

**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  
DAVE COWAN, SCOTT ROWLAND AND STEVE VAVRIK**

**ON BEHALF OF UPC VERMONT WIND, LLC**

February 21, 2006

Summary:

Mssrs. Cowan, Rowland and Vavrik provide a detailed description of the wind generating project that UPC Vermont Wind is proposing to build and operate. They discuss the wind resources and siting of the Project, construction and operation, and the project's compliance with the criteria of 30 V.S.A. § 248.

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1 **General Background**

2 **Q. Please state your names and positions, relative to this project.**

3 Response.

4 My name is Dave Cowan. I am Vice President of Environmental Affairs for  
5 UPC Wind Management, LLC. My business address is 100 Wells Avenue, Suite 201,  
6 Newton, MA 02459.

7 My name is Scott Rowland. I am Vice President of Engineering and  
8 Construction for UPC Wind Management, LLC. My business address is 100 Wells  
9 Avenue, Suite 201, Newton, MA 02459.

10 My name is Steve Vavrik. I am Vice President of Risk Management for UPC  
11 Wind Management, LLC. My business address is 100 Wells Avenue, Suite 201,  
12 Newton, MA 02459.

13

14 **Q. Please describe your qualifications and experience.**

15 Response.

16 Dave Cowan: My education includes a Bachelor of Science, Wildlife Biology,  
17 SUNY Syracuse College of Environmental Science and Forestry, 1981 and a Masters  
18 of Science, Marine Biology, SUNY Stony Brook, Marine Sciences Research Center,  
19 1985. I have over 20 years' experience in project management, environmental  
20 assessment, regulatory/permitting and mitigation services as a consultant and  
21 employee for major utility, transportation and renewable energy projects in  
22 northeastern and western United States. My wind power experience includes Project  
23 Manager in charge of permitting for the 42 MW Mars Hill Wind Farm in northern

1 Maine in 2003-2004, a project of Evergreen Wind Power, which is an affiliate of  
2 UPC. I also served as Senior Scientist reviewing the environmental impact  
3 assessment of the New England Wind Energy Station permitted in Maine's western  
4 boundary mountains in 1993-1994. Since 2004 I have been overseeing permitting  
5 for several UPC projects including the Kaheawa Pastures Wind Energy facility  
6 (currently under construction in Maui, Hawaii), the Mars Hill Wind Farm in Maine,  
7 the Sheffield Wind Farm in Vermont, the Cohocton Wind Farm in New York, the  
8 Prattsburgh Wind Farm in New York, and several other projects in various stages of  
9 development in the U.S. and Canada. I was the primary author of the Habitat  
10 Conservation Plan for protection of endangered species for UPC's Kaheawa  
11 Pastures project referenced above. This was the first-ever Habitat Conservation Plan  
12 for a wind farm in the United States, and was recently approved by the U.S. Fish and  
13 Wildlife Service and the Hawaii State Department of Forestry and Wildlife. My  
14 resume is attached as *Exhibit UPC-CRV-1*.

15 Scott Rowland: My education includes a Bachelor of Science, Mechanical  
16 Engineering, MIT, 1989 and a Master of Science, Civil Engineering, University of  
17 Texas at Austin, 1992. My experience includes serving as owner and manager of a  
18 private contracting firm in San Antonio, TX and as a Project Manager with Texas  
19 Wind Power Company, a privately held wind power services company based in  
20 Austin, Texas and affiliated with Cielo Wind Power Company. During both  
21 employment tenures, I have participated in multiple wind power projects in Texas  
22 and surrounding states totaling approximately 245 MW. During my employment by  
23 UPC, I have managed engineering activities related to UPC's development portfolio

1 and the construction of UPC's first project in the U.S., the Kaheawa Pastures Wind  
2 Energy facility, a 30 MW project located in Maui, Hawaii that will be completed in  
3 April 2006. My resume is attached as ***Exhibit UPC-CRV-2***.

4 Steve Vavrik: My education includes a bachelor of science and a masters in  
5 Mechanical Engineering from the University of Illinois, a second masters in Public  
6 Affairs from Woodrow Wilson School at Princeton University, and a law degree  
7 from Yale University. I have 10 years of work experience in the energy field,  
8 concentrating on the financial aspects of power production and power sales. My  
9 past work experience includes: GE Capital, where I developed financial models for  
10 equity investments on energy projects, and Enron Europe and Dynegy, where I  
11 structured long term power and fuel purchases and sales. My first wind project was  
12 for PPM Energy in Portland, Oregon, where I was responsible for green tag power  
13 sales of the 198 MW Maple Ridge wind project in New York State. Currently I am  
14 the Vice President of Risk Management for UPC Wind Management, where I am in  
15 charge of all power sales.

16

17 **Q. Have you previously testified before the Public Service Board or in other**  
18 **judicial or administrative proceedings?**

19 Response.

20 Dave Cowan: Not before the Vermont Public Service Board, although I  
21 have testified in other administrative proceedings, including most recently before the  
22 Maine Board of Environmental Protection and the Hawaii Board of Land and  
23 Natural Resources.

1           Scott Rowland: I have not, although I have participated in wind project  
2 permit proceedings concerning UPC's Mars Hill and Kaheawa projects.

3           Steve Vavrik: I have not testified before the Public Service Board.  
4

5 **Q.    What is the purpose of your testimony?**

6           Response. The purpose of our testimony is to provide a detailed description of the  
7 Sheffield Wind Farm that UPC Vermont Wind, LLC is proposing to build and  
8 operate. Our testimony discusses the wind resources and siting of the Project,  
9 construction and operation, commercial basis, and the Project's compliance with the  
10 criteria under Title 30 section 248.  
11

12 **Q.    Please describe the Petitioner.**

13           Response. UPC Vermont Wind is a Delaware limited liability company, with its  
14 principal offices at 100 Wells Avenue, Suite 201, Newton, MA 02459 and with an  
15 office at 107 Eastern Avenue, Suite 10, St. Johnsbury, VT 05819. It was created in  
16 2003 by the principals of UPC Wind Partners, LLC, a Delaware limited liability  
17 company, with its principal offices located in Newton, Massachusetts. UPC Wind  
18 Partners, LLC was formed by principals of the UPC Group (see below) to pursue  
19 wind farm Projects in the United States. Through special-purpose subsidiary  
20 companies, UPC Wind Partners, LLC is constructing the Kaheawa Pastures Wind  
21 Energy facility, a 30 MW wind project in Hawaii; has received regulatory approval  
22 for a 42 MW wind project in Maine; and has over 3,000 MW currently under  
23 development throughout North America, including in Maine, Vermont, New York,

1 Pennsylvania, California, Oregon, Utah, Hawaii and Canada. These projects are  
2 being pursued through various affiliate companies similar to UPC Vermont Wind.

3 UPC Group is a group of related companies that have developed large scale  
4 wind farms in Europe. To date, UPC Group has developed, financed, constructed,  
5 owned and operated over 635 MW of large-scale wind turbine generators in southern  
6 Italy and the islands of Sicily and Sardinia through a company called Italian Vento  
7 Power Company (“IVPC”) (www.ivpc.com). Certain principals of the UPC Group  
8 recently sold their ownership interests in holding companies that own the IVPC  
9 companies. In conjunction with this sale, a new European subsidiary of UPC Group  
10 has been established and is pursuing several hundred megawatts of wind energy  
11 projects in Europe and North Africa, including additional projects in Italy.

12

13 **Q. Please describe the Petitioner’s capacity to finance, construct and operate a**  
14 **wind generation project.**

15 Response. UPC-related companies have a proven ability to finance, build, and  
16 operate wind projects. UPC Wind Management, LLC, which is the entity that  
17 employs all of the staff required to develop, finance, build, own, and operate wind  
18 farms across the North American market, has a staff of 22 employees, most of  
19 whom have extensive experience in the fields related to the environmental, financial,  
20 and construction aspects of power projects including wind power. See  
21 <http://www.upcwind.com/about-team.php>. Employees of UPC Wind Management  
22 have worked and will continue to work on behalf of UPC Vermont Wind to ensure

1 the development, permitting, financing, construction, ownership and operational  
2 phases of this Project are done in a coordinated and competitive fashion.

3 In terms of project financing, the UPC Group has raised over \$1 billion in  
4 total capital for its wind farms in Europe and North America. This includes debt  
5 and equity.

6 The IVPC subsidiaries of the UPC Group achieved an exceptional operating  
7 record, with its wind turbines available 98.5% of the time on a fleet-wide basis. An  
8 extensive operations and maintenance organization was established for the Italian  
9 projects, consisting of over 120 personnel dedicated exclusively to the day-to-day  
10 management, operation and maintenance of the IVPC projects.

11

12 **Project Overview**

13 **Q. What are the basic elements of the proposed project and its location?**

14 Response. The Project consists of the construction and operation of a 52 MW wind  
15 generation project to be located in the towns of Sheffield and Sutton, in Caledonia  
16 County, Vermont. See ***Exhibits UPC-CRV-3*** (Context Site Map) and ***UPC-CRV-4***  
17 (Aerial View of the Project). The Project is expected to utilize 26 Gamesa G87 wind  
18 turbines, with a nameplate capacity of 2 MW each. The turbine layout would run  
19 along two parallel ridges in Sheffield and Sutton -- Hardscrabble Mountain (the so-  
20 called “southern array”), and a second ridgeline that runs from Granby Mountain to  
21 Norris Mountain (the “northern array”). The elevation of the ridges varies between  
22 1,970 feet and 2,540 feet.

1           UPC Vermont Wind has entered into agreements with several landowners,  
2 covering approximately 3,000 acres in the project area, which allow the company to:  
3 erect and operate the wind turbines and associated equipment; access the ridgelines  
4 from town roads and logging roads/trails; construct electrical collection lines from  
5 the turbines to a central collection point near VELCO's existing St. Johnsbury to  
6 Irasburg 115 kV transmission line; and construct a substation and related electrical  
7 interconnection facilities to electrically connect to that VELCO line. The vast  
8 majority of the project lands that UPC Vermont Wind has under agreement have  
9 previously been utilized for timber harvesting. Some year-round off-the-grid homes  
10 or seasonal camps are located on the land on the ridgeline at or near Hardscrabble  
11 Mountain.

12           The proposed turbine locations are distributed between the towns of  
13 Sheffield and Sutton. The current locations show 20 turbines in Sheffield and 6 in  
14 Sutton. However, this division is based upon our understanding of the location of  
15 the boundary between the two towns. The line identified within this application is  
16 based on information provided by the Vermont Center for Geographical  
17 Information (VCGI). The VCGI has stated that the political boundaries are based  
18 upon best available information; however, there is no understanding of the accuracy,  
19 so it is impossible to state with certainty at this time precisely how many turbines are  
20 located in Sheffield and how many in Sutton. Instead of attempting to resolve this  
21 issue at this point in the Project, we have decided to represent within this application  
22 that there are 20 turbines in Sheffield and 6 in Sutton. We will resolve this issue with  
23 the towns following the 248 permitting process.

1

2 **Q. Please explain why UPC is proposing to use the Gamesa wind turbines.**

3 Response. At this juncture, based upon the anticipated market for wind turbines,  
4 UPC is expecting to use 26, 2 MW wind turbines manufactured by Gamesa. The  
5 turbine layouts and other relevant analyses have been based upon the use of that  
6 machine. We should emphasize, however, that the wind turbine market is extremely  
7 tight and is expected to continue to be so over the next three years, at a minimum. It  
8 is a seller's market, with essentially no available inventory. Wind turbine technology  
9 is also changing rapidly, with higher efficiency and capacity machines becoming more  
10 prevalent. As a result, it is unknown what turbine models will actually be available at  
11 the point in time when UPC will make a firm order, i.e., at the time of regulatory  
12 approval. Given these circumstances, UPC has modeled the use of a machine that is  
13 appropriate for this project, and that reflects a realistic scenario in terms of the  
14 Project's benefits and impacts. Regardless of the exact model put into service, UPC  
15 will be erecting no more than 26 towers of the same general configuration and scale  
16 as the Gamesa 2 MW wind turbine, i.e. three-bladed upwind Danish style wind  
17 turbine on an 80 meter tower.

