

**STATE OF VERMONT
PUBLIC SERVICE BOARD**

Docket No. 7156

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 REBUTTAL TESTIMONY OF
DAVE COWAN, SCOTT ROWLAND AND STEVE VAVRIK**

ON BEHALF OF UPC VERMONT WIND, LLC

September 25, 2006

Summary:

Mr. Cowan, Mr. Rowland, and Mr. Vavrik describe revisions to the proposed project design and respond to comments from other parties regarding overarching aspects of the petition.

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

2 Response.

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

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

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

12

13 **Q. Have you previously testified in this proceeding?**

14 Response. Yes, we have.

15

16 **GENERAL**

17 **Q. Please summarize your testimony.**

18 Response. The purpose of our testimony is to respond (either ourselves or by
19 reference to rebuttal testimony by UPC's other witnesses) to the concerns raised by
20 the other parties in their direct prefiled testimony filed on July 28, 2006. Our
21 response consists of three distinct components:

22 1. **Changes to the Project's layout to address claims/concerns raised by**
23 **other parties.** UPC has attempted wherever possible to revise the Project in

1 order to make it acceptable to as broad a community of interests as is possible,
2 although UPC does not necessarily agree with the merits of each and every claim
3 or concern expressed. The changes, as compared with the old layout, are
4 summarized in ***Exhibit UPC-CRV-Reb1***. The revised layout is depicted on the
5 Revised Overview Maps, ***Exhibit UPC-CRV-Reb2a-c***. In short, they include:

- 6 a. Reducing the number of turbines from 26 to 16:
- 7 i. Eliminating the Hardscrabble (southern) array of 6 turbines.
 - 8 ii. Reducing northern array from 20 to 16 turbines.
 - 9 iii. Reducing the project footprint, and thus reducing the limited
10 potential impacts to wetlands, streams, bear and other wildlife
11 habitat.
 - 12 iv. Reducing the limited potential for habitat fragmentation.
 - 13 v. Reducing the amount of new roads, including ridgeline roads.
 - 14 vi. Eliminating 4 of 6 turbines in Sutton.
 - 15 vii. Making the project layout more compact, and thus reducing the
16 limited overall noise and visual impacts.

- 17 b. For site access, using a western approach from New Duck Pond Road
18 and then to the turbine locations via existing legal trails, existing logging
19 roads and new roads. The eastern approach from Kivmae/Dareios
20 Roads near the King George School would be a secondary option.

- 21 2. **Additional data and other detailed technical documents on certain issues**
22 **as requested by other parties.** UPC has undertaken more studies and is
23 providing additional information in a number of areas, notwithstanding the fact

1 that UPC believes that its current prefiled direct evidence should be sufficient to
2 reach affirmative findings, and/or that some of these materials could properly be
3 submitted as post-CPG filings, as the Board has permitted in other cases. The
4 information includes:

- 5 a. Additional bird and bat data
- 6 b. Additional bear habitat and wetland delineation work
- 7 c. Detailed stormwater and erosion plans
- 8 d. Additional sound data on the wind turbines
- 9 e. Additional electric system information from ISO-New England
- 10 f. Decommissioning cost estimates

11 3. **Rebuttal responses to various issues raised by the other parties where**
12 **UPC's witnesses simply disagree with their testimony, and where UPC**
13 **believes that it is clear no additional data or project changes are warranted**
14 **to meet its burden under 248.** A summary of the concerns expressed by other
15 parties, and UPC's responses, is provided as ***Exhibit UPC-CRV-Reb3.***

16
17 **Q. Please explain the revisions to the Project, and how it now differs from the**
18 **previous layout and components**

19 Response. The principal differences between the two layouts is described and shown
20 in ***Exhibits UPC-CRV-Reb1*** and ***UPC-CRV-Reb2c.*** Detailed resource maps and
21 grading plans are provided in ***Exhibits UPC-CRV-Reb4a-b.***

22 Turbines: The revisions to the project include a new model of turbines by a
23 different manufacturer, and new access and turbine roads. The new turbines are

1 Clipper Liberty Class IIB 2.5 MW turbines. These turbines are manufactured by
2 Clipper Wind of Carpinteria, CA. See www.Clipperwind.com. The turbines are very
3 similar to the Gamesa G87 discussed in our prefiled direct testimony, and are
4 consistent with the general specifications provided on page 8 of that testimony, i.e.,
5 they are 3-blade, upwind, Danish style wind turbines on 80 meter towers. The
6 construction and operation of these turbines are very similar to that of the G87s,
7 with the principal difference being the Clipper having a tip height that is
8 approximately 6.5 meters taller (21.24 ft) and an individual output capacity of 2.5
9 MW. The Clipper machine, though, provides for some significant operational
10 advantages compared to the Gamesa: the Clipper houses four (4) generator-sets to
11 the G87's one. By having four independent and smaller generators, the risk of
12 power production outage is greatly reduced. If a generator fails, the turbine will still
13 produce 75% of the rated power, rather than none in the single-generator design.
14 Further, the Clipper incorporates a two ton hoist in the nacelle that allows the on-
15 board replacement of generators, pinions, and other equipment. This reduces the
16 need of cranes being brought on-site to perform repairs to the turbines.

