

**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  
ARTHUR V. GILMAN**

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

February 21, 2006

Summary:

Mr. Gilman describes his investigations concerning wetlands, surface water bodies, rare and irreplaceable natural communities, and rare, threatened and endangered plant species. Mr. Gilman assesses the Project's potential impacts under Act 250 criteria 1(E), 1(G), 4, 8, and 8(A) with respect to those resources, and concludes that the project will not have an undue adverse impact.

1 **Q. What is your name, occupation, and business address?**

2 Response. My name is Arthur V. Gilman. I am a principal in the firm of Gilman &  
3 Briggs Environmental, Inc., of Barre, Vermont, specializing in environmental  
4 consulting in regard to wetlands, terrestrial ecology and wetland ecology, botany,  
5 wildlife biology, and rare, threatened and endangered species.

6

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

8 Response. I have a Bachelor of Arts Degree from Brown University (1976). Prior to  
9 starting my own firm in August 2005, I was employed in a similar capacity for 17  
10 years for the firm of William D. Countryman Environmental Assessment &  
11 Planning, based in Northfield, Vermont. During that time, and since, I have worked  
12 on hundreds of projects in Vermont, Maine, New Hampshire, New York, and  
13 Massachusetts, in which I have delineated, evaluated and assessed wetlands and other  
14 natural resources, and have performed a similar number of searches for rare,  
15 threatened and endangered species. Pertinent to the botanical aspect of this project, I  
16 would draw attention to the fact that I authored “The Vascular Flora of Caledonia  
17 County, Vermont,” which was published in Rhodora, the Journal of the New  
18 England Botanical Club, in 1999. A copy of my current professional resume is  
19 attached as *Exhibit UPC-AG-1*.

20

21 **Q. Have you previously testified before the Public Service Board?**

22 Response. Yes, I have testified before the Board, specifically in the VELCO  
23 “Northwestern Vermont Reliability Project,” and the VELCO “Lamoille County

1 Project” dockets, in regard to issues similar to the ones I will testify to in this  
2 proceeding. Additionally, I have testified before the Vermont Environmental Board,  
3 before several District Environmental Commissions on numerous projects, before  
4 various town and city boards and commissions, and before the Institutions  
5 Committee of the Vermont State Senate.

6

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

8 Response. I was hired by UPC Vermont Wind, LLC to conduct several  
9 environmental studies to evaluate the impacts of the proposed Sheffield Wind Farm.  
10 The purpose of my testimony is to summarize the methodology and results of my  
11 investigations. My testimony will address the following Act 250 criteria that the  
12 Public Service Board considers in a section 248 proceeding:

- 13 ○ Criterion 1(E) streams
- 14 ○ Criterion 1(G) wetlands
- 15 ○ Criterion 4 water quality (as pertaining to wetlands)
- 16 ○ Criterion 8 rare and irreplaceable natural areas
- 17 ○ Criterion 8a endangered species: flora

18

19 **Q. Please describe your general approach in conducting a review of this project.**

20 Response. In addition to reviewing available resource maps and literature pertaining  
21 to the project area, I reviewed the project area on foot over seven days between  
22 August 2 and November 15, 2005, including inspections for wetlands and searches  
23 for rare, threatened and endangered species. All the individual turbine sites, the

1 access roads, and the substation site were inspected. During my field review, I also  
2 made observation of other surface water bodies, including perennial and intermittent  
3 streams. Wetlands were delineated according to methodology outlined in the 1987  
4 US Army Corps of Engineers Wetland Delineation Manual, which is the standard  
5 methodology in Vermont. This methodology requires inspection of three  
6 parameters in determining wetland boundaries: soils, plants, and hydrology.  
7 Boundaries were marked with sequentially numbered flags which were located with  
8 global positioning system (GPS) technology. This technology provides submeter  
9 accuracy for mapping wetlands to the project site plans, and for calculating impacts  
10 where they occur. To document the wetland boundaries, transect data were taken on  
11 a subset of typical, representative wetlands. Each wetland was given a unique  
12 identifier number for reference, which is used throughout my reports and in my  
13 testimony.