18

19 **Q. Why did UPC Vermont Wind focus on this site for the development of a wind**  
20 **electric generation facility?**

21 Response. Wind power development is primarily dictated by a) the area's average  
22 wind regime from which to capture energy; b) a site's proximity to available  
23 transmission infrastructure; c) electrical energy prices in the project area; d) the

1 absence of significant environmental or other impacts that could not be avoided or  
2 minimized; and e) a location where visual impacts are lessened by topography and  
3 vegetation. In our prospecting for sites in Vermont, the area proposed for this  
4 project was identified as a confluence of the criteria above.

5

6 **Q. Has UPC Vermont Wind received any prior approvals from the Public Service**  
7 **Board concerning this site?**

8 Response. Yes. In PSB Docket No. 6884, the Public Service Board approved the  
9 construction of meteorological towers at the project site to measure wind speed.

10

11 **Q. Please describe the wind resources at the site.**

12 Response. UPC has gathered comprehensive, long-term wind resource data for this  
13 project from several sources. First, three meteorological stations in the project area  
14 have been collecting data: (i) since November 2002, a 40-meter tower on  
15 Hardscrabble Mountain; and (ii) since the summer of 2004, a 50-meter tower on an  
16 unnamed ridge to the west of Norris Mountain and a 50-meter tower on  
17 Hardscrabble Mountain (see PSB Docket No. 6884, Order dated 4/21/2004).

18 Second, UPC Vermont Wind has also gathered eight years of long-term wind data  
19 from a reference anemometer on Burke Mountain, located approximately twelve (12)  
20 miles east from the site. All wind resource data have been evaluated by UPC Wind  
21 Management's in-house meteorologist, as well as by a leading wind consulting  
22 company, Garrad Hassan America, Inc. The available data suggest that the site has a  
23 predicted long term average wind speed of 7.3 m/s (16.3 mph). See *Exhibits*

1            **UPC-CRV-5** (Assessment of Energy Production) and **UPC-CRV-6** (Update of  
2            Energy Assessment).

3

4            **Q.    What is the expected capacity factor and energy output of the Project?**

5            Response. Based upon the estimation of wind speed, and accounting for expected  
6            blade icing/fouling, cold temperature shutdown, turbine availability, array losses,  
7            high wind factors, electrical losses, and a margin for uncertainty, the expected annual  
8            net energy production of the Project will average 147,600 MWh. See **Exhibit UPC-**  
9            **CRV-6**. This is equivalent to a net capacity factor of 32.4%. The actual production  
10           will also depend on the ultimate turbine model selected and number of turbines  
11           actually sited.

12                      The Project's expected annual energy production will be equivalent to the  
13           energy demands of 19,446 homes, assuming an average household usage of 7.59  
14           MWh/year in the Vermont Electric Cooperative service territory (according to  
15           VEC).

16

17           **Q.    How will the power output of the Project be sold?**

18           Response. UPC Vermont Wind's goal is to sell all the electrical energy generated to  
19           Vermont utilities. UPC is under agreement to sell the Washington Electric  
20           Cooperative (WEC) 2 MW of Project capacity, and WEC has an option to take an  
21           additional 2 MW, as explained in more detail in the prefiled direct testimony of  
22           Avram Patt. See also **Exhibit-CRV-7**. In addition, UPC is currently in discussions  
23           with other Vermont utilities, including the Vermont Electric Cooperative (VEC) and

1 Burlington Electric Department, concerning long-term power sale agreements. UPC  
2 has entered into an MOU with VEC which describes the parties' intentions to enter  
3 into a long-term power sales agreement. See *Exhibit UPC-CRV-8*. UPC hopes to  
4 enter into a similar MOU with other Vermont utilities in the near future. These  
5 power sales negotiations are expected to be concluded by Fall 2006.

6

7 **Q. Has UPC Vermont Wind obtained Qualified Facility (QF) status for the**  
8 **proposed project?**

9 Response. Yes. UPC has submitted a self-certification for the Project seeking QF  
10 status under federal law (PURPA) from the Federal Energy Regulatory Commission.  
11 *Exhibit UPC-CRV-9* provides UPC's QF application materials.

12

13 **Q. Will the proposed project produce electric energy for sale to load-serving**  
14 **utilities solely by the use of renewable resources?**

15 Response. Yes. The Project will produce energy solely from wind resources.

16

17 **Q. Will the proposed project sell electricity only at wholesale?**

18 Response. Yes. UPC plans to sell the power only at wholesale and to Vermont or  
19 other utilities.

20

21 **Q. Will the Project be owned by an entity not primarily engaged in the**  
22 **generation or sale of electric power, other than the energy the Project will produce?**

1        Response. Yes. UPC Vermont Wind, LLC is not a utility, and is not primarily  
2        engaged in the production or sale of electric power, other than the electric energy  
3        produced by the Project.

4  
5        **Q.     Will the Project have a production capacity not greater than 80 megawatts?**

6        Response. Yes. As described elsewhere in this testimony, the Project will have a  
7        total nameplate capacity of up to 52 megawatts.

8  
9        **Q.     Is UPC Vermont Wind seeking approval of a mandatory power purchase**  
10       **agreement pursuant to PSB Rule 4.100 for any of the Project's power capacity?**

11       Response. No. As described above, UPC Vermont Wind, LLC is seeking to sell the  
12       Project's power through negotiated power purchase agreements (PPAs). UPC  
13       currently has a 20-year PPA with WEC for the purchase of 2 MW of the Project's  
14       capacity. WEC has an option to purchase an additional 2 MW in the future if the  
15       Project is granted a CPG. UPC has also entered into an MOU with VEC, which  
16       reflects the parties' intentions to enter into a 20-year PPA for approximately 28 MW  
17       of power. It is UPC's intention to contract with other Vermont utilities, if possible,  
18       for the purchase of the Project's remaining capacity.

19

20       **Project-Related Equipment and Site Plan**

21       **Q.     Please describe in detail the turbines and other Project-related equipment.**

22       Response. **Exhibit UPC-CRV-10** is a Project Overview Map that shows the  
23       following: the northern and southern arrays; the wind turbines; the access roads; the

1 underground and above ground transmission lines; and the so-called laydown/blade  
2 assembly areas at each turbine location where the turbine components will be placed  
3 prior to erection. The prefiled direct testimony and exhibits of Ralph Nelson  
4 provide additional information on the site plan and road layouts.

5 **Wind turbines.** A representative turbine is depicted in ***Exhibit UPC-CRV-***  
6 ***11.*** The Project expects to use Gamesa G87 wind turbine generators (or a similar  
7 unit produced by Gamesa or a different manufacturer), with 87 meter diameter  
8 rotors on 78 meter towers. As reflected on the site plan, the wind turbines will be  
9 sited a minimum of about 3 rotor diameters apart, or approximately 860 feet, from  
10 center of turbine to center of turbine. The wind turbines begin generating energy at  
11 wind speeds as low as 9 mph and produce full power at wind speeds above 33 mph.  
12 The rotor speed varies between 10 and 20 revolutions per minute, depending on  
13 wind speed.

14 Each wind turbine is comprised of three components: the tower, the nacelle,  
15 and the rotor blades. The turbines will be supported by a conical tubular steel tower,  
16 which at its widest dimension is approximately 16 feet in diameter and which will  
17 taper to approximately nine feet in diameter just below the nacelle. Tower heights  
18 will be up to approximately 257 feet. The turbine towers will be painted white or  
19 light grey. The towers will be brought to the site in sections, and then mounted on a  
20 reinforced concrete foundation. If subsurface conditions are as anticipated, the  
21 concrete foundation will be a caisson approximately 20 feet in diameter and 30 feet  
22 deep. An alternate foundation if sufficient soil depth is encountered would be a  
23 hexagonal block with a primary width of approximately 55 feet and a depth of

1 approximately 10 feet. The foundations will be almost completely below ground  
2 with only approximately one foot of the foundation visible above finished grade to  
3 serve as the attachment point for the lower tower section of each turbine.

4 The tower is topped by a nacelle, which houses the main mechanical  
5 components of the turbine. The nacelle is approximately 15 feet square and 30 feet  
6 long, and connects with the rotor hub. The interior of the towers can be accessed in  
7 order to maintain turbine components in the nacelle via a ladder. The rotor consists  
8 of three fiberglass blades up to approximately 139 feet in length, resulting in a  
9 maximum turbine height of 398.6 feet (with the blade tip in the vertical position).

10 The rotor blades are made of carbon fiber reinforced fiberglass. The individual rotor  
11 blades are capable of being "pitched" (rotated along their longitudinal axis) to enable  
12 them to operate efficiently at varying wind speeds. In addition, the rotors' variable  
13 speed transmissions allow the turbines to operate more efficiently over a wider range  
14 of wind speeds.

15 **Meteorological Towers:** The three meteorological towers that were  
16 constructed as part of the site evaluation will be removed as part of the construction.  
17 In their place, four metrological towers will be constructed. The new metrological  
18 towers will be of guyed lattice construction, with a triangular cross-section  
19 approximately 18 inches across. The top of the towers will be at nacelle elevation  
20 (78 meters or 256 feet). Two of these towers will be temporary, with one being  
21 located within the northern array and one in the southern array. They will be placed  
22 on the exact footprint of a turbine, immediately following the clearing and before  
23 foundation work is initiated at this location. No additional clearing will be required

1 for the two temporary metrological towers, and they will be removed after two to  
2 four months of data collection. The locations of the two new permanent towers are  
3 provided on *Exhibit UPC-CRV-10* and the met tower specifications are provided in  
4 *Exhibit UPC-CRV-12*. These towers will be located within two rotor diameters of  
5 the temporary towers. These locations will require minimal additional clearing for the  
6 tower foundation and for the guy wire anchors.

7 The two temporary towers will be in place for 2-4 months until UPC's  
8 meteorologist correlates the wind resource as between the temporary and permanent  
9 meteorological towers. The temporary towers will then be taken down and removed  
10 from the site. The purpose of the two permanent towers is to provide ongoing wind  
11 data as a check on the turbine efficiencies and power production. They will also be  
12 used to verify the power production warranty provided by the turbine manufacturer.

13 **Transformers.** Each turbine will have an associated step up transformer to  
14 increase the nominal generated voltage of 575 V to 34.5 kV. For each Gamesa  
15 machine anticipated for this project, this transformer is a dry-type, mounted in the  
16 rear of the nacelle. The power will be transmitted via internal cables to switch gear  
17 located in the base of the tower section. For alternative turbines of this same type,  
18 this transformer could be a dead front, loop feed pad-mounted transformer mounted  
19 to a small foundation outside the base of the turbine. If an exterior transformer is  
20 used, the footprint of these 7 ton units will be approximately 8 feet square with the  
21 cabinet and cooling radiators in place (all dimensions and weights are approximate).  
22 A concrete pad approximately 10 feet square will support each transformer at a

1 location approximately 10 feet from the base of the turbine. Each transformer will  
2 contain approximately 500 gallons of non-PCB containing mineral oil.

3 **Electrical Collection (Transmission) Facilities.** A 34.5 kV electrical  
4 gathering system will be built to deliver the energy from the turbine arrays to a  
5 substation to be built adjacent to VELCO's existing 115 kV line. The collector lines  
6 between the turbines along the ridge lines will be underground with an overhead  
7 collector line running along the Project's access roads to the substation. The  
8 overhead collector lines will be approximately 2.0 miles from the closest turbine in  
9 the northern array to the substation and approximately ¾ of a mile from the closest  
10 turbine in the southern array to the substation. Pole heights will be approximately 35  
11 feet, although in a few locations they may be as tall as 65 feet to span sensitive  
12 environmental resources (e.g., streams or wetlands) or due to other engineering  
13 constraints. Energy will be stepped-up from 34.5 kV to 115 kV by a substation to be  
14 constructed at the interconnection point with the VELCO substation.

15 **Substation.** Electrical energy collected at 34.5 kV will be transformed to  
16 115 kV by a substation to be constructed as part of this project. The substation will  
17 consist of 34.5 kV circuit breakers, a 34.5/115 kV power transformer, and related  
18 metering and protective relay equipment. This facility will be constructed adjacent to  
19 the existing VELCO 115 kV line. See the testimony of Daniel Crocket, E/PRO.