17 The sixteen Clipper machines are rated at 2.5 MW each (40 MW total), rather
18 than 2.0 MW each for the twenty-six G87 machines (52 MW total). Therefore, there
19 is greater power generation per turbine with the new machines. However, the
20 change from 26 to 16 turbines results in total average power production for the
21 Project decreasing from 147,600 to 111,900 MWh/year. This annual generation,
22 111,900 MWh, is the equivalent of the entire energy usage of all homes within
23 Caledonia County.

1 The concrete foundations for these new turbines will be approximately 33%
2 larger in total volume than the Gamesa foundations. However, the overall concrete
3 volume for the Project decreases because of the reduction in machines (thus also
4 reducing truck trips during construction). The only part of the foundation that will
5 protrude from the ground is the attachment point with the towers, so the visual
6 difference of the foundations is minute.

7 Roads: The turbine roads have been reconfigured to accommodate the new
8 turbine layout. This has resulted in the northern array being divided into two main
9 portions. Two turbines located on Norris Mountain in Sutton will be accessed by an
10 existing logging road (with sections to be improved) that runs approximately north-
11 south. The western portion of the array will be accessed by the same logging road,
12 upgraded for use,¹ as was identified in our prefiled direct testimony. Another branch
13 of the existing logging road will be used to access the middle of the ridge and ten
14 turbine sites. The remaining four turbines on Granby Mountain and Libby Hill will
15 be accessed via a new road See ***Exhibit UPC-CRV-Reb4***.

16 The principal benefits to this revised road configuration are avoidance of the
17 beaver pond wetland (Wetland 22) and avoidance of a very steep section going up
18 Norris Mountain that would have required more significant cut and fill and a more
19 challenging design to adequately handle stormwater. In addition, the new road
20 network will reduce the limited incremental habitat fragmentation perceived to occur

¹ Upgrading the logging roads for use consists of grading, new/replaced culverts, and new gravel work where necessary. A road width of 16 feet is generally adequate to accommodate construction and operation equipment.

1 across the project site (beyond what already exists from past logging activities – see
2 ***Ex. UPC-CRV-Reb2c*** (aerial view).

3 The primary alternative for entry to the site area off of public roads will now
4 be from the west, rather than the east. This is one of the 3 options discussed in our
5 prefiled direct testimony at page 23. UPC has shifted to this as the preferred route in
6 order to address potential concerns regarding use of the I-91 emergency access ramp
7 and the use of other local public roads close to Hardscrabble Mountain homes and
8 the King George School. This access route starts at the I-91 exit in Barton, proceeds
9 on Route 5 to New Duck Pond Road, and then turns east into the project site area
10 via a legal town trail. A combination of the town trail and new roads will be used as
11 the road runs west to east before turning north to the ridge. The road layout has
12 been designed to balance minimizing impacts to wetlands and bear-scarred beach,
13 while avoiding particular difficult slopes or the creation of more roads.

14 The total length of on-site roads is approximately 9.7 miles. This includes
15 the access road from New Duck Pond Road, the existing logging roads that will be
16 upgraded for use, and the new turbine roads. Of that total, 5.5 miles represents new
17 road construction, a reduction of about 10% from the old design. As before, all
18 access roads will be 16 feet wide. The roads linking the turbines will be 36 feet wide
19 during construction but will then be allowed to re-vegetate as soon as construction is
20 completed, to a finished width of 16 feet.

21 Electrical lines: Given that the revised layout results in three distinct clusters
22 of turbines, two separate collector lines will be required to conduct the power from
23 the turbines to the substation. As before, the collector line between the individual

1 turbines will be underground and the collector line down from the ridge to the
2 substation will be an overhead.

3

4 **Q. Why is UPC proposing a smaller project with lower power production?**

5 Response. UPC believes that the larger 52 MW project, as it originally proposed,
6 would have provided greater benefits to Vermonters, than the revised project.
7 However, finding a project layout that would be most acceptable to the local
8 community was also an important factor that led UPC to redesign the Project.

