STATE OF VERMONT
PUBLIC SERVICE BOARD

Docket No. _____

Petition of UPC Vermont Wind, LLC for a Certificate of	)
Public Good pursuant to 30 V.S.A. section 248,	)
authorizing it to construct up to a 52 MW wind electric	)
generation facility, and associated transmission and	)
interconnection facilities, in Sheffield and Sutton, Vermont,	)
and operate the same.	)

PREFILED DIRECT TESTIMONY OF DAVID RAPHAEL

ON BEHALF OF UPC VERMONT WIND, LLC

February 21, 2006

Summary:

Mr. Raphael discusses his aesthetic assessment of the Sheffield Wind Farm and includes an assessment of the visual impacts that may affect historic resources. He concludes that the Project's aesthetic impact is not unduly adverse under the Quechee analysis and that the Project will not cause undue adverse impacts on historic resources.

Q. Please state your name and business address.

Response. My name is David Raphael and I am the Principal of LandWorks, located at 211 Maple Street, MW 26, Middlebury, Vermont.

Q. What is the purpose of your testimony?

Response. The purpose of my testimony and the accompanying report and attachments is to provide an aesthetic assessment of the Sheffield Wind Farm as proposed by UPC Vermont Wind, LLC. Also included in this review is an assessment of the visual impacts that may affect historic resources, with reference to the report submitted by Ms. Liz Pritchett which addresses historic resources in a comprehensive manner. I express my opinion that the Project will not result in undue adverse impacts on scenic or historic resources.

Q. Please describe your qualifications.

Response. I have professional training in visual and aesthetic assessment that began with my studies at Harvard University's Graduate School of Design, where I obtained a Masters degree in Landscape Architecture (M.L.A.). I began my career as a landscape architect and planner working for the State of Massachusetts Department of Environmental Management. Since 1986, I have been the Principal and owner of LandWorks, a multidisciplinary planning, design and communications firm based in Middlebury, Vermont. LandWorks serves both public and private sector clients in Vermont and the Northeast. Our areas of expertise include visual, aesthetic and environmental assessment, site and master planning, graphic

communications and GIS mapping, permit planning, participatory and community planning, downtown revitalization, open space and conservation planning, zoning ordinance and design review development, landscape architecture and environmental design. At LandWorks, we have worked as advocates for communities, appellants, the State of Vermont and private corporations.

I personally have presented and served as an expert witness before most of the District Commissions in the State and the Environmental Board, as well as the Public Service Board. LandWorks has extensive experience with regard to visual assessment and environmental impact, Criterion 8 of Act 250, and the design and installation of utility facilities and towers. We have been consultants in this capacity for the Vermont Department of Public Service. We have evaluated the aesthetic and environmental impact of transmission lines and corridors (throughout the state of Vermont); transmission towers (throughout the state of Vermont and the PV20 line removal along the Route 2 causeway in Milton/South Hero); proposed telecommunication facilities (Coy Mountain tower proposal) and wind power turbines (Searsburg Wind Farm Project, developed by Green Mountain Power Corp.). We have prepared feasibility studies for wind power siting for the Lamoille County Development Commission.

I have served as a member of the Design Issues Study Committee appointed by the Secretary of the Agency of Natural Resources, an initiative which clarified the application of the Quechee Analysis for aesthetics and which resulted in the publication of *Vermont's Scenic Landscapes: A Guide for Growth and Protection.* In addition, we have prepared zoning ordinances based on scenery preservation and

environmental protection guidelines (Town of Stowe Scenic Hillside and Overlay District), prepared scenic highway corridor studies (Interstate 91 in Brattleboro) and authored a study and state policy which was adopted for permit review of the night lighting of ski areas (Agency of Natural Resources). In addition, we are currently involved with the VELCO Northwest Reliability Project, PSB Docket No. 6860, as well as the Lamoille County Project, PSB Docket 7032. We are working as consultants for the Vermont Department of Public Service in developing testimony, exhibits and post-certification documents. I am also on the faculty of the Rubenstein School of Environment and Natural Resources at the University of Vermont, where I teach courses that include landscape architecture, environmental aesthetics, community design and recreational planning. My resume is attached as ***Exhibit UPC-DR-1***.