20 **Interconnection.** After transformation at the project substation, electrical  
21 energy will be transmitted, via interconnection facilities to be built, to the VELCO  
22 115 kV line intersecting the project site. Currently the 115 kV VELCO transmission  
23 line is a radial line that extends from Littleton, New Hampshire through the VELCO

1           substation in St. Johnsbury, VT and terminates in the Town of Irasburg, VT.

2           VELCO has received a Certificate of Public Good for the Northern Loop Project  
3           (NLP) and has begun construction on a new 115 kV line connecting Irasburg to  
4           Moshers Tap, which is located close to the northern border of Coventry. Once the  
5           NLP is completed, the line to which the Sheffield Wind Farm proposes to  
6           interconnect will no longer be radial. For additional details concerning these project  
7           components, see the prefiled direct testimony of Daniel R Crocket, PE E/PRO.

8                     **Other Equipment.** Additional maintenance equipment will be located in a  
9           roughly 6,000 square foot, single story, metal framed building. As of the date of this  
10          application, UPC has identified two potential locations on lands that UPC has under  
11          agreement with the landowner. The first potential location is immediately adjacent to  
12          a gravel pit, and adjacent to the access road that will be improved to access the  
13          northern array. The second is a location immediately uphill of this first location.  
14          Both of these locations meet UPC's siting criteria: a relatively flat area, proximal to  
15          the Project, adequate road access, and in an already disturbed area. An alternative  
16          under consideration is to lease existing adequate space within an existing building  
17          from a local landowner.

18                    If a new equipment facility is constructed on one of the two sites identified  
19          by UPC, the building will be slab on grade construction, with an appropriate climate  
20          control system for the office and warehouse suitable for the equipment and  
21          personnel. An on-site septic system and water supply well will be provided. The  
22          septic and water supply will be constructed in compliance with State of Vermont  
23          requirements. In addition, a gravel parking area will be created in front of the

1 building that will allow for all-season access by maintenance personnel and delivery  
2 trucks. Given the height of trees in the areas under consideration (35 to 60 feet), it is  
3 unlikely that the building will be visible from any residence or public roads.

4  
5 ***Construction***

6 **Q. Please describe in greater detail the construction plans.**

7 Response. Site development will require upgrade of existing roads and construction  
8 of a roadway system between turbine sites, clearing and grading of a work area for  
9 each turbine, installation of turbine foundations, erection of the turbines, burial of  
10 the 34.5 kV underground power collection system between turbines, construction of  
11 a 34.5 kV overhead collection system between the ridge lines and substation,  
12 construction of a project substation and interconnection facilities at the point of  
13 interconnection with the existing VELCO 115 kV power transmission line, and  
14 construction of an operations and maintenance center. Each of these features has  
15 been, or will be, designed and constructed in a manner to avoid and minimize  
16 impacts to existing natural areas, and to best fit the project features into the existing  
17 contours of the landscape. A key element in minimizing impacts of this project on  
18 the land is the extensive re-use of the existing network of woods roads to the extent  
19 feasible and where the improvements to the woods roads will not result in undue  
20 adverse impacts to natural features. To the extent practicable, existing roads will be  
21 upgraded to accommodate construction equipment and delivery of turbine  
22 components. The existing roads are currently between 15 and 18 feet wide and will  
23 be upgraded by the addition of road gravel to allow for the necessary weight-bearing

1 and all-weather capability. Minimal widening of corners and minimal clearing are  
2 expected to be required. Culverts will be added, replaced or strengthened to allow  
3 for the crossing of wet features, with a preference for strengthening rather than  
4 replacing, whenever feasible. The road network will add approximately 6.1 miles of  
5 roads (approximately 4.5 miles in the northern array and 1.6 miles in the southern  
6 array) to the existing approximately three miles that will be upgraded for use.  
7 Roadways that will require crane transit during erection of the Project will be  
8 constructed with a nominal 10 foot earthen shoulder on either side (which will allow  
9 sufficient width for a large crawler crane to transit the site), which will be allowed to  
10 re-vegetate after completion of construction. The construction plans used for the  
11 exhibits represent 20% design plans. An exhibit of the road layouts for both the  
12 Northern and Southern Array is provided in *Exhibit UPC-RN-2*. Further, typical  
13 examples of water quality control features, including erosion control, storm water  
14 management features, and the like are provided in the above referenced exhibit.

15           Workspace and temporary lay down areas, where equipment and turbine  
16 components can be staged during construction, will be required for the construction  
17 of the Project. Turbine tower sections and other components require secure lay  
18 down areas in reasonable proximity to the construction sites. A workspace area  
19 approximately 1.1 acres in area (250 feet diameter circle) around the base of each  
20 turbine will be cleared of vegetation and leveled to a maximum 5% grade during  
21 construction. Following construction, a gravel roadway will lead from the access  
22 road to each turbine, and a rectangular area of approximately 50 by 50 feet will be  
23 maintained permanently at the base of each turbine for maintenance purposes. Once

1 construction and installation are completed, the remaining lay down areas will be  
 2 stabilized, seeded and allowed to re-vegetate naturally.

3 **Impact on Vegetation.** Existing vegetation cover in the project area  
 4 reflects a variety of land management and timber harvesting activities: vegetative  
 5 cover includes active and recently cut areas, early successional forest, mid-  
 6 successional second growth and mature second growth forest. ***Exhibit UPC-CRV-***  
 7 ***13a and b*** provides aerial views of the project area with indications of prior land  
 8 uses.

9 In total, construction of the Project is expected to require clearing of  
 10 approximately 119 acres of vegetated cover, including clearing for improvement and  
 11 construction of the turbine sites (lay down areas and blade assembly areas), access  
 12 roads, underground power collection lines and transmission lines, the maintenance  
 13 and operations center, the substation and up to six small stormwater ponds. Of this  
 14 total, approximately 104 acres (87%) of clearing will be temporary (i.e., necessary  
 15 during construction but not thereafter), and will be allowed to naturally re-vegetate  
 16 after construction is complete. Roughly 14 acres will be permanently cleared for new  
 17 access roads, power collection lines, the substation, and a small area (0.06± acres)  
 18 associated with each turbine. The breakdown for clearing is as follows:

19

<b>Proposed Feature</b>	<b>Permanent Clearing (acres)</b>	<b>Temporary<sup>(1)</sup> Clearing (acres)</b>
Crane pads and towers	2.4	
Upgraded Existing Roads	0	
New Access Roads – Northern Array	8.8	
New Access Roads – Southern Array	3.1	
Substation	0.1	
Maintenance Building and Parking	0.3	

Proposed Feature	Permanent Clearing (acres)	Temporary <sup>(1)</sup> Clearing (acres)
Wetland Ponds – Stormwater Control		6
Clearing – Northern Array		70.2
Clearing – Southern Array		22.2
Construction Lay down Area – Northern Array		3.8
Construction Lay down Area – Southern Array		2.1
<b>Total</b>	<b>14.7</b>	<b>104.3</b>
<b>Grand Total</b>	<b>119</b>	
Notes:		
1) Following construction, these areas will be stabilized and allowed to re-vegetate.		

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To put these impacts into perspective, the permanent cleared area represents 0.5% of the total leased area. Moreover, existing logging roads and small-to-moderately-sized clearings are common throughout the project area, owing to its long history of land uses including old farmsteads and timber management.

Construction of the Project will commence with site clearing of the existing vegetative cover in areas required to support road, turbine pad, and substation/interconnection facility construction and be followed in parallel fashion by construction of a) project roadways and turbine area pads, b) turbine foundations, c) substation and interconnection facility, d) electrical gathering system installation, e) turbine erection, and f) operations facility.

The Project will be built over one construction season during 2007. Many of the construction materials needed for road building and for turbine foundations will be sourced locally. UPC Vermont Wind expects that the Project will employ 50 to 75 people during construction, with the majority of the workers who are involved in road, foundation, and electrical line construction anticipated to be coming from State of Vermont labor pools.

1

2 **Q. How will the site be accessed for construction and operation?**

3 Response. Transportation of turbine components to the site during construction is a  
4 major part of the feasibility assessment of a project. A variety of transportation  
5 modalities can be utilized for the long-haul portion of components journey from the  
6 manufacturing location to the site, including rail, waterways, and specialized overland  
7 trucks. However, regardless of long-haul transport modality, transport close to a  
8 project site will be by specialized overland trucks. The specific local route is dictated  
9 by a number of factors: (i) the size of the turbine components (with individual non-  
10 divisible components ranging in length up to 140', in diameter up to 16', and in  
11 weight up to 80 tons), and (ii) the vehicles used for these operations are oversized  
12 and are not of the typical dimensions and carrying capacity of most the vehicles that  
13 traditionally traverse the roadways of Vermont. Nevertheless, the trailer systems are  
14 designed with sufficient axles to ensure design loads for the roadways are not  
15 exceeded. All such oversized and over dimensional loads will travel under permits  
16 issued by the Vermont Agency of Transportation (VTAOT).

17 There are a number of options that are being reviewed and investigated prior  
18 to applying to the VTAOT for an oversized load permit. The routes to the project  
19 site will involve exiting the northbound lane of Interstate 91 and utilizing the local  
20 road network as much as practical to the northern and southern array. The various  
21 alternatives described here may be utilized uniquely or in combination with each  
22 other. The routes under consideration include, but are not be limited to, the  
23 following:

- 1           • Exit from I-91 at the Barton exit, proceed on surface roads to New Duck  
2           Pond Road, to a new access road to be built up the northwestern shoulder of  
3           Granby Mountain. From here, the northern array would be accessed. The  
4           southern array would be accessed via driving down the access road, turning  
5           south on the local access roads and then westwards again on Hardscrabble.  
6           This new access road would involve the clearing of approximately 3 acres.  
7           This access route is currently the least desirable option under consideration.
- 8           • Exit off of I-91 to the south of the Project in Lyndon. The components  
9           would then proceed over local roads through Sutton to King George Farm  
10          Road. From there, the northern array would be accessed via Dareios Road  
11          and the southern array via Hardscrabble Mtn Road. This option would  
12          require an upgrade of the Kivimae Road section of Hardscrabble Mtn Road.
- 13          • Exit I-91 at the emergency vehicle access point where Berry Hill Road  
14          crosses under the Interstate. This access ramp would be modified to provide  
15          a straight access onto Berry Hill Road. The components would travel up  
16          Berry Hill Road to Hardscrabble (southern array) and Dareios Road  
17          (northern array). This option may also involve an upgrade of the Kivimae  
18          Road section of Hardscrabble Mtn Road. The empty trucks would not  
19          reenter the Interstate system at this location, but instead could utilize existing  
20          surface routes through Sheffield to Route 122, south to the Lyndon highway  
21          entrance. This option represents the least intrusive one to the public in  
22          general, given that it is the shortest travel distance along public routes, and  
23          utilizes an exit point from the Interstate system that would be limited to this

1 use only. No conflict with other travelers thus occurs.

2 Community concerns with transportation of such large components generally  
3 centers around potential traffic obstructions and modifications to existing roadways  
4 imposed by or made necessary by the size of these loads. Traffic obstruction issues  
5 are vetted with the VTAOT as a part of their permitting process, and are typically  
6 addressed by a combination of travel window limits (time restrictions) and use of  
7 escort vehicles. Fortunately, public roadways that are anticipated to be utilized for  
8 this project provide sufficient width that two-way traffic may be accommodated even  
9 with the largest dimensional loads. Required modifications to existing roadways, at  
10 least for this Project, appear to be limited to construction of the new exit(s) created  
11 off of Interstate 91, possibly placing steel plating over some existing culverts to  
12 ensure their structural stability, and resurfacing of the Kivimae Road section of  
13 Hardscrabble Mtn Road.

14 Concerns have been expressed by some Sheffield residents that there would  
15 be no front yards left in downtown Sheffield due to road widening necessary for  
16 Project transport, and that incredible volumes of project material would be hauled  
17 through the middle of Sheffield. Neither situation could occur, however, as transit  
18 of oversized components through the Town of Sheffield en-route to the Project site  
19 is a physical impossibility given the height of the underpass where Berry Hill Road  
20 goes under Interstate 91 – a 16' load will not clear a 13' high underpass.