14

15 **Q. Did you identify any streams in the vicinity of the Project?**

16 Response. Yes, there are several streams within the project area. The only named  
17 stream is Calendar Brook, which drains the southern slopes of Granby Mountain,  
18 Libby Hill, so-called Barrett Mountain and Norris Mountain, and the north slope of  
19 Hardscrabble Mountain. Calendar Brook has several tributaries, including  
20 permanent and seasonal streams that drain these slopes. The largest of these is a  
21 tributary that drains the beaver pond area located near Libby Hill. There are also at  
22 least three seasonal streams that flow northward, draining some of the smaller  
23 wetlands located on the summit of Norris Mountain, and wetlands just west of

1 Barrett Mountain. All of these streams are identified on the Wetlands Maps,  
2 Attachment B of *Exhibit UPC-AG-2*.

3

4 **Q. Will the Project require any work within the riparian buffer zone for the**  
5 **streams you have identified?**

6 Response. Yes, the Project will require some work within the riparian buffer,  
7 primarily associated with construction and upgrade of the access roads. For  
8 example, the crossing of Calendar Brook, just north of the proposed substation, is  
9 now done on a logging road with a poorly set culvert that should be replaced. Other  
10 culverts on existing access roads across the tributaries of Calendar Brook will also  
11 have to be re-set to handle the project loads. At present, the plans call for five such  
12 culverts on streams.

13 Additionally, new culverts will be required for the new road-crossings of the  
14 permanent stream that outlets the beaver dam near Libby Hill, the stream that is  
15 located near Turbine 11, the stream towards Turbine 10, the seasonal stream  
16 between Turbines 7 and 14, the seasonal stream downslope of Wetland 36, and the  
17 stream outlet of Wetland 40A, all of which are not near existing access roads.

18 Otherwise, streams are generally avoided by the project layout.

19

20 **Q. What, if any, impacts will the Project have on streams?**

21 Response. As stated above, there will be a relatively small amount of new work in or  
22 near streams, and I believe that with proper engineering, this work can be  
23 accomplished without degrading the streams to the extent that they would not meet

1 water quality standards. A detailed discussion of erosion control during construction  
2 and stormwater measures is included in the testimony of Ralph Nelson. The impacts  
3 associated with upgrade and construction of access roads will be temporary in nature  
4 and the natural condition of the streams will be maintained. In some instances,  
5 stream quality may be improved when poorly built culverts or roads are upgraded.

6 The turbine sites are located more than 100 feet from streams. Land-clearing  
7 associated with construction at the turbine sites should not affect the water quality of  
8 streams. In some forested situations, an increase in the sunshine at the ground level  
9 on cleared, bare ground, for example in clearcuts, has been shown to increase water  
10 temperatures, which could be detrimental to streams. Here, however, the turbine  
11 locations will be allowed to re-vegetate after construction, reducing the potential for  
12 impacts associated with increased water temperatures. Overall, I believe that the  
13 Project will not result in any undue adverse impacts on streams in the vicinity.

14  
15 **Q. Please summarize the investigations that you conducted regarding wetlands.**

16 Response. Our evaluation of the Project's potential impacts on wetlands involved  
17 both field and office work. My colleague, Errol Briggs, and I delineated the  
18 boundaries of all the wetlands that are within the footprint of the project as it is now  
19 proposed, with minor exceptions, and evaluated their functions and values as  
20 outlined in the Vermont Wetland Rules. The delineated wetlands boundaries were  
21 added to the project base map for planning purposes, so that I could assess impacts  
22 that might occur to them as a result of the project. I also inspected the Vermont  
23 Significant Wetlands Inventory for the Project area to determine which, if any, of the

1 wetlands in or near the project are significant wetlands as defined by the Vermont  
2 Wetland Rules.

3 After identification, I evaluated the wetlands using two standard protocols in  
4 addition to my professional judgment. These were the Vermont Wetland Evaluation  
5 Form and the US Army Corps of Engineers “Highway Methodology Workbook  
6 Supplement.” Together, these protocols give a clear picture of the functions and  
7 values of the wetlands, as summarized in Table 1 of my report (*Exhibit-AG-2,*  
8 *Attachment A*). The Vermont Wetland Evaluation Form, in particular, addresses  
9 the functions and values that are protected for Class One and Class Two wetlands  
10 under the Vermont Wetland Rules.

11 The methodology and results of my wetlands investigations are further  
12 detailed in my report dated January 2006 (*Exhibit UPC-AG-2*).