Q. Have you ever testified before the Public Service Board before?

Response. Yes. I testified before the Board for the Searsburg Wind Farm Project, The VELCO PV 20 project and most recently, the Northwest Reliability Project and the Lamoille County Project.

Q. Please describe what you did, or what was done under your supervision, in connection with your analysis of the Sheffield Wind Farm.

Response. We reviewed all aspects of the Project proposal as provided by UPC Vermont Wind, and I personally spent several days in the project environs, project site and surrounding region evaluating the project layout and visibility. We developed

an extensive photographic inventory that includes photos taken by me personally as well as by several of my staff members. Under my supervision, computerized viewshed analyses were prepared and field observations notated, including the Project's visibility from a range of public viewing locations and public roads. Visual simulations of what the proposed wind farm would look like from selected locations were prepared under my supervision. I analyzed available town and regional planning documents, as well as principles and draft policies for wind farm siting. I researched aspects of the recreational, physiographic and cultural qualities of the Project environs and the region. I also researched various aspects of wind turbine and wind farm technology, including siting. I worked with Liz Pritchett to evaluate the potential aesthetic impacts to historic resources in the region. My report, which contains my analysis in detail and supporting materials, is attached as ***Exhibit UPC-DR-2***.

Q. In your opinion, will the Project result in an undue adverse effect on aesthetics?

Response. In my opinion, the Project will not result in an undue adverse effect on aesthetics.

Q. Please explain the basis for your opinion.

Response. My opinion is based on the so-called Quechee test, which the Board uses to inform its decision as to whether a project will have an undue adverse effect on aesthetics. The Board is not bound by the Quechee analysis, and need only give it

due consideration in reaching its own determination of whether aesthetic impacts will be adverse, or if adverse, whether they will be unduly adverse. The Quechee test is the established method for organizing one's analysis of the aesthetic impacts of any project on the Vermont landscape. It is important to note, however, as a professional who has spent a career studying the Vermont landscape and reviewing or planning for projects within that landscape, I have come to the conclusion that the Quechee test, as traditionally applied, is insufficient to the task of analyzing the aesthetic impacts of a wind farm. I will discuss this later in my testimony. However, in reaching my opinion, and recognizing that the Board uses Quechee in its current iteration, I conducted a "traditional" Quechee analysis and concluded that the aesthetic impacts of the Project would be adverse but not unduly adverse. If the Quechee analysis were modified to more realistically reflect the way in which the Vermont landscape changes over time, I would conclude that the aesthetic impacts of the Project are not adverse.

Q. Please explain your Quechee analysis.

Response. I began by performing step 1 of the Quechee analysis, which considers a number of factors in determining whether the Project, as proposed, will result in an adverse impact on aesthetics. The analysis is presented in detail in my report, but in summary, I described the Project and the nature of the Project's surroundings, I considered the compatibility of the Project's design with its environs, I discussed the color and materials of the Project and their suitability within the Project's context, I considered the impact of the Project on open space, and I analyzed comprehensively

the visibility of the Project and the nature of that visibility, from moving cars, or stationary viewing points that are frequented by the public. All of these factors are favorable for the Project, as more fully explained in my report. However, I would like to highlight two of them here.

First, because of the nature of the landscape surrounding the site, the visibility of the Project is remarkably low. The low visibility of the Project is shown on our Potential Viewshed Map, ***Exhibit UPC-DR-3***. The Project is well situated within a portion of the Northeast Kingdom landscape that lacks extreme topographic diversity and is characterized by extensively forested areas with relatively limited local topographic variations. For example, if we take a sampling of mountains or hills which are in the vicinity of the Project, including those which will host turbines, the average elevational change from the base to the summit is 773 ft. for named features including Norris Mountain, Libby Hill, Granby Mountain, Hardscrabble Mountain, Frost Mountain, Grout Mountain and Grays Mountain. This is hardly a dramatic or pronounced vertical difference and none of these mountains or hill tops are particularly **prominent** or **dominant**, which is relevant in assessing scenic quality and impact. Only 6% of the total mountains, ridges and hilltops within a ten-mile radius of the Project are proposed for the wind turbine locations. The proposed wind farm sites are neither focal points for the region nor identified or considered outstanding scenic or recreational assets, according to local and regional plans. Therefore, although this area is an attractive Vermont landscape, like many other places in the State, it does not rise to the level of having outstanding or unique visual or scenic qualities. These characteristics, coupled with the alignment