21 During operation of the Project, traffic is generally more pedestrian vehicles,  
22 including pick-up trucks, delivery vans, and the like. As a result, no access issues are  
23 anticipated during routine operation of the Project. It is possible that periodic

1 delivery of large components, such as a blade, may have to be accomplished during  
2 the Project's life-cycle. If so, it would follow a transport path similar to that outlined  
3 for construction of the Project.

4  
5 **Maintenance**

6 **Q. Please describe the ongoing operation and maintenance requirements of the**  
7 **Project.**

8 Response. The Project will directly employ 3-5 permanent employees on-site to  
9 provide maintenance of the individual wind turbines, transmission facilities, site  
10 improvements (roads, gates, fences, etc.) on a routine basis and administrative  
11 assistance. A centralized Supervisory Control and Data Acquisition (SCADA)  
12 system will monitor the condition of the wind plant equipment, alert service  
13 technicians to any fault or alarm conditions, record and sort data, and allow remote  
14 control of the turbines.

15  
16 **Q. Will the public have access to the site?**

17 Response. In general, with the exception of the fenced areas immediately  
18 surrounding the project substation and operations facility, landowners will continue  
19 to manage their lands and make decisions regarding access to their lands by the  
20 general public.

21 In the unlikely event that ice accumulation on the turbine blades would pose  
22 an unacceptable safety risk (icing events of this magnitude would generally cause an

1 automatic shutdown of the turbines), UPC may implement additional warnings and  
2 restrictions to access in the area immediately surrounding the wind turbines.

3

4 **Q. Will the turbines require lighting, and if so, how?**

5 Response. Lighting standards of the U.S. Department of Transportation, Federal  
6 Aviation Administration (FAA) apply, as the turbines are over 200 feet in height.

7 The FAA's draft revised guidelines specify that the turbines at the end of a ridgeline  
8 string and those approximately one-half mile apart within the string should be lit at  
9 night with one red blinking light atop the nacelles. No white or daytime strobe lights

10 would be required. UPC's proposed plan was to light 10 of the 26 turbines in this  
11 manner, consistent with the revised guidelines. The FAA has issued Determinations  
12 of No Hazard for each of the 26 turbines, although it has recommended that 15 of  
13 the 26 turbines be lit. UPC's proposed lighting plan, as modified by the FAA

14 recommendation, is reflected on *Exhibit UPC-CRV-14*. One of the FAA  
15 Determinations for the Project is attached as *Exhibit UPC-CRV-15*. All of the  
16 other No Hazard Determinations are identical to this, save for the location

17 coordinates of the individual turbines. UPC will continue to work with the FAA to  
18 further minimize turbine lighting to the greatest extent possible while at the same  
19 time ensuring air traffic safety.

20

21 **Q. What is the expected useful life of the Project? Will the Project require**  
22 **decommissioning, and if so, how?**

1        Response. The Project will be operated year-round over its useful efficient life,  
2        which is expected to be at least 20 years. At the end of its useful efficient life, the  
3        facility will either be re-powered with more efficient turbines (subject to then-  
4        applicable regulatory approvals) or decommissioned. Decommissioning would  
5        consist of the following elements: all turbines, including the blades, nacelles and  
6        towers will be disassembled, and transported off site for reclamation and sale. All of  
7        the transformers will also be transported off-site for reuse or reclamation. The  
8        overhead power collection conductors will be removed and reclaimed, and the power  
9        poles will be cut off at grade. All underground infrastructure at depths less than two  
10       feet below grade will be removed. All underground infrastructure at depths greater  
11       than 2 feet below finished grade (including the subsurface collection conductors,  
12       concrete pads and foundations) will be abandoned in place. Areas where subsurface  
13       components are removed will be graded to match adjacent contours, stabilized with  
14       an appropriate seed mix, and allowed to re-vegetate naturally. All road materials will  
15       be allowed to remain on site.

16                Decommissioning would be funded according to a plan filed and approved  
17        with the Board. Typically, a reserve account is created to cover the estimated  
18        expenses of decommissioning, and during the term of the project company's main  
19        debt facility, the lenders would maintain and control this account. In this case, once  
20        the term debt facility has been paid in full, UPC Vermont Wind will fund this  
21        account through a letter of credit, bond, or corporate guarantee.

22

1 **Q. Has UPC consulted with the Agency of Natural Resources (ANR) and the**  
2 **Department of Public Service (DPS) prior to filing this petition?**

3 Response. Yes, UPC has had ongoing discussions with both ANR and the DPS  
4 since 2004, seeking their input on the nature and scope of its pre-application  
5 investigations and sharing with them the preliminary results of that work. UPC has  
6 met with their staffs and conducted field visits with ANR biologists. In addition,  
7 UPC met with DPS staff during anemometer permitting and has met with DPS staff  
8 on several occasions over the last two years to keep them updated on the Project.

9 The expert reports on bird migration, small-footed bats, bat summary report,  
10 wetlands summary, and rare, threatened and endangered species report have been  
11 submitted to ANR for its information and review. Verbal presentations of the site  
12 plans, large mammal studies, and overall wildlife habitat studies have also been  
13 provided. Follow-up meetings with ANR experts have been held to discuss the  
14 findings of the reports and to obtain their input on the studies and the Project in  
15 general.

16 Informal consultation with ANR began in July 2004 and has included regular  
17 correspondence with staff, including: wildlife biologists specializing in birds, bats,  
18 and bears; wetland regulatory staff; staff specializing in water resources, stormwater,  
19 erosion control, and air quality; and planning and legal staff. On-site meetings were  
20 held in May and June, 2005, and additional meetings were held at ANR's Waterbury  
21 and Barre offices in November 2005 (two meetings) and January 2006. UPC is  
22 continuing to dialog with ANR staff concerning the description of the site's existing  
23 wildlife and other natural resources, assessment of the Project's potential impacts on

1 these resources, and opportunities to avoid, minimize or otherwise mitigate for  
2 impacts that may occur.

3

4 **Section 248 Criteria**

5 **Q. Have you assessed the Project's compliance with the criteria of 30 V.S.A. §**  
6 **248?**

7 Response. Yes, in conjunction with other witnesses, we have assessed the Project's  
8 compliance with 30 V.S.A. § 248(b)(1)-(10). The Project complies with all relevant  
9 criteria. Our specific responses are noted below.

10

11 **30 V.S.A. § 248(b)(1) – Orderly Development of the Region**

12 **Q. Will the Project unduly interfere with the orderly development of the region?**

13 Response. No, the Project will not unduly interfere with the orderly development of  
14 the region, and will not cause any direct impacts on the capacity of the region to  
15 develop. The Project will not cause an undue burden on public roadways, or other  
16 types of municipal or state services or infrastructure. It will not utilize land or  
17 resources that are otherwise needed or planned for other forms of development  
18 within the region. The Project will result in the permanent development of only  
19 approximately 14 acres of land, principally for roads, out of more than three  
20 thousands of acres of surrounding land that is principally devoted to forestry. The  
21 Project will improve access for continued forest management on the surrounding  
22 properties, and will provide additional income to the landowners, thus making it  
23 easier for them to keep the land in forest management and to continue applying

1 sustainable forest management practices. Jeff Smith of Meadowsend Timber has  
2 provided a letter detailing the benefits and advantages his company sees from this  
3 proposed project. These advantages include having other sources of revenue in  
4 addition to timber harvesting, allowing them to do a much better job of managing  
5 and planning periodic harvests. Utilizing other revenue sources reduces the potential  
6 for over-harvest, early harvest and/or subdivision of tracts of land to cover the  
7 ongoing costs of property taxes, road maintenance, and monitoring. Therefore, with  
8 additional revenue, they can lengthen the cutting cycles, cut less intensively and grow  
9 larger trees. See *Exhibit UPC-CRV-16*.

10 Further information relative to these criteria may be found in the prefiled  
11 direct testimony of Thomas Kavet and David Raphael.

12

13 **Q. Please describe any input or recommendations received from any**  
14 **municipality or the regional planning commission.**

15 Response. The Sheffield and Sutton Selectboards and Planning Commissions, and  
16 the Northeastern Vermont Development Association (NVDA) (acting as the  
17 regional planning commission), were provided 45-day prior notice of this Petition  
18 and plans for construction of the Project, pursuant to 30 V.S.A. § 248(f). All towns  
19 within a ten mile radius of the Project were provided copies of the notice as well. To  
20 date, we have received no formal written response or recommendations from the  
21 Sheffield Selectboard, the Sheffield Planning Commission, the Sutton Selectboard,  
22 the NVDA, or any of the so-called ten mile towns.

1           The Town of Sheffield did conduct an officially-noticed Town Meeting on  
2           December 1, 2005, at which time residents voted on whether they supported UPC's  
3           proposed project. Town voters supported the Project by a margin of 120-93.

4           The Sutton Planning Commission filed a letter with the Public Service Board  
5           dated October 19, 2005, in which it recommended disapproval of the Project  
6           because in the Planning Commission's view the Project does not comply with the  
7           Sutton Town Plan, will force the King George School to close, and will have a  
8           negative economic impact on the property values and on the town as a whole. We  
9           believe these claims are just plain wrong, and unfortunately, the letter appears to be  
10          based more on unsupported fears than on any facts or analysis. The testimony and  
11          other evidence provided by UPC in this petition regarding economic, environmental,  
12          noise, visual, and other issues clearly demonstrate that the impacts from the Project  
13          will not be undue.

14          Further, Mr. Raphael, in his testimony, discusses in more detail the  
15          provisions of the Sutton Town Plan. As representatives of UPC, we would offer a  
16          few brief remarks. Under section 248(b)(1) the Board is required to give "due  
17          consideration" to the Planning Commission's recommendations, and "due  
18          consideration" to land conservation measures contained in a town plan. As the  
19          Board has previously noted, this is not akin to giving veto power to any town over a  
20          project subject to 248; rather, it is one of a number of factors that the Board must  
21          take into account and balance in determining whether the project would serve the  
22          public good. In order to be economically viable and to make a meaningful difference  
23          in the availability of electricity produced from renewable energy, commercial wind

1 projects must be built in areas where the wind regime is consistently strong. This  
2 requirement generally translates to ridgelines in the state of Vermont. Town plans,  
3 such as Sutton's, that purport to create blanket prohibitions against commercial scale  
4 wind projects on all the ridgelines within the town's borders could effectively create a  
5 moratorium on all wind projects. This would be contrary to the section 248 process  
6 and contrary to the Vermont Legislature's intent through Act 61 to promote more  
7 in-state generation of renewable energy and to meet all incremental growth in  
8 electricity use through the use of renewable power.

9

10 **Q. Does the Project comply with the land conservation measures contained in**  
11 **the plan of any affected municipality?**

12 Response. The Project will be physically located in the towns of Sheffield and  
13 Sutton. The Town of Sheffield does not have a town plan; the Town of Sutton does.  
14 David Raphael's direct testimony discusses provisions of the Sutton Town Plan.  
15 Most relevant are provisions of the Plan that purport to establish scenic protection  
16 areas on lands above 2,000 feet elevation. Although the Plan does generally  
17 discourage wind turbines greater than 100 feet in these areas, it does not prohibit  
18 such development, and it specifically allows development up to 100 feet in height.  
19 Elsewhere, the plan actually acknowledges the importance of wind as a renewable  
20 energy source, and encourages the efficient development of renewable resources. In  
21 light of the fact that the plan allows development above 2,000 feet elevation up to  
22 100 high, does not establish an absolute prohibition on wind turbines at that  
23 elevation, and generally supports wind energy, the plan can hardly be seen as

1 containing a conservation measure for lands above 2,000 feet, and the Project is  
2 consistent with it in any event.

3 The Project will not be physically located in any of the other so-called ten  
4 mile towns, and thus any land conservation measures in their respective town plans  
5 would not be relevant.