9 It should be noted that UPC's redesign of the project has involved a
10 balancing of the competing interests in this case – environmental, neighbors'
11 concerns, constructability, road building, etc.; as a result no single factor was
12 optimized to its fullest. Thus, the revised project layout avoids certain local roads
13 and access points, but as a result, requires the creation/reconstruction of a road off
14 of New Duck Pond Road that results in the crossing of several additional small Class
15 3 wetlands. While our wetlands expert does not believe these small changes will
16 cause an undue adverse impact to the resources, it does reflect a tradeoff of sorts.
17 Similarly, UPC's efforts to account for and mitigate several other perceived concerns
18 results in a decrease in the total number of turbines, and as a result a smaller amount
19 of in-state renewable electrical generation provided to the State and its citizens.

20

21 **Q. So UPC is seeking Board approval of the revised Clipper layout?**

22 Response: Yes, subject to the flexibility the Board typically affords to projects to
23 accommodate issues that arise during micro-siting or other post-certification

1 refinement of the project. It should also be noted that in light of rapid changes in
2 wind turbine technology, and the severe supply limitations on turbines over the next
3 few years, the actual turbine that will be used could conceivably change. It is
4 certainly not UPC's intention to propose any further turbine change; should such a
5 proposal be necessary, however, UPC would seek the Board's approval.

6

7 **Q. What studies/analyses did UPC update or perform based upon the revised**
8 **project layout?**

9 Response. UPC has undertaken multiple studies at the request of ANR and others
10 to supplement the information provided as part of the prefiled direct testimony. In
11 addition, UPC undertook specific studies because the turbine layout changed. These
12 additional studies include the following:

13 Wildlife, wetlands, rare plants

14 The entire revised array area including all access roads, the turbine locations
15 and the location of the maintenance building were investigated for the presence of
16 wetlands and rare plants, and wildlife specific habitats (for bear, moose and deer).
17 The complete inventories of these features are mapped and were used to select the
18 final location of the project features. As before, an iterative process was followed to
19 attempt to minimize impacts to wetlands and wildlife. Only 38 bear-scarred beech
20 (BSB) (out of over 1300 in the study area), 1.16 acres of wetlands (spread over 26
21 wetlands), and no rare plants are directly impacted by this Project. Continuing efforts
22 are underway to further reduce these impacts. See prefiled rebuttal testimony of
23 Arthur Gilman and Jeffrey Wallin, and their associated exhibits.

1 Noise

2 A revised noise contour map was prepared by HMMH in the same fashion as
3 the original noise contour map, but in this case, it was prepared utilizing actual sound
4 measurement data from an existing Clipper wind turbine. The noise contours
5 indicate very similar sound levels as described in the prefiled direct testimony of
6 Chris Bajdek for the Gamesa G87. The revised layout results in less potential noise
7 impacts because of the greater distances from the turbines to the closest residences,
8 and the elimination of the Hardscrabble array. See prefiled rebuttal testimony of
9 Chris Bajdek and his associated exhibits.

10 Visual

11 The viewshed analysis and photo simulations for the revised turbine layout
12 show that the revised configuration of the Project, like the original proposal, will not
13 result in undue adverse impacts. However, with the modified array, the massing is
14 more compact and visual prominence of the project is further reduced. Specifically,
15 the houses on or near Hardscrabble now have no views of turbines, southern views
16 from the King George School similarly have no views, the number and massing of
17 turbines visible from Crystal Lake is reduced, and the amount of land area within the
18 10 mile-towns from where this Project is visible has also been reduced. See prefiled
19 rebuttal testimony of David Raphael and his associated exhibits.

20 A revised shadow flicker analysis utilizing the modified layout indicated
21 similar results as with the Gamesa turbine array. With the modified array, there are
22 no residential or other neighbors close enough to the site to experience any shadow
23 flicker caused by the turbines. As with the previous results, the results indicate that

1 there is no adverse impact from shadow flicker from this wind farm. See **Exhibit**
2 **UPC-CRV-Reb5**.

3 Archaeological

4 The archaeological review by UVM of the access road off of Duck Pond
5 Road and the new turbine roads determined that the area is not sensitive for
6 significant archaeological resources, and thus the Project will have no detrimental
7 effect. UVM did recommend one additional field inspection of the existing logging
8 road that will be used to access the two Norris Mountain turbines. UPC is arranging
9 for this field inspection to occur. See **Exhibit UPC-CRV-Reb7b**. An earlier
10 follow-up field assessment of the substation site and electrical feeder line (completed
11 after the Petition was filed) found that there were no sensitive archaeological
12 resources except for the foundation of a barn and house that appeared on historic
13 maps. UVM concluded that impacts can be completely avoided at that historic site if
14 a 40 foot buffer is established, with power pole placement and soil disturbance being
15 placed outside this area. UPC will implement this recommendation. See **Exhibit**
16 **UPC-CRV-Reb7a** (includes figure with approximate location of the foundation).