and orientation of roads, as well as the location of many of the villages within valley areas or draws (Sheffield, Lyndon, West Burke, Barton, Wheelock) combine to limit extensive or prolonged views of the Project site. The composite potential viewshed of the turbines represents only **3%** of the total viewshed area within a ten-mile radius of the Project, and of approximately 793 miles of roadways within the ten-mile radius, only 52 miles, or 6%, have a potential view of the wind farm as proposed. Visual simulations of the Project from selected view points are presented in ***Exhibit UPC-DR-4***; an analysis of the visibility of the Project from roadways in the area is presented in ***Exhibit UPC-DR-5***. Thus, overall, and given the siting on high points and ridges in Sheffield and Sutton, this Project has extremely low visibility.

Second, the Project fits well within the pattern of landforms and traditional land uses in the area. The acreage surrounding the parcel has been heavily used over a long period of time. It is a working landscape. Figure 11, in section III.A.2 of ***Exhibit UPC-DR-2***, is an aerial photograph of the site and its surrounding acreage that shows how heavily the site has been used over time, including roads, clearings and other infrastructure elements that exist. The Project is well sited to fit the form of the contours, and also to make best use of existing roads and clearings. This reinforces its compatibility with traditional uses and ongoing logging activity in this area. The proximity of the VELCO 115 kV line right through the heart of the Project is also an important factor, both because it shows the parcel is already being used in connection with the State's electrical system, and because its presence minimizes transmission corridor impacts for the Project itself.

The only issue that remains under step 1 of Quechee, in my mind, is the question of whether the Project is in harmony with the land around it, which traditionally has relied to a great extent on whether or not the Project fits visually with its surroundings, or is visually similar to those surroundings. In order to function in Vermont, utility scale wind turbines need to be on ridges, above the treeline, and they need to be of a scale and design to function efficiently and effectively in producing utility scale energy for widespread distribution through the electrical grid. There are few if any architectural or land use patterns which are visually similar to or conform with the scale and pattern necessary for a productive wind farm. Thus, under traditional Quechee thinking, it must be concluded that large-scale wind turbines pose a change from existing conditions, are not visually the same as the surroundings, will place an element in the landscape that is different than or contrary to one's expectations, and therefore will result in an adverse effect on aesthetics.

On a conceptual level, however, we can see the evolution of the small-scale wind mill, traditional to the Vermont landscape and farmstead, to the utility scale wind turbine, just as small-scale, water-powered grist mills evolved to small and even large-scale hydroelectric facilities. We can also see the consistency of harnessing natural resources to produce energy, whether it is water or wind. But the utility scale wind farm has only had limited applications in Vermont, historically on Grandpa's Knob and on Little Equinox Mountain, and most recently in Searsburg. Thus, the landscape pattern of large-scale wind turbines has not yet been well established, even though it appears it is an appropriate one given the State's history and the presence

of the wind resource. Just as we have harnessed water through small and large-scale hydroelectric utilities, and wood through small and large-scale logging operations and even power plants such as the McNeil Generating facility in Burlington, utility-scale wind farms are in their infancy in Vermont and only visible currently in one location, Searsburg.

Although this evolution of the Vermont landscape could be considered the "context" for purposes of determining whether a project "fits" under step 1 of the Quechee analysis, applying the traditional Quechee concept of "visual sameness" to determine "fit", I must conclude that the Project does not fit and therefore will result in an adverse impact on aesthetics.

Q. You mentioned earlier that you believe step 1 of the Quechee analysis should be broadened for purposes of reviewing wind farms. Why do you believe that?