6

7 **Q. Is the Project consistent with the Regional Plan?**

8 Response. Section 248 requires the Board to give due consideration to the  
9 recommendations of the Regional Planning Commission, but does not specify that a  
10 project must specifically comply with the Regional Plan itself. The NVDA has not  
11 submitted any recommendations to UPC or the Board regarding the Project. In  
12 addition, there is no regional plan applicable to the northeastern Vermont region.  
13 The most recent regional plan expired in November of 2005, and the NVDA has not  
14 adopted a new plan to replace the expired plan. As a result, there is no regional plan  
15 relevant to the proposed project.

16

17 **Q. Are there any other aspects of the Project that will have a positive impact on**  
18 **the development of the region?**

19 Response. Yes. Rather than unduly burdening the development of the region, this  
20 project will provide positive benefits. As described in the prefiled direct testimony of  
21 Thomas Kavet, the Project will provide jobs, taxes, lease payments, and other  
22 economic benefits to individuals and towns of the region along with the State of  
23 Vermont. His analysis shows that the construction and operation of the Project will

1 bring significant economic benefits to Caledonia County and the State of Vermont,  
2 resulting in the creation of more than 80 jobs in 2007 and 24 permanent new jobs in  
3 2008 and beyond. About one-third of the initial employment gains and two-thirds of  
4 the new permanent jobs are expected to be in Caledonia County. This Project could  
5 generate more than \$1 million in State tax revenues during the construction and  
6 development phase, with ongoing State revenues totaling more than \$12.5 million  
7 over the 20 year initial life of the facility. The direct fiscal benefits to the Towns of  
8 Sheffield and Sutton are expected to exceed \$450 per resident per year in Sheffield,  
9 where 20 of the 26 turbines are to be located, and just under \$100 per resident per  
10 year in Sutton, where 6 of the 26 turbines are planned. See Kavet testimony and  
11 *Exhibit UPC-TK-2*.

12

13 **30 V.S.A. § 248(b)(2) – Need for the Project**

14 **Q. Is the Project required to meet the need for present and future demand for**  
15 **service which could not otherwise be provided in a more cost effective manner**  
16 **through energy conservation programs and measures and energy efficiency and load**  
17 **management measures?**

18 Response. As an initial matter, there is some question as to whether this criterion  
19 even applies to an independent power producer, such as UPC. UPC is not a  
20 regulated distribution utility under Vermont law and is not required, nor does it have  
21 the ability, to deliver energy conservation programs and load management measures  
22 to Vermont electricity consumers. To the extent that this provision is intended to  
23 protect ratepayers by ensuring that utilities are making sound investments that are

1 both necessary and cost-effective, those concerns do not present themselves here.

2 UPC is a private company which is paying for the development, permitting,  
3 construction, financing and operation of this Project. It is UPC, not Vermont  
4 ratepayers, that bears the risk of these investments.

5           Should this criterion be applied to the Project, there is ample evidence that  
6 the Project is required to meet the need for present and future demand – both in  
7 Vermont and the region. As explained in greater detail in the testimony and report  
8 of economist Thomas Kavet, the need for this Project is driven by several factors.  
9 First, Vermont is heavily reliant on out-of-state sources of power that are among the  
10 most expensive in the U.S., and are prone to disruption and price increases.  
11 Moreover, two-thirds of Vermont’s power is supplied by just two sources -- Hydro  
12 Quebec and Vermont Yankee – and these contracts will expire within the next  
13 decade. According to the 20-year electricity plan, one of the state’s major energy  
14 priorities is to “ensure that Vermont’s overall energy portfolio is sufficiently diverse,  
15 especially in light of the potential loss of major generating supplies.”

16           In addition, general demand for power is increasing. Over the past fifteen  
17 years, electricity demand in Vermont has increased steadily at an annual rate of 1.5%,  
18 a trend which the 2005 Energy Plan anticipates will continue through 2020. Finally,  
19 demand for Renewable Energy Credits (RECs) is increasing as New England states  
20 develop and implement Renewable Portfolio Standards (RPS) to encourage  
21 renewable energy generation. Here in Vermont, Act 61 has established the state’s  
22 commitment to renewable energy generation, and established the goal of meeting

1 statewide incremental load growth between January 1, 2005 and January 1, 2012 with  
2 renewable resources.

3 Energy efficiency and conservation programs alone are not sufficient to  
4 eliminate these needs. Such programs would not increase the diversity of the state or  
5 regional power supply, and they will not address the goals set by regional RPS.

6 Furthermore, as the 2005 energy plan points out, current energy efficiency programs  
7 and demand-side management techniques, while responsible for significant savings,  
8 are not sufficient to satisfy the expected growth in demand.

9 The need for this project is confirmed by UPC's negotiations to sell the  
10 Project's power. As explained in more detail in Mr. Patt's testimony, UPC has  
11 entered into a contract with Washington Electric Cooperative (WEC) that provides  
12 WEC two options to purchase power from the Project. The first option, which  
13 WEC has already exercised, permits WEC to purchase 2 MW of capacity out of the  
14 Project's total nameplate capacity, along with the applicable Renewable Energy  
15 Certificates, for a term of twenty years. In addition, WEC has the option to  
16 purchase an additional 2 MW of power upon UPC obtaining a certificate of public  
17 good pursuant to 30 V.S.A. § 248. See ***Exhibit UPC-CRV-7***. UPC has also entered  
18 into an MOU with Vermont Electric Cooperative (VEC), which describes the  
19 parties' intentions to enter into a long-term power sales agreement. See ***Exhibit***  
20 ***UPC-CRV-8***. As outlined in the MOU, UPC and VEC are negotiating a 20-year  
21 power purchase agreement for approximately 28 MW, or 54% of the Project's  
22 capacity. Once this agreement is in place, the majority of the Project's capacity will  
23 be committed to local utilities.

1

2

**30 V.S.A. § 248(b)(3) – System Stability and Reliability**

3

**Q. Will the Project adversely affect system stability and reliability?**

4

Response. The Project will not adversely affect system stability and reliability. The

5

wind turbines, transformers, and power lines will utilize a number of systems to

6

isolate the Project from the power grid in the event of equipment failure within the

7

Project, including the ability to automatically shut off individual turbines or

8

disconnect from the VELCO transmission line in the event of ground faults, phase

9

faults, over-current, under and over voltage, under and over frequency, and system

10

imbalance within the Project. In addition, the turbines have power electronics which

11

provide soft-start capability to reduce starting surges, ride through short-term system

12

voltage dips, and provide or consume reactive power to improve voltage regulation

13

on the transmission system to which the Project is interconnected. We anticipate

14

that the final interconnection agreement with the host utility will impose minimum

15

“ride-thru” requirements to ensure a neutral or positive effect on system stability and

16

reliability.

17

Further details are provided in the prefiled direct testimony of Daniel R

18

Crocket, PE.

19

20

**30 V.S.A. § 248(b)(4) – Economic Benefit to the State**

21

**Q. Will the Project result in an economic benefit to the state and its residents?**

22

Response. Yes, in a number of ways through the creation of jobs, lease payments,

23

tax payments, purchases, the creation of competitively-priced renewable power, and

1 other direct and indirect economic benefits (including the value of avoided air  
2 emissions). See the prefiled direct testimony of Thomas Kavet and Avram Patt.

3

4 **30 V.S.A. § 248(b)(5) and (8) – Environmental Considerations**

5 **Q. Will the Project have an undue adverse effect on esthetics, historic sites, air**  
6 **and water purity, the natural environment, and the public health and safety, with due**  
7 **consideration begin given to the criteria specified in 10 V.S.A. § 1424a(d) and §**  
8 **6086(8a)(1) through (8) and (9)(K)?**

9 Response. No, it will not have an undue adverse effect on those resources, for the  
10 reasons discussed below. Note that in addition to the testimony and exhibits of  
11 other witnesses as referenced below, the Natural Resource Map (*Exhibit UPC-*  
12 *CRV-17*) and the Wetlands/RTE Species/Bear-Scarred Beech Maps should be  
13 referred to (*Exhibit UPC-CRV-18*).

14

15 **Outstanding Resource Waters**

16 There are no Outstanding Resource Waters on the Project site or in any  
17 adjacent areas, based upon the list published by the Water Resources Board. To the  
18 extent they are relevant to the Project, the criteria enumerated in 10 V.S.A § 1424a(d)  
19 have been given due consideration and are addressed throughout the several  
20 environmental evaluations supporting this petition.

21

1        **No Undue Air Pollution**

2                The Project will not “result in undue air pollution.” The wind turbines will  
3        not generate any air pollutants. Accordingly, operation of the Project will not require  
4        an air pollution control permit from ANR. The Project may make use of one or  
5        more emergency backup generator(s), which may be installed on-site to provide  
6        power for the operations and maintenance center in the event of loss of power. As  
7        emergency-only devices, these do not require a permit from ANR.

8                Based on the typical energy mix of the ISO New England grid, the energy  
9        produced by this Project will displace the generation of equivalent energy from fossil  
10       fuel-fired plants. The emissions from fossil fuel plants will be reduced in two ways:  
11       1) the energy needed to mine, purify and transport the fuel to the power generation  
12       asset will be reduced; and 2) the emissions from the actual operation of the plant will  
13       be reduced because the plant can operate at a reduced capacity. Therefore, while the  
14       reduction in generation will be matched on a one to one basis, the resulting decrease  
15       in emissions will be more significant. Given that the higher elevations of Vermont  
16       specifically, and New England in general, are being significantly impacted by acid  
17       rain, smog, and global warming caused by the burning of fossil fuels, any reduction  
18       will have a positive impact on Vermont’s natural and human environments.

19       Replacing the energy produced by the current average New England fuel supply with  
20       the proposed 52 MW wind facility will result in significant annual reductions in air  
21       emissions, including:

- 22                • Carbon Dioxide (greenhouse gases) = 171,653,400 lbs/year
- 23                • Sulfur Dioxide (acid rain precursor) = 345,800 lbs/year

- Nitrogen Dioxide (smog precursor) = 101,200 lbs/year

These figures are based upon U.S. Department of Energy generating output and reported emissions from New England utilities in 2004 by type of fuel source, as cited and discussed in the prefiled direct testimony of Thomas Kavet.

The Project is expected to require an air permit from ANR during construction to cover temporary emissions (e.g., fugitive dust) related to concrete batching. This work may fall under an amendment to an existing permit (if batching is done by an already-permitted vendor/supplier), or a new permit to be obtained by either UPC or a vendor/supplier. At this time, UPC does not expect to batch concrete on-site.

Fugitive dust emissions from earth disturbance during construction will be minimized through the implementation of site-specific plans by the Project contractors. While specific mitigation measures will be the subject of an NPDES permit to be procured prior to the start of construction, it is anticipated that dust control measures will include, at a minimum, regular watering of earthwork areas and finished roadways. Additionally, use of non-impacting chemical dust palliatives will be explored for use during heavy traffic times of project construction.

### **Noise**

There are no health-based federal or state noise regulations that apply to operation of the Project. Noise levels from the turbines will be minimal and will not pose any harm to human health or disturb the quality of life of nearby residents. See

1 the discussion under Aesthetics, below, and the prefiled direct testimony of Chris  
2 Bajdek.

3 With regard to construction-related noise, there will be an increase in  
4 ambient noise during construction-related activities. This increase will be temporary,  
5 and will normally be limited to daylight hours. Further, the degree of noise impact  
6 will be a function of the type and number of pieces of construction equipment  
7 employed on this site and the distance of the noise source to nearby homes. No  
8 specific contractors or construction methods have been selected for this Project,  
9 therefore specifics on pieces of equipment and work activities are not available.  
10 However, based upon our expertise in the wind farm development field, the  
11 construction equipment will consist of typical excavation type equipment (bulldozers  
12 and excavators), loaders, dump trucks, and there will be some noise from other truck  
13 traffic and crane operations. The contracts governing this work shall specify that all  
14 pieces of equipment used on site will be in good/proper working order, including  
15 operational muffler systems.

