to promulgate rules and regulations governing siting criteria, including setbacks. *See* Massachusetts Wind Bill at § 69U. The bill provides:

> The standards may vary from region to region to take into account material differences in the natural resources, available wind resources or other characteristics of regions; provided, however, that all applicable standards shall be at least as protective as existing state environmental statutes and regulations. The standards shall be: (i) based upon best available science; (ii) drafted in consultation with the relevant agencies and the advisory group established in subsection (c); and (iii) reviewed and updated as necessary; provided, however, that the standards shall be updated every 5 years.

Id. at § 69U(b).

Therefore, while the majority of local setback requirements in other states appear to be in the 1.1 to 1.5 times tower height range, there is a trend towards considering site-specific conditions in determining appropriate setbacks where height-based standards cannot be met. If the Massachusetts Wind Bill passes, the EFSB will initiate rulemaking which will set up uniform rules for future projects based upon scientific and other evidence. This will provide more certainty and enable both developers and communities a clearer understanding of where wind projects can be sited.

C. Evidence Regarding Risk in this Docket

Petitioners presented the testimony of Marc LeBlanc regarding the risks of ice throw, ice drop and turbine failure.

i. Ice throw

As discussed in its initial brief, the Department believes that with appropriate mitigation, the probability of an ice fragment landing in any particular square meter of ground beyond 60 meters (approximately 197 feet) is once in 65,000 years. Based on an assumed 25 days of icing, the probability of an ice fragment striking a stationary person located at 60 meters and present for all icing events is once in 10 years. Exh. Pet.-ML-3.

ii. Blade failure/Turbine failure

Mr. LeBlanc also testified and prepared a report entailing a literature review of information pertaining to blade failure and turbine failure. LeBlanc reb. at 3-4; Exh. Pet.-ML-4. Mr. LeBlanc concluded that the risk of blade failure is remote, and with modern turbines the blade will likely remain attached to the turbine. LeBlanc reb. at 4. In his report, he cites a study based upon conservative assumptions that concluded that that the risk of an individual being struck by a modern turbine failure at a distance of 150 meters is 1 in 1,000,000. Pet.-ML-4.

D. Recommendation

While the majority of local setback requirements for property lines are based upon the height of the turbine, regardless of site-specific conditions, the recent trend is towards setting a height-based requirement as a baseline, but looking at site-specific conditions if the height-based requirements cannot be met. The Department believes that a basic setback standard of 1.1 times the total height of the tower when the rotor blade is extended vertically from the tower at its highest point height from property lines would be reasonable, but that site-specific, risk-based

setbacks should be permitted where the developer cannot meet that standard.[3]

Here, it appears that several of the turbines are closer to adjoining property lines than the 1.1 times height standard. Therefore, the Board should examine the risk-based evidence to see if a shorter setback is justified.

Based upon the risk-based evidence, the Department believes that a setback requirement of 60 meters is sufficiently protective, primarily based upon the risk of ice throw. Given the low probability of blade or turbine failure and the remote nature of the terrain abutting the Project, the Department does not believe any additional setback distance is warranted in this matter to protect against those risks.

The Department recommends the Board impose the following condition if it issues a CPG for the Project:

> There shall be a setback distance of at least 60 meters from the nearest property line, measured from the base of the wind turbine(s).

III. LIGHTING MITIGATION

In its initial brief, the Department recommended imposition of a condition requiring the installation of the OCAS prior to operation. DPS Brief at 26. In their initial brief, Petitioners point out that the OCAS constitutes reasonable mitigation under the *Quechee* analysis, such that it must be pursued, although it may not be obtained. Initial Brief of Petitioners at 3. The Department recognizes that the FAA may not approve the OCAS, such that conditioning approval of the CPG on the installation of the OCAS prior to operation is not consistent with the *Quechee* test.

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[3] Where occupied dwellings or more populated areas are at issue, strict height-based standards may be appropriate, though that is not an issue in this docket. The Board should consider scheduling a workshop to determine whether a rulemaking designed to establish standards for all projects going forward may be the appropriate forum to consider this and other siting issues for wind turbines.

In place of the OCAS condition proposed in its initial brief, the Department recommends that the Board impose the following condition if it issues a CPG for the Project:

> Petitioners shall apply for and take all reasonable steps to obtain approval of the OCAS, and shall install the OCAS promptly should it obtain approval.
>
> If Petitioners are unable to obtain approval of the OCAS, they shall submit for review by the Department and approval by the Board an alternative Lighting Mitigation Plan, within 3 months of notification of disapproval of the OCAS.

CONCLUSION

The Department recommends approval of the Project as set forth above, in its initial brief and subject to the conditions set forth in its initial brief and in this brief.

Dated at Montpelier, Vermont, this 4th day of April, 2011.

VERMONT DEPARTMENT OF PUBLIC SERVICE

By: 

John Beling, Special Counsel

cc: Service list