Response. I believe that because Quechee doesn't take into account the following considerations:

First, the unique characteristics that a wind farm or wind turbine itself possesses. For example, one key analysis conducted under Quechee has to do with how visible the project is and the nature of the project's visibility. Most applications for projects analyzed under Quechee spend a good deal of effort to address visibility and how effectively the project will be screened from visibility. This makes sense for many projects. However, you cannot screen a utility scale wind turbine or wind farm – turbines have to be "up" in the air, above the treeline, in high elevation locations, to effectively access the wind resource. Also, Quechee's focus on harmony and

visual "sameness" to determine whether or not a project fits within a landscape may be appropriate for projects with precedents in the landscape, but the very characteristics of a turbine or a wind farm preclude it from having visual sameness with its surroundings. As a result, we must redefine our understanding of harmony in terms of both the physical and cultural context of a project, and how those contexts have changed over time. Quechee does not readily address this issue.

Another issue with regard to the Quechee test is the fact that the Quechee decision was in response to one project, in one location, at one point in time. The Vermont landscape is evolving, and our acceptance of what is aesthetically appropriate and not "shocking or offensive" has evolved over time. Quechee does not account for our changing values and our acceptance of visual impacts consistent with those changing values. If, for example, ski areas were to be developed in Vermont today for the first time, it is very likely that Vermonters would react negatively to clear cut ribbons of trails on unbroken, seemingly pristine high mountain slopes, and find them shocking and offensive. However, over time, skiing has become identified with Vermont and is now part of our culture, and thus we can celebrate the visual impacts that ski areas create without a hint of controversy. The cover of the Winter 2005-6 *Vermont Life* demonstrates this as it features the Sugarbush Ski Area (***Exhibit UPC-DR-2***, section I.C.4, Figure 8, shows the cover photo.). If the Quechee test were modified to include these considerations, then I would conclude that the Project will not have even an adverse impact on aesthetics.

Q. Assuming the aesthetic impact is adverse, is it unduly adverse under the second step of the Quechee analysis?

Response. No, it is not. My detailed analysis of the issues under step 2 of Quechee is presented in my report, but I will summarize the main points here.

First, the Project does not violate any clear written community standards intended to preserve the aesthetics or scenic beauty of the area. There is no extant Regional Plan. The Northeast Vermont Development Association's most recent plan has expired and is yet to be readopted. The same is true for the Town of Sheffield which has, at present, no duly adopted town plan or zoning ordinance.

The Town of Sutton does have both a recently adopted town plan and zoning ordinance in effect, but none of the language in that plan constitutes a clear written community standard intended to preserve aesthetics or scenic beauty such that it should be given deference under Quechee step 2, for several reasons. First, the plan's language that articulates the scenic values of ridgelines over 2000 feet in elevation goes on to state, "Therefore, this plan recommends that any development above 2000 feet in elevation not exceed 100 feet in height and strongly discourages the erection of wind towers on lands above 2000 feet." This is not a standard intended to preserve scenic beauty; on the contrary, the language expressly *allows* development "up to 100 feet in height" on ridgelines above 2000 feet. Such development, depending on its nature and scope, could readily alter or greatly impact any perceived scenic qualities. This is a far cry from plan language that bans all development on ridgelines, for the clear purpose of preserving how they look. Some town plans have such language, often implemented by ridgeline zoning. Sutton has

neither. Moreover, the language is abstract and advisory in effect – it "recommends" and "strongly discourages," but is not mandatory, and therefore does not constitute a standard.

Second, although other provisions in the plan speak of scenic resources, there is no systematic basis for understanding these scenic resources and their values. For example, every road in Sutton is referred to as scenic, again with no justification or analysis to support this conclusion. If aesthetic impacts must not affect scenic roads, then it is possible that very little, if any, development can or should occur which would be visible from any road in Sutton. The plan's language is unworkable.

Third, there is inconsistency in language in the plan, specifically among related elements, which undermines the clarity of articulated provisions. Additionally, the zoning bylaw provides no guidance and standards by which to uphold any protections of scenic quality.

Based on these factors, and as explained in my discussion of this component of the Quechee test in my report, I conclude that there is no clear written community standard intended to preserve scenic beauty that is applicable to this project. What seems clear is that opponents on the Planning Commission have singled out this project and reacted to it by inserting language which attempts to ban wind farms (and even residential scale projects which might be sited at 2000 feet), and yet have not based this ban on any clearly defined analysis, assessment or determination of scenic values and the effect that forms of development, other than this specific project, will have on the scenic qualities of the area.