16 Bedrock excavation will be performed by a combination of ripping and  
17 blasting. The bedrock excavation method selected will depend upon the  
18 hardness/strength, quality, and amount of weathering of the bedrock. Information  
19 for blast and rip characteristics of the bedrock may be evaluated at least in a general  
20 sense, and applied towards an appropriate bedrock excavation method. Softer  
21 bedrock, such as sedimentary or weathered igneous and metamorphic rock, may  
22 possibly be removed by ripping. Weathered bedrock is highly variable, as glaciation  
23 has removed most of the weathered rock that existed. Weathered zones generally

1 occur in pockets that were protected from the ice. Other geologic features may  
2 control the effects of blasting. Rock fabric, or the arrangements of minerals,  
3 determines intrinsic rock strength, and thus influences rock excavation. Joint  
4 spacing, bedding, and foliation also influence rock excavation. Blasting will be kept  
5 to a minimum extent practical, will be performed during normal business hours and  
6 will utilize multi-stage delayed charges to reduce peak overpressure generated  
7 whenever possible.

8 No adverse effects from blasting, on either sensitive natural resources or  
9 private landowners, are anticipated because of the remote location of the Project. In  
10 all cases, blasting will be conducted in general conformance with the U.S.  
11 Department of Interior Rules 816.61-68 and 817.61-68, and the Blasting Guidance  
12 Manual, Office of Surface Mining, Reclamation and Enforcement, U.S. Department  
13 of Interior, to limit peak particle velocity and ground vibration to safe levels. Noise  
14 and air blast effects will be mitigated by the use of proper stemming techniques, and  
15 the occurrence of flyrock will be limited by using blasting mats, where appropriate.

16

17 **Public Health and Safety**

18 The Project will not have any undue adverse affect on public health and  
19 safety. Analyses of potential icing and shadow flicker by AWS Truewind show that  
20 neither presents undue health or safety risks to the public. See *Exhibits UPC-*  
21 *CRV-19 and UPC-CRV-20*, and the shadow flicker maps provided in *Exhibit*  
22 *UPC-CRV-21*.

1           During construction, the contractor will be responsible for controlling access  
2 to the site and for ensuring safe construction practices in compliance with OSHA  
3 standards. As determined by our sound level analysis, operational and construction  
4 sound levels do not pose a risk to human health and safety. Public access to the  
5 substation will be prevented by chain link fenced in accordance with safety  
6 standards.

7  
8           **No Undue Water Pollution (incl. headwaters, waste disposal and soil erosion),**  
9           **or Stormwater from Construction and Operations**

10           The Project will not result in undue water pollution, and will meet any  
11 applicable Department of Environmental Conservation regulations regarding water  
12 quality and waste disposal. Construction of the Project will require coverage under  
13 the NPDES General Permit for Stormwater Runoff from Construction Sites.  
14 Operation of the Project will require coverage under the State Stormwater Permit for  
15 New Development. Due to the advanced level of design and analysis required for  
16 permitting, these permits will be applied for during the final design stage of the  
17 Project. For the purposes of this filing, UPC's engineers have prepared preliminary  
18 engineering plans to demonstrate that the Project is fully capable of meeting or  
19 exceeding all of the technical standards required to obtain these permits. See the  
20 prefiled direct testimony of Ralph Nelson for further details.

21           The State of Vermont's Best Management Practices (BMPs) for stormwater  
22 management and erosion prevention and sediment control provide the basis for  
23 ensuring that the Project will meet all standards, and that surface waters will be

1 protected. UPC has met with ANR to review the standards, and will work with  
2 ANR during the stormwater permitting process to incorporate the applicable BMPs  
3 into the Project's final design plans. The preliminary plans prepared for this  
4 submittal include typical details that illustrate how the BMPs will be applied to meet  
5 the standards (see preliminary design plans and testimony of Ralph Nelson).  
6 Development of the full stormwater analysis and final EPSC will be completed as  
7 part of the final design process, once the engineering designs of all roads, laydown  
8 areas and other project features have been finalized.

9 Examples of BMPs to minimize impacts during construction include  
10 installing silt fencing and similar protection measures adjacent to streams and  
11 wetlands, minimizing the amount of exposed soil that is open at any one time,  
12 applying mulch and temporary seeding in a timely manner to protect and stabilize  
13 exposed soils, and dispersing runoff as sheet flow into vegetated uplands rather than  
14 as concentrated runoff. Permanent measures during operations will include regular  
15 inspection and maintenance of all Project roads and drainage features to ensure  
16 proper functioning over the life of the Project. Implementation of these measures  
17 will ensure the protection of all surface waters, including the headwaters of small  
18 streams above 1500 feet elevation (of which there are very few within the Project,  
19 see prefiled direct testimony of Art Gilman).

20 Only one Project turbine (Turbine 3 in the northern array) is located above  
21 2500 feet at a base elevation of 2522 feet. There are no identified surface waters  
22 within the area of this turbine. Given the very limited amount of construction that

1 will occur within this area, we do not expect an adverse impact to Class A waters.

2 See the prefiled direct testimony of Ralph Nelson for further details.

3 Excavated rock and organic debris will be disposed of on-site. Solid waste  
4 from the construction activities will be collected and disposed of off site at an  
5 approved landfill.

6

7 **Water Conservation**

8 Design of the Project “has considered water conservation, incorporates  
9 multiple use or recycling where technical and economically practical, utilizes the best  
10 available technology for such applications, and provides for continued efficient  
11 operation of these systems.” Construction use of water will be primarily for  
12 earthwork compaction and dust control. This water will be brought on site by the  
13 contractor if sufficient quantities are not found to be available locally. The volume of  
14 water will be dictated, in part, by on-site conditions during the construction efforts.  
15 For purposes of discussion, construction-related water would likely involve the  
16 transportation from a local source in straight axle trucks of 3,000 gallon size. We  
17 would expect that between 8 and 10 truck loads of water would be required per day.  
18 While the contractor would be responsible for identifying and permitting, as  
19 necessary, the withdrawal of water, we understand from local contractors that water  
20 has been withdrawn in the past from the Passumpsic River and other local  
21 tributaries, lakes and ponds and the Sheffield municipal well for a variety of  
22 earthwork projects. Additional water will be utilized for concrete batching, but it is  
23 anticipated that this operation will take place off site. During operation of the

1 facility, only infrequent, small volumes of water are needed to maintain the wind  
2 turbines and other equipment – primarily for periodic cleaning. A water supply well  
3 will be installed at the maintenance shed described earlier in this testimony. This  
4 well will be used for domestic consumption and sanitary facilities at the maintenance  
5 shed and will likely supply the limited amount of water necessary for the ongoing  
6 operation.

7

8 **Waste Disposal**

9 Solid waste disposal will be handled through private haulers, and will create  
10 no burden on local government. Stormwater management is discussed above. A  
11 septic disposal system will be designed and constructed to service the sanitary  
12 facilities at the maintenance building that is described previously in this testimony.  
13 This leach field will not be receiving any flows except those generated via the  
14 sanitary facilities.

15

16 **Floodways**

17 The Project is not within a floodway or floodway fringe. According to the  
18 FEMA Flood maps for this area, the Project is entirely in Zone C: outside the 500-  
19 year flood zone.

20

1        **Streams**

2                    Any portion of the Project adjacent to the banks of a stream “will, whenever  
3        feasible, maintain the natural condition of the stream, and will not endanger the  
4        health, safety, or welfare of the public or of adjoining landowners.”

5                    Impacts to streams in the Project area have been avoided and minimized to  
6        the greatest practicable extent through careful planning and layout of the Project’s  
7        access road network. The Project’s civil engineers have worked in an iterative  
8        fashion with environmental scientists to modify the road layout to avoid streams, and  
9        where stream crossings are unavoidable, to minimize the potential for adverse effects  
10        (see prefiled direct testimony of Art Gilman and Ralph Nelson, P.E.).

11                    As a result of this approach, only five new stream crossings are proposed.  
12        All of these crossings occur at the uppermost reaches of the streams, but below the  
13        saddle wetlands that serve as their sources. In this way, the widths of the crossings  
14        have been kept to a minimum, and the potential for direct runoff into the headwater  
15        wetlands has been avoided. The limited adverse effects that do occur (i.e., a small  
16        loss of stream channel beneath the footprint of the road) will be limited to the  
17        immediate area of the crossing, and will not result in adverse downstream or off-site  
18        effects.

19                    One of the headwater wetlands is actively used by beaver, and there is a  
20        beaver dam across the wetland’s outlet. In this case, the configuration of the beaver  
21        dam and stream was examined in the field, surveyed using GPS, and plotted onto the  
22        engineering drawings. The proposed road crossing was then designed in  
23        consultation with the Project’s biologists, and carefully sited to cross below the dam,

1 thus avoiding any alteration of the dam or the wetland's hydrology. Culverts under  
2 the road at this location will be designed in consultation with ANR biologists to  
3 allow beaver activity to continue without threatening the integrity of the road.

4 Three additional stream crossings occur along existing logging roads within  
5 the site. The existing culverted crossings are in varying condition, and at least one  
6 appears prone to wash-outs as evidenced by downstream deposits of sediment in the  
7 stream bed and erosion across the road surface. These existing crossings will be  
8 improved to support the anticipated truck transport requirements during  
9 construction. In these cases, there will be only minor construction impacts to the  
10 stream with no net adverse impacts. In all cases, the net result will be a more stable  
11 crossing that is less prone to wash-out and the associated adverse effects on  
12 downstream biota.

13

14 **Shorelines**

15 The Project is not located on or adjacent to a shoreline of any lake, pond, or  
16 river.

17

18 **Wetlands**

19 Wetlands were delineated according to methodology outlined in the 1987 US  
20 Army Corps of Engineers Wetland Delineation Manual, which is the standard  
21 methodology in Vermont. This process identified no Class 1 wetlands, one (1) Class  
22 2 wetland, and fifty-eight (58) Class 3 wetlands in the area of the Project.

1           The Project will comply with the Vermont Wetland Rules regarding Class 1  
2           and 2 wetlands. There are no Class 1 wetlands. There is one (1) Class 2 wetland,  
3           located adjacent to the pond on the King George property at the foot of Dareios  
4           Road, approximately one mile from the nearest turbine location. This wetland will  
5           not be impacted by construction or operation of the Project. An existing paved road  
6           passes within the 50-foot buffer of the wetland, which will require a minor upgrade  
7           and repair to accommodate construction access. This will not result in an undue  
8           adverse impact to the protected functions and values of the Class 2 wetland.

9           The Project's civil engineers have worked in an iterative fashion with  
10          environmental scientists to modify the Project layout to avoid wetlands, and where  
11          wetlands are unavoidable, to minimize the potential for adverse effects (see  
12          testimony of Art Gilman and Ralph Nelson). To facilitate planning and avoidance of  
13          impacts, wetlands were identified and mapped within a potential development  
14          envelope, and along existing access roads, often extending several hundred feet  
15          outward from the final layout of the proposed project features. As mentioned, a  
16          total of 58 individual Class 3 wetlands (or portions thereof) were mapped within this  
17          broad envelope and represented on the Project plans. Using this information,  
18          project engineers developed a series of preliminary layouts that were taken into the  
19          field by the wetlands delineation team for further refinement of wetland boundaries,  
20          and to identify opportunities for avoiding and minimizing impacts. The layout of  
21          project features was thus tailored to fit around existing wetlands wherever possible to  
22          keep impacts to a minimum.

1           As a result of the above redesign process, impacts to Class 3 wetlands are  
 2 proposed at just six (6) previously undisturbed wetlands within the project area.  
 3 Individual impact locations are generally quite small, and range from 120 square feet  
 4 to 11,680 square feet in total area. Typically, these wetlands are found in forested  
 5 areas with seasonally saturated soils; there are no impacts proposed in wetlands  
 6 classified as marshes, ponds, vernal pools, or unique natural communities. The  
 7 impacts to previously undisturbed wetlands that cannot be avoided have been  
 8 minimized to less than 0.5 acres. The square feet of impacts on a per-wetland basis  
 9 would be as follows:

<b>Wetland Impact Summary</b>	
<b>Wetland Number<sup>1</sup></b>	<b>Sq Ft of impact</b>
Wetland 22	2,550
Wetland 35	4,700
Wetland 34	11,680
Wetland 37	360
Wetland 40	500
Wetland 40A	120
<b>TOTAL</b>	<b>19,910</b>
<b>Area in Acres</b>	<b>0.46</b>
<sup>1</sup> Wetland numbers correspond to the wetlands identified in <i>Exhibit UPC-CRV-18</i> .	