13

14 **Q. Please briefly summarize your findings with respect to the size and**  
15 **characteristics of the wetlands in the vicinity of the Project.**

16 Response. As detailed in my report (*Exhibit UPC-AG-2*) and as shown on the  
17 project site plans, there are numerous wetlands within the general vicinity of the  
18 Project. Altogether, I have delineated approximately 58 wetland areas within, near,  
19 or adjacent to the project footprint. Of these 58 wetlands, 17 are within the project  
20 footprint. See Attachment B in *Exhibit UPC-AG-2*. For the most part, the  
21 wetlands in the vicinity of the Project are small, discrete, and well-separated  
22 palustrine forested wetlands, i.e., small wooded swamps that are not parts of larger  
23 contiguous wetland systems. Many of them are characterized by groundwater

1 discharge, where groundwater comes to the surface. Some are basin or ‘pocket’  
2 wetlands in bedrock depressions. The largest wetlands are a beaver pond just north  
3 of Libby Hill, wetlands along Calendar Brook, and wetlands along the VELCO  
4 power line on the valley floor.

5 Besides the beaver pond area, only a couple of wetlands are naturally open,  
6 non-forested wetlands. One is the wetland labeled Wetland 16, which is a ‘fen’ as  
7 defined by the Vermont Wetland Rules. Wetland 26 is also not forested, but unlike  
8 the fen, which is characterized by groundwater discharge, it does not evidence any  
9 discharge and more likely is an area of recharge. Wetlands along the VELCO power  
10 line (i.e., Wetlands 7A, 8, and 9) are maintained in an open state, although they  
11 would be forested under natural conditions.

12 There is one pond, which is on the King George School property, to which I  
13 have not had access. Otherwise, there are no marshes, ponds, or wet meadows.  
14 Some of the wetlands, especially along logging and access roads, have been disturbed  
15 and in some cases it is apparent that wetland conditions have expanded due to  
16 ground disturbance and interference with runoff.

17

18 **Q. Have you identified any Class Two wetlands that are protected by the**  
19 **Vermont Wetland Rules?**

20 Response. None of the delineated wetlands in the project area are identified on the  
21 Vermont Significant Wetlands Inventory map as Class Two wetlands, with the  
22 exception of the pond on the King George School property, which is mapped as a  
23 pond (‘palustrine open water’). This pond is located near but downstream of the

1 access road for the northern power array of the Project, and if, upon delineation, it is  
2 found to be within 50' of the road, then the access road would traverse through its  
3 statutory 50' buffer zone.

4 I would also note that the Vermont Geographic Information System (GIS)  
5 wetlands layer for this area shows another Class Two wetland, generally on the south  
6 side of Norris Mountain. This wetland is outside the project footprint. Inspection  
7 of a paper copy of the actual map published by the National Wetlands Inventory  
8 (1979), as required by the Rules, shows that the GIS layer is in error. I have been on  
9 the ground in that vicinity and observed no wetland within 50 feet of the proposed  
10 access roadways.

11 All of the remaining wetlands I have identified are Class Three wetlands.

12

13 **Q. What, if any, impacts would the Project have on the mapped Class Two**  
14 **wetland on the King George property?**

15 Response. In my opinion, the project will not result in an undue adverse impact on  
16 the Class Two wetland on the King George School property. I have not been  
17 granted access to the site to conduct a complete analysis, but assuming that the pond  
18 consists only of the pond and there are no contiguous wet meadows, and given  
19 UPC's estimation that the roadway would not have to be substantially rebuilt to  
20 accommodate project traffic, there would be no direct impacts to the wetland. The  
21 extent of reconstruction of this portion of roadway may include, if anything,  
22 strengthening of the culvert and resurfacing following the completion of the project.  
23 No widening of the travel surface or widening of the turning radius in this area is

1 expected to be needed. Even if the roadway requires some additional reconstruction  
2 from that described, such that it passes through the pond's buffer zone (with the  
3 pond being downslope of the road), I do not believe that use of the road will result  
4 in any undue adverse effects. Without having seen the pond site, I estimate that the  
5 pond is likely only significant for water quality maintenance, possibly for wildlife  
6 habitat, and possibly for visual quality. These functions would not be affected by use  
7 of the nearby existing road at the levels projected for this project. Except for  
8 allowed uses, intrusion into the 50' buffer zone of this wetland would require a  
9 Conditional Use Determination from the Agency of Natural Resources, which can  
10 only be granted if the Agency finds no undue adverse impacts to protected functions  
11 of the wetland. If so, I believe the standards could be met and a CUD could be  
12 granted to allow use of this roadway.