Q. Did you consider whether the Project will offend the sensibilities of the average person?

Response. Yes, and I concluded that it will not.

My report contains a discussion of Vermonters' attitudes toward windfarms. Based on the limited visibility of this Project, and the widespread support that wind turbines and wind farms have garnered among Vermont residents in recent scientific surveys as well as other surveys and forums, and the fact that for every Vermonter who might find wind turbines not pleasing to look at there is certainly an equal number who find turbines and wind farms to be aesthetically pleasing, I conclude that these projects will not offend the sensibilities of the average person. In addition, numerous studies have found that wind turbines, as opposed to cell towers, for example, symbolize environmental sustainability as a source of renewable energy, and therefore are consistent with a philosophy that supports "green" development, and that such development can be beautiful to look at. Indeed, wind turbines in and of themselves are light and "airy", not massive, and often disappear in the background of clouds or inclement weather conditions, a factor in the Northeast Kingdom for over 50% of the days.

Q. Did you consider whether UPC Vermont Wind has taken generally available mitigating steps to improve the harmony of the Project with its surroundings?

Response. Yes, and I concluded that such steps have been taken.

These include siting the turbines in a manner that fits the contours, the shape and direction of the ridgelines and in a manner that takes advantage of both the wind

resource and existing development patterns. The Project is co-located with an existing 115kV VELCO line, eliminating the need for new transmission corridors to serve the Project. The Project takes advantage of existing logging roads and clearings already present on the site, and the wind farm will continue to be compatible with ongoing forestry activities, continuing the tradition of commercial resource use in this region. The turbines will be either white or light grey, and either color will serve to further reduce visibility of the turbines against a cloudy sky. New roads and clearings are being proposed in a manner to minimize the extent of clearing and grading required so that these elements will not be visible from afar or have any appreciable environmental impacts. Public education about the wind farms is being proposed as part of the application. Another key mitigating measure is the commitment to decommission the Project at the end of its useful life and return the site, as much as is possible and practical, to its original condition (unless repowering of the Project is proposed, in which case a new regulatory approval would be required). Taken together, these elements effectively satisfy this third question of the second step of the Quechee test, and I can conclude unequivocally that this Project will not have an undue, adverse effect on the scenic or natural beauty of the area.

Q. Did you reach a conclusion about the impact of the Project on historic resources?

Response. Yes, I concluded that the Project will not cause undue adverse impacts on historic resources. My conclusions are derived, in part, from working with Liz Pritchett, the Historic Preservation expert retained to evaluate historic resources, and

the conclusions of her study. I have based my findings on the fact that out of four identified historic resources or properties, only two have any potential for adverse visual impacts, and none of those impacts rises to the level of being undue. The former Clark Farm/King George Farm (now the King George School) will have limited views of portions of the wind farm, with the closest views between 1.1 and 1.5 miles distant. Depending on one's viewpoint from this complex, between three and eight turbines, or portions of them, will be visible. There are foreground elements which will mitigate these views as well. Most importantly, the orientation of the historic buildings is to the east and southeast, towards Burke Mountain, thus further diminishing the presence of and potential impact from the proposed wind farm. The other critical site is the Crystal Lake State Park. Fifteen of the turbines will be visible at a distance of 5.6 miles. There may be an adverse effect on some visitors from the view of the turbines, but flanking mountainsides and the fact that the focus of activity at the Park is on the beach and the lake de-emphasize the distant view. Additionally, the lake and its environs are part of a developed landscape that includes a lakeshore quarry, a nearby downtown, and industrial and commercial uses along adjacent Route 5, including the presence of a rail line. An educational exhibit, information or signage will inform and educate park visitors about the Project and its purpose. Taken together, these factors will mitigate the overall impact and thus I conclude that the Project will not result in an undue adverse impact to historic resources of Crystal Lake State Park..

Q. Does this conclude your testimony at this time?

Response. Yes it does.