10  
 11           An additional eleven (11) Class 3 wetlands will be impacted by the Project,  
 12 but these wetlands have already been disturbed from prior human activity (e.g.,  
 13 existing road crossings). Arthur Gilman’s wetlands report and prefiled direct  
 14 testimony discuss all 17 impacted Class 3 wetlands and find that the construction and  
 15 operation of the proposed wind farm Project will not have an undue adverse impact  
 16 on the identified significant functions for these wetlands. The U.S. Army Corps of

1 Engineers wetland permitting process has not been initiated as of the date of this  
2 application due to continuing efforts to avoid all wetland impacts and due to the  
3 possibility of further redesign being necessary as a result of conditions in a section  
4 248 CPG if one is issued. Wetland delineation, assessment and impacts are discussed  
5 in more detail in the prefiled direct testimony of Arthur Gilman.

6

7 **Sufficiency of Water and Burden on Existing Water Supply**

8 There is “sufficient water available for the reasonably foreseeable needs” of  
9 the Project. The Project will not “cause an unreasonable burden on an existing water  
10 supply, if one is to be utilized.” As noted above, water for construction activities will  
11 be the responsibility of the contractor, but based on our experience it will likely be  
12 brought on site via straight axle trucks loaded from regional surface water sources.  
13 We have had discussions with local contractors and found that surface water sources  
14 utilized in the past for large construction projects include local ponds, lakes, the  
15 Passumpsic River and its tributaries. The water for operations will likely be provided  
16 from the well drilled for the maintenance building. Very limited water is needed for  
17 ongoing maintenance and operational activities. Given the off-site, surface water  
18 source for the construction and the small quantities needed for operations and  
19 maintenance, we do not believe that any local water supplies will be impacted by this  
20 Project.

21 In addition to water usage, we would like to address the potential effects of  
22 blasting on local water supplies. In general, the blasting that is being considered and  
23 is typical for construction of this nature involves small charges that result in very

1 localized effects. In fact, the use of charges that would result in large scale breakage  
2 of rock is counter-intuitive for this type of construction. The blasting will primarily  
3 be used for foundation construction. As discussed above, the foundations will be  
4 holes constructed in competent rock. Without competent rock, the holding ability  
5 may be compromised. Therefore, use of large charges would damage too much  
6 rock, increasing foundation and construction costs. UPC's blasting consultant has  
7 advised UPC that if appropriately-sized explosive charges and appropriate timing  
8 between detonations is used, damage to area homes and water wells is not expected.  
9 See *Exhibit UPC-CRV-22*. In keeping with standard construction practices a  
10 detailed blasting plan will be prepared by the contractor in advance of construction.  
11 In addition, if called for, we will test the wells of willing landowners within an  
12 appropriate radius of the facility to ensure that project construction has not caused  
13 any impacts. If a water supply is determined to be impacted by the activities, UPC  
14 will remediate the situation.

15

16 **Soil Erosion**

17 The Project will not "cause unreasonable soil erosion or a reduction in the  
18 capacity of the land to hold water so that a dangerous or unhealthy condition may  
19 result." UPC has prepared a preliminary site-specific Erosion Prevention and  
20 Sediment Control Plan, and will apply for coverage under the NPDES General  
21 Permit for Stormwater from Construction Sites, and the State Stormwater Permit for  
22 New Development. The erosion prevention and sediment control practices will likely  
23 include the use, where and if appropriate, of silt fencing, stabilizing disturbed soils,

1 matting, hay bale and stone check dams and diversion of water away from disturbed  
2 areas. The stormwater control will utilize Best Management Practices as described in  
3 the guidelines provided by the State of Vermont. The BMPs will likely include  
4 settlement ponds, berms, fencing and infiltration via sheet flow. Further details are  
5 provided in the direct testimony by Ralph Nelson.

6

7 **No Unreasonable Congestion or Unsafe Conditions with Respect to Use of**  
8 **Highways, Waterways, Railways, Airports, and Airways**

9 The Project will not cause unreasonable congestion or unsafe conditions with  
10 respect to the use of the highways, waterways, railways, airports and airways, and  
11 other means of transportation existing or proposed.

12 All public roads can handle the expected volume of construction and post-  
13 construction traffic without creating congestion or unsafe conditions. As noted in  
14 the transportation discussion above, the only changes anticipated to the public  
15 roadways used for access to this Project (including portions of Berry Hill Road,  
16 Hardscrabble Road, Union Road, and Dareios Road) are the addition of temporary  
17 steel plating to ensure the stability of some culverts along the roads.

18 Adequate space for worker parking and construction vehicles is available on  
19 private land and/or private roads.

20 Because the turbines are over 200 feet in height, guidelines issued by the  
21 FAA call for lighting. The FAA's draft revised guidelines specify that the turbines at  
22 the end of a ridgeline string and those approximately one-half mile apart within the  
23 string should be lit at night with one red blinking light atop the nacelles. No white

1 lights would be required. The FAA has issued Determinations of No Hazard for  
2 each of the 26 turbines, recommending that 15 of the 26 turbines be lit. ***Exhibit***  
3 ***UPC-CRV-15*** is a copy of one of the Determinations. UPC will continue to work  
4 with the FAA to further minimize turbine lighting to the greatest extent possible  
5 while at the same time ensuring air traffic safety.

6

7 **Educational Services**

8 The Project will not cause an unreasonable burden on the ability of a  
9 municipality to provide educational services. The construction phase of the Project  
10 will occur over a roughly 10 month period during the 2007 winter and construction  
11 season(s). It is unlikely that temporary construction workers and their families would  
12 move to the area due to the Project. Once the Project is operational, 3-5 workers  
13 will be devoted to operation and maintenance. These workers may be hired from  
14 the existing local workforce.

15 UPC has notified the Towns of Sheffield and Sutton and the Caledonia  
16 North Supervisory Union of the Project. Responses received to date indicate that  
17 the Project should not create any unreasonable burdens. See ***Exhibits UPC-CRV-***  
18 ***23 and UPC-CRV-24.***

19

20 **Municipal Services**

21 The Project will not cause an unreasonable burden on the ability of the local  
22 governments to provide municipal or governmental services. The private roads  
23 accessing the site will not require municipal expenditures for maintenance. Town

1 roads – including Berry Hill Road - may require minor alteration (at UPC’s expense  
2 and in coordination with the Town of Sheffield) during the construction phase to  
3 accommodate axle weights and/or horizontal and curvatures required by trailers for  
4 the Project.

5 The traffic associated with project operations (roughly 35 vehicle trips per  
6 week) will be minimal; thus, additional maintenance of the town highways should not  
7 be necessary.

8 Waste disposal will be handled through private haulers, and will create no  
9 burden on local government.

10 All roads to the Project will be of sufficient size and capacity to handle any  
11 emergency vehicles. The appropriate fire and rescue departments have been  
12 notified. See *Exhibit UPC-CRV-25*. No responses have been received to date.

13 Notice of the Project has been provided to the Vermont State Police and the  
14 Caledonia County Sheriff’s Office. See *Exhibits UPC-CRV-26*. No responses  
15 have been received to date.

16 The Project will provide a net benefit to the town and surrounding  
17 communities, in that it will generate local property taxes but require very little in the  
18 way of municipal services.

19

20 **Aesthetics**

21 The Project will not cause an undue adverse effect on the aesthetics or scenic  
22 or natural beauty of the area.

1           To evaluate the effect of noise on nearby land uses, UPC's noise engineering  
2 consultants, HMMH, used a noise modeling approach that represented worst-case  
3 conditions for sound propagation and assumed full operation of the wind farm.  
4 HMMH determined that at times, noise from the wind farm will be audible at those  
5 homes that are closest to the wind farm – in particular at homes along Berry Hill  
6 Road and Hardscrabble Mountain Road in Sheffield. The character of the sound  
7 from the wind farm would be consistent with background levels and somewhat like  
8 wind in the trees. The wind farm would be mostly inaudible at many of the other  
9 locations that were evaluated in this study. HMMH further noted that under some  
10 conditions the turbine sound would be masked by the sound of the wind itself.  
11 Finally, HMMH evaluated wind farm noise against guidelines established by the  
12 United States Environmental Protection Agency (EPA), and found that the Project  
13 would not exceed EPA guideline levels at any of the nearby residences. See the  
14 prefiled direct testimony of Chris Bajdek and *Exhibits UPC-CB-2 and -3*.

15           The testimony of Landscape Architect David Raphael evaluates the impacts  
16 of the Project on the aesthetics of the region. He analyzes the nature of the  
17 surrounding landscape and the visibility of the turbines, from a variety of turbines.  
18 His analysis shows that in light of the topography and extensive forest cover of the  
19 region, and the fact that many roads and villages are located in valleys, the visibility  
20 of the Project is remarkably low. He also notes that the acreage surrounding the  
21 Project, and the region in general, is a working landscape and has been one for a long  
22 period of time. These and other factors, he concludes, render the Project's impacts  
23 on the aesthetics of the region remarkably small.

1           Mr. Raphael employs the so-called Quechee Analysis to consider whether the  
2 aesthetic impact of the Project is adverse, and if adverse, whether it is undue.  
3 Applying the first step of the Quechee test as it has traditionally been applied –  
4 finding an adverse impact if a project is visually dissimilar from its surroundings – he  
5 concludes that the Project would have an adverse impact because wind turbines of  
6 this size are unprecedented in this landscape. However, Mr. Raphael proceeds to  
7 conclude – applying step 2 of the Quechee Analysis – that such an impact would not  
8 be undue because it does not violate a clear, written community standard intended to  
9 preserve scenic beauty, it would not be shocking or offensive to the average person  
10 (especially in light of clear evidence of widespread public acceptance of wind  
11 turbines in the landscape), and generally available mitigating steps have been taken to  
12 improve the harmony of the Project with its surroundings.

13           In addition, Mr. Raphael reflects upon the dynamic nature of the Vermont  
14 landscape, over time, to give a deeper understanding of its aesthetic. He points out  
15 that it is a working landscape, with a long history of sustainable use of natural  
16 resources, including some uses – such as ski areas, logging and hydroelectric  
17 development – that have significant visual impacts. Noting that all of these have  
18 become accepted over time, Mr. Raphael suggests that the Quechee test’s bias  
19 toward visual sameness renders it too limiting for purposes of evaluating commercial  
20 windfarms which, by their nature, are not visually the same as their surroundings.  
21 For this reason, and to account for the reality that the Vermont landscape changes  
22 over time, Mr. Raphael suggests that a modification of Quechee may be appropriate.  
23 See the prefiled direct testimony of David Raphael and *Exhibits UPC-DR-2 to -5*.

1

2 **Historic and Archaeological Sites**

3 The Project will not cause an undue adverse effect on archaeological or  
4 historic sites. The Project site has low potential for archaeological remains, subject to  
5 one additional field inspection of the substation location that needs to be conducted  
6 in the Spring. See letter from Charles Knight, *Exhibit UPC-CRV-27*.

7 The Project site will not physically impact any state-listed or state-eligible  
8 historic structure. Nor will it have an undue adverse impact on historic structures  
9 based upon its visibility from such sites. See the prefiled direct testimony of David  
10 Raphael and *Exhibit UPC-DR-2*.

11

12 **Rare and Irreplaceable Natural Areas**

13 The Project will not “cause an undue adverse effect on rare or irreplaceable  
14 natural areas.” See the prefiled direct testimony of Arthur Gilman.

15

16 **Necessary Wildlife Habitat, and Endangered Species**

17 The Project will not “destroy or significantly imperil necessary wildlife  
18 habitat or endangered species.” See the prefiled direct testimony of Arthur Gilman,  
19 Robert Roy, and Jeffrey Wallin. UPC has sponsored extensive and detailed field  
20 studies over the last two years to assess wildlife habitat throughout the site, and to  
21 document use by selected groups or species of wildlife during key times of the year  
22 and for specific activities of concern or interest. Some examples include early  
23 summer surveys of breeding birds, spring and fall monitoring of bird migration

1 including both daytime and nighttime observations (the latter using radar), detection  
2 of bat activity using acoustical recording devices, winter tracking surveys for  
3 mammals, and inventorying beech trees that show evidence of use by black bears.