13

14 **Q. What type of analysis is appropriate for the remaining Class 3 wetlands?**

15 Response. Class 3 wetlands are not governed under the Vermont Wetland Rules,  
16 and thus are not relevant under criterion 1(G). However, impacts to such wetlands  
17 will need to be permitted by the US Army Corps of Engineers, either under the  
18 Vermont General Permit No. 58, or an Individual Permit. I have evaluated these  
19 wetlands using the same functions and values analysis that would be used for Class 2  
20 wetlands to assist in the permitting process.

21

1 **Q. Please summarize your findings concerning potential impacts to Class 3**  
2 **wetlands.**

3 Response. Table 1, included as part of *Exhibit UPC-AG-2* (Attachment A)  
4 provides a summary of each wetland. This report and attached table describe the  
5 functions and values for which each wetland is significant, and the project's potential  
6 impacts. It is my assessment that the project will not result in undue adverse affects  
7 to the wetlands associated with this project. This is principally due to the iterative  
8 process I undertook with UPC to identify wetlands and avoid and minimize impacts  
9 through redesign of roads and turbine locations wherever possible, UPC's proposed  
10 use of a site-specific erosion prevention and sediment control plan, the small size of  
11 many wetlands, the small area actually impacted, and the limited functions and values  
12 that many of the wetlands perform.

13

14 **Q. In your opinion has UPC Vermont Wind avoided wetlands impacts to the**  
15 **maximum practicable extent?**

16 Response. In my opinion, the applicant has met this standard through careful siting  
17 of the proposed turbines, roadways, and substation. I have proposed  
18 recommendations for mitigating the Project's potential impacts on wetlands, which  
19 UPC has followed. In particular, I recommended that the substation site be re-  
20 located from the original plan, to avoid wetland impacts, that Turbines 26, 16, 10,  
21 and 14, be moved to avoid or minimize impacts, and that the access road be shifted  
22 in several locations, particularly between Turbine locations 16 and 12, between 19  
23 and 12; access to Turbine 10, between 5 and 3, access to 8, between 7 and 14,

1 between Turbines 20 and 13, and between 15 and 2, to avoid or minimize impacts.  
2 UPC has implemented these suggestions in their planning, significantly reducing the  
3 amount of wetland impact that was included in the preliminary site design.  
4

5 **Q. Given the number of Class 3 wetlands that are within the project's footprint,**  
6 **have you considered potential cumulative impacts?**

7 Response. I have. Although there are numerous individual wetlands, they are all  
8 quite small, and most have limited functions and values. Because they are almost all  
9 within the Calendar Brook watershed, the accumulation of impacts would accrue to  
10 this waterbody, which is not an impaired waterway. Because the total amount of area  
11 that will actually be filled will be small, because many of the wetlands are basin-type,  
12 without outlets, and because they are scattered more or less throughout the project  
13 area, I believe that the potential for unduly adverse cumulative impacts is not great.  
14 Because these wetlands form a small percentage of the involved lands, potential for  
15 cumulative impacts to the resource is actually more of an upland/erosion control  
16 issue. As I noted above, impacts to the cumulative total wetlands resource base are  
17 minimized by project planning. Although there are many, scattered wetlands within  
18 the area, they are mostly avoided by the planning effort. And, although wetlands  
19 overall form a minor part of this landscape, wetlands are not rare or lacking in the  
20 Northeast Kingdom.  
21

1 **Q. Please describe your review regarding “rare and irreplaceable natural areas.”**

2 Response. My evaluation of the Project’s potential impacts on rare and irreplaceable  
3 natural areas was based on both literature reviews and site studies. I conducted a  
4 literature search and map review of the project area, which showed no such sites. I  
5 also reviewed a list of other such sites in Vermont, as known to me through my  
6 experience over the years. Finally, I inspected the project area to see if there were any  
7 communities that would be ranked as ‘rare’ by the Vermont Nongame and Natural  
8 Heritage Program (VNNHP).

9  
10 **Q. What, if any, impacts will the Project have on rare and irreplaceable natural**  
11 **areas?**

12 Response. My investigation is described in my report, *Exhibit UPC-AG-3*. During  
13 my fieldwork, I observed no areas within the project footprint that are comparable to  
14 any other areas in the State that have been designated as irreplaceable natural areas. I  
15 did note two habitats that may be of some importance on a statewide basis: a fen  
16 near the clearing between Libby and Barrett Mountains, and three patches of “rich  
17 northern hardwood” forest.

18 The wetland area (Wetland 16) identified as a ‘fen’ would be ranked “rare”  
19 under the VNNHP’s ranking system. The Project will not have any direct impacts on  
20 this area, and I do not anticipate that any indirect impacts will result in undue  
21 adverse effects on this area.

22 The three patches that I would consider to meet the definition of “rich  
23 northern hardwood forests” are perhaps notable for “heritage value.” These are

1 Wetlands 18, 38 and 39. This forest type, however, is not ranked as “rare” by the  
2 VNNHP. Furthermore, at my suggestion, UPC Vermont Wind has planned the  
3 project to specifically avoid these areas, and they are outside of the project footprint.  
4

5 **Q. Please describe your review of threatened and endangered plant species.**

6 Response. Again, my investigation is described in my report, *Exhibit UPC-AG-3*.  
7 In addition to review of the Vermont Significant Habitat map, which incorporates  
8 data from the VNNHP, and performing a literature and herbarium search specific to  
9 the towns of Sheffield and Sutton, I spent two days in directed searches in much of  
10 the project area, and inspected most of the rest of the project area while doing  
11 wetland delineations. My report gives further details on the scope of these searches.  
12

13 **Q. What were the results of your evaluation of threatened/endangered species?**

14 Response. I found a substantial population of a plant species that is listed as  
15 ‘endangered’ under Vermont statute (V.S.A. 10, Chapter 123). This is ‘woodland  
16 cudweed’ (*Omalotheca sylvatica*), a small perennial member of the aster family. It  
17 occurs in an area at the southern summit of Hardscrabble Mountain that is currently  
18 pastured to cattle. Woodland cudweed is ranked as “very rare” by the VNNHP and  
19 I concur with this ranking, as the species is known in Vermont from only three other  
20 sites, all of which may not be extant. All of the four known sites are in the  
21 Northeast Kingdom.  
22

1 **Q. Have you made any recommendations to UPC Vermont Wind in regard to**  
2 **this species?**

3 Response. Yes. Because woodland cudweed is listed as endangered, any taking  
4 would require an endangered species permit from the Secretary of the Agency of  
5 Natural Resources. For this reason, and for good conservation practice, I  
6 recommended that the location of the southernmost turbine on Hardscrabble  
7 Mountain (Turbine 23) be relocated to avoid any need to ‘take’ any individuals of this  
8 species. The turbine site has been relocated to a more wooded area (which is less  
9 likely to support this species notwithstanding its name), and I expect to undertake a  
10 follow-up inspection of the new site in 2006. If, as I anticipate, there are no  
11 individuals of this species in the new area, then construction could proceed without  
12 resulting in a taking. If additional individuals are identified, then the location could  
13 be moved again, or an endangered species permit application could be submitted to  
14 the Agency of Natural Resources.

15

16 **Q. How does woodland cudweed tolerate the trampling and grazing by cows in**  
17 **the area?**

18 Response. It appears to tolerate the level of grazing that now occurs; most plants  
19 that I observed had been cropped and occurred in very short turf. If the pasture  
20 extends to the new turbine site, I anticipate that additional habitat will be created for  
21 it.

22

1 **Q. Did you observe any other rare, threatened, or endangered species?**

2 Response. No, woodland cudweed was the only species that I encountered within  
3 the project area that is ranked as ‘rare’ under the system used by the VNNHP. As  
4 noted in my report (*Exhibit UPC-AG-3*), I did observe four species that the  
5 VNNHP considers “uncommon.” Based on my experience in developing the  
6 “Vascular Flora of Caledonia County,” I concur that these species are uncommon,  
7 but not rare. Most of the populations of these species are outside the footprint of  
8 the project as it is now proposed. It is my opinion that populations of these species  
9 will not be unduly harmed.

10

11 **Q. Does that complete your testimony at this time?**

12 Response. Yes it does.