4 As described in the testimony of Art Gilman, Bob Roy and Jeff Wallin,  
5 vegetation cover on the site is dominated by northern hardwood forest, with lesser  
6 representation by softwoods, all of which have been subjected to a long history of  
7 land use that includes clearing, reforestation, and ongoing timber harvesting and  
8 management activities. The majority of the site has experienced some degree of  
9 cutting in the last ten years; the balance consists of either permanent clearings or  
10 somewhat more mature second-growth forest. These habitats are common  
11 throughout the region, and support a variety of wildlife species, including mammals,  
12 birds, reptiles and amphibians, which are typical of the region. Other than an  
13 occasional migrant, no rare, threatened or endangered wildlife are known or believed  
14 to be likely to occur on the site, and no undue adverse impacts to such species are  
15 anticipated.

16 No federally-listed plants are known or likely to occur on the site. One state-  
17 listed endangered plant species (woodland cudweed, see testimony of Art Gilman  
18 and *Exhibit UPC-AG-3*) has been identified in the vicinity of the Project's  
19 southernmost turbine on Hardscrabble Mountain, and in response the proposed  
20 design has been modified to avoid any adverse impacts to this population. On the  
21 plant community level, a unique natural wetland fen community occurs in the vicinity  
22 of the northern array, but outside the footprint of the Project. In addition, two

1 limited areas of “rich northern hardwood forest” were noted in the vicinity, but  
2 outside the area of impact. No adverse impacts to these areas are anticipated.

3 Breeding bird surveys conducted in June, 2005 by Sarah Allen of  
4 Normandeau Associates (see testimony of Bob Roy) revealed a species assemblage  
5 that reflects the mixture of forest age classes across the site. The species  
6 documented by Ms. Allen are typical of the region and are for the most part  
7 relatively common. Likewise, mammal species documented by Judy Tumosa and  
8 Bruce Barnum of Wildworks Woodland Management in tracking surveys in winter  
9 2004 were representative of the existing habitats and are common to the region.

10 Development of the Project will alter some existing habitats, and effect local  
11 changes in the wildlife species that use them. For example, existing forest cover will  
12 be converted to early-successional cover (e.g., herbaceous and shrub cover) along  
13 roadsides and in the construction laydown areas. Additionally, some areas will be  
14 permanently converted to gravel access roads. These changes will be distributed  
15 over a large area, much of which already reflects historical and ongoing forest  
16 management activities, including an existing network of logging roads, areas of  
17 clearcuts, log landings, and selective harvesting. Some of these activities have  
18 occurred quite recently, for example, selective cutting on Hardscrabble Mountain  
19 and strips of clearcutting on Granby Mountain. In addition, the southern end of  
20 Hardscrabble includes an area of sparsely forested pasture that is still in active use.  
21 As a result, many of the species that currently use the site are edge-adapted, and will  
22 experience only very minor changes in their distribution and use of the site.  
23 Relatively mature second-growth forest cover is more common in the northern array,

1 including on the top of Barrett Mountain (so-called) and along the spine of Norris  
2 Mountain. In these areas indications of past logging are evident, including scattered  
3 logging roads and landings. There is no “old-growth” forest, or extensive blocks of  
4 unfragmented mature forest habitat.

5 Winter reconnaissance of the site by Multiple Resource Management  
6 indicates that moose are abundant within and around the site, as would be expected  
7 in the mixed-age stands and recently cut-over areas that provide readily available  
8 browse (see testimony of Jeff Wallin). No moose winter concentrations were  
9 indicated, and the site does not constitute “necessary habitat” for this species. Mr.  
10 Wallin also confirmed that there are no winter deer yards, as would be expected for  
11 these elevations.

12 Surveys to determine whether the site provides “necessary habitat” for black  
13 bears included investigations of potential travel corridors, forested wetlands, and  
14 bear-scarred American beech. The site does not appear to support any important  
15 travel corridors for black bears. One forested wetland (#22) has a recent history of  
16 beaver activity, and has the potential to provide “necessary habitat” for bears,  
17 although direct evidence of use was not observed. As explained in the testimony of  
18 Art Gilman and Ralph Nelson, this wetland will be crossed by the access road at the  
19 narrowest possible location downstream. No undue adverse impacts on the  
20 suitability of the wetland for bears are expected.

21 A number of bear-scarred beech were documented within the Project  
22 vicinity, primarily occurring in scattered clusters within the northern array.  
23 According to Mr. Wallin, although a number of trees will be removed for the Project,

1 they represent only about a quarter of those identified in the immediate area (and  
2 more beech trees certainly occur outside the area searched). Although use of these  
3 trees by bears was apparent, they do not constitute “necessary habitat” due to their  
4 limited numbers, widely scattered distribution, overall declining health and the  
5 variability of mast production from year-to-year. Although adverse impacts are  
6 expected to be minimal and not undue, UPC Vermont Wind is continuing  
7 discussions with biologists at ANR, and some additional fieldwork may be  
8 conducted to more fully characterize existing conditions and to consider whether  
9 impacts can be further avoided, minimized and/or mitigated.

10           Investigations by Woodlot Alternatives, as summarized in the testimony of  
11 Bob Roy, indicate that the installation of the turbines is not likely to present an  
12 undue risk of impacts for migrating birds and bats. Passage rates for daytime  
13 migrants (primarily raptors) were very low, indicating that the site is not a  
14 concentration area that would put large numbers of birds at risk of collision. Radar  
15 surveys of nocturnal migrants, which include most songbird species, confirmed that  
16 they pass over the site in both spring and fall in a broadfront pattern that is typical of  
17 this landscape. Numbers of migrants were similar to those documented elsewhere in  
18 the region, and only a small percentage was documented flying below turbine height.

19           Documented bat activity, as indicated using acoustical recording detectors  
20 deployed for a total of 322 detector-nights in fall 2004, spring 2005, and summer-fall  
21 2005, was on the order of 1 to 2 bats per detector-night, or less, on average (i.e.,  
22 quite low), and thus the site does not appear to pose a risk of a high incidence of bat  
23 collisions. For comparison, detection rates at the Mountaineer project in West

1 Virginia, where large numbers of collisions have been documented, were roughly 20-  
2 40 times the level documented at Sheffield. Although the risk of impacts appears to  
3 be quite low, UPC is continuing to discuss the results of surveys with ANR  
4 biologists, and may conduct a limited amount of additional survey work at the site to  
5 characterize specific aspects of bat occurrence and activity patterns in more detail.

6 In summary, the site provides habitat for a variety of species that are  
7 common to the region. Development of the Project will alter the ways that some  
8 species (or individuals) use the site, and may lead to minor changes in some local  
9 populations. Overall, the species that currently use the area are well-adapted to the  
10 existing and proposed habitats, and there will not likely be any undue adverse  
11 impacts to rare, threatened or endangered species, wildlife habitats, or local or  
12 regional wildlife populations.

13

14 **Development Affecting Public Investments**

15 The Project will not unnecessarily or unreasonably endanger the public or  
16 quasi-public investment in public facilities, services, or lands, or materially jeopardize  
17 or interfere with the function, efficiency, or safety of, or the public's use or  
18 enjoyment of or access to the public facility, service, or lands.

19 The Project area is not directly adjacent to any publicly-owned lands or  
20 facilities. With respect to any public lands or facilities from which the Project may  
21 be visible, it will not materially jeopardize the public's use or enjoyment of those  
22 lands. See the prefiled direct testimony of David Raphael.

1           As discussed above under Traffic, the Project will not unreasonably impact  
2 any public roads, and UPC will bear the cost of any necessary improvements.

3           The Project's transmission line is being designed in consultation with  
4 VELCO to preserve the stability and reliability of its system.

5

6                           **30 V.S.A. § 248(b)(6) – Integrated Resource Planning**

7   **Q.     Is the Project consistent with the principles for resource selection expressed**  
8 **in that company's approved least cost integrated plan?**

9           Response. This criterion is not directly applicable to this Project. UPC is not a  
10 regulated distribution utility and thus is not required to submit for Board approval a  
11 least cost integrated plan.

12           However, inasmuch as integrated resource planning is relevant to any Board  
13 determination under Section 248, Vermont utilities who may purchase power from  
14 this Project would each seek to diversify supply portfolios that include a mix of  
15 renewable and non-renewable energy.

16

17                           **30 V.S.A. § 248(b)(7) – Comprehensive Energy Plan**

18   **Q.     Is the Project in compliance with the Department of Public Services'**  
19 **approved Electric Energy Plan?**

20           Response. Under 30 V.S.A § 202(f), the Department of Public Service is responsible  
21 for making the determination on the Project's compliance with the Comprehensive  
22 Electric Plan. UPC has submitted a request for this determination.

1           A general review of the 2005 Vermont Electric Plan clearly demonstrates that  
2           the Project complies with the goals, recommendations and priorities established by  
3           the Plan. The overarching goal of the Plan is “to meet Vermont’s electric energy  
4           needs in a manner that is efficient, adequate, reliable, secure, sustainable, affordable,  
5           safe, and environmentally sound, while encouraging the State’s economic vitality and  
6           maintaining consistency with other state policies.” The proposed UPC Sheffield  
7           Wind Farm is consistent with this broad goal. The Project will provide 52 MW of  
8           new energy in an efficient, reliable, secure, sustainable, affordable, safe, and  
9           environmentally sound manner. To achieve these goals, the Plan identifies several  
10          priorities for the State of Vermont, including resource diversification, lower cost  
11          electric service, and the promotion of clean and stable energy sources. Increased  
12          wind power plays an important role in each of these priorities.

13           Operation of the proposed UPC Sheffield Wind Farm would result in greater  
14          diversification of Vermont’s energy portfolio and would add another energy source  
15          that does not rely on inputs from outside the state. This increased diversification  
16          will, in turn, help buffer against increasing energy costs. The Plan itself  
17          acknowledges that, “[w]ind should be viewed as a component in a balanced portfolio  
18          of resources that can importantly act as a hedge against fluctuating fossil fuel prices.”  
19          Plan at 5-6. Wind similarly plays a critical role in “environmentally sound electric  
20          energy supply.” The Plan emphasizes that, “[e]nhancement and conservation of our  
21          natural resources and mitigation of the impact of necessary energy production and  
22          use on air, water and land are basic governmental responsibilities. Planning for  
23          future electric energy needs must also address air and water quality objectives.” Plan

1 at 1-6. As previously noted, wind is a clean source of energy, and no air pollution will  
2 be generated by the turbines. Energy produced by the turbines will, in fact, decrease  
3 the overall emissions from fossil fuel plants, which would otherwise be needed to  
4 supply energy being produced by the wind farm. In addition to producing no air  
5 emissions, the Project will also not result in undue water pollution.

6 Overall, the Project represents a commitment to the type of clean, reliable,  
7 affordable, and sustainable energy future envisioned in the Plan. There is no reason  
8 to believe that the Project is not consistent with the 2005 Vermont Comprehensive  
9 Energy Plan.

10

11 **30 V.S.A. § 248(b)(10) – Transmission Facilities**

12 **Q. Can the Project be served economically by existing or planned transmission**  
13 **facilities without undue adverse effect on Vermont utilities or customers?**

14 Response. Yes it can. UPC will construct a 34.5 kV collector line that will run from  
15 the turbine arrays to a new substation, where it will interconnect with VELCO's  
16 existing 115 kV line. UPC will pay all necessary costs to interconnect the Project to  
17 the VELCO line, with no financial impact to Vermont ratepayers. In addition, UPC  
18 is paying for the necessary studies being conducted by ISO-New England to confirm  
19 that the Project will not have an undue adverse affect on system stability and  
20 reliability. See the prefiled direct testimony of Daniel R Crocket, PE E/PRO.

21 Finally, it should be noted that one of the strong attributes of this Project is its close  
22 proximity to an existing transmission line, thus eliminating the need to run any new  
23 transmission lines along public roads or other public rights-of-way.

1

2 **Q. Does this conclude your testimony at this time?**

3 Response. Yes it does.