17 Electrical System

18 The number of collectors has remained the same with two 34.5 kV collector
19 circuits. The only other modifications are the potential addition of a voltage
20 regulatory device that may include dry film capacitors and a second transformer in
21 the substation (see discussion below). The revised collector circuit schematic is
22 provided as **Exhibit UPC-CRV-Reb8**.

1 Subsequent to our original filings, the ISO-NE has finally released the draft
2 final system impact study they completed for the original layout (UPC first applied to
3 the ISO-NE for an interconnection study in October 2004). This study indicates
4 that no modifications to the transmission system are required. The only operational
5 constraint identified was that the wind farm would need to reduce power production
6 if one of the transmission lines it is connected to were to fail. **See Exhibit UPC-**
7 **CRV-Reb9a.** UPC can and will comply with such an operational requirement.
8 Because the revised layout has a reduced total capacity of 40 MW, it is extremely
9 improbable that any additional requirements would need to be imposed as a result of
10 the proposed Project modification.

11 ISO-NE has asked that the issue of voltage regulation be studied in more
12 detail to determine if voltage regulator equipment is needed for the Clipper
13 machines. Such a device was already integrated into the design of the Gamesa
14 turbines. UPC is in discussions with the ISO regarding this issue. **See Exhibit**
15 **UPC-CRV-Reb9b.**

16 Lighting:

17 UPC has revised its proposed lighting plan, and sent notice to the FAA
18 requesting a new determination. The FAA has not yet made a recommendation.
19 The revised plan calls for 8 of the 16 turbines to be lit at night with synchronized
20 pulsating red L-864 fixtures. The prior layout had 15 turbines with lights. See
21 **Exhibit UPC-CRV-Reb6.**

22
23

1 Economics:

2 UPC has updated its economic analysis using the inputs germane to the
3 revised project, and the results are very comparable to those for the prior layout.
4 The Project will result in a total economic investment of \$75 million. Approximately
5 \$25 million will be generated in State economic output during construction and
6 development, \$1.6 million/yr in new Vermont disposable income, 20 new permanent
7 Vermont jobs, and between \$350,000 and \$481,000 per year to the Town of
8 Sheffield in taxes and other payments. Avoided air emissions are estimated to be
9 CO₂ – 130 million lbs/yr, SO₂ – 262,200 lbs/yr, and NO_x – 76,700 lbs/yr. The
10 monetized value of such avoided emissions is \$926,000/year. See the prefiled
11 rebuttal testimony of Thomas Kavet and Sheffield Exhibit MA-2.

12 .

13 **Q. DPS witness Ide states that UPC has not submitted details regarding the cost**
14 **of decommissioning or proposed a specific mechanism for funding the work.**
15 **Further, Mr. Ide disagrees with UPC’s proposal to finance the fund over time**
16 **through revenues generated from the project’s operation, and asserts that a**
17 **decommissioning fund should be fully financed prior to any significant construction**
18 **activities taking place (Ide PFT pg. 18, lines 1-6). Do you have a response?**

19 Response. The DPS seems to acknowledge that should the Board issue a CPG in
20 this case, it could require details regarding the scope, cost, and funding of
21 decommissioning as a post-approval filing. While UPC agrees that this would be
22 appropriate, it has nonetheless developed an estimate for the cost of
23 decommissioning, provided as ***Exhibit UPC-CRV-Reb10***.

1 With respect to funding, there are a number of different possible
2 mechanisms that could provide reasonable assurance to the Board that the funds
3 would be available. As stated in our original testimony on page 27, a reserve account
4 could be created to cover the estimated expenses of decommissioning. During the
5 term of the project company's main debt facility, the lenders would maintain and
6 control this account. This mechanism would cover approximately the first ten years
7 of project operations. After the debt service has been paid in full, UPC Vermont
8 Wind would fund this account through a letter of credit, bond, or corporate
9 guarantee. In addition, UPC has also suggested (in response to a DPS discovery
10 request) that funding the account by cash from operations could also be an
11 appropriate option at this later stage.

12 In general, UPC believes that the risk of the Project ceasing operation and
13 requiring decommissioning prior to the end of its useful life is very remote given the
14 energy market projections for New England in general and specifically for Vermont.
15 Further, if the turbines did not perform as specified by the manufacturer, making the
16 project economically unviable, then insurance and/or warranty coverage would
17 provide for either the correction of the problem or decommissioning of the facility.
18 Insurance coverage will be carried in the unlikely event that the entire facility is
19 rendered worthless by a natural disaster. Therefore, the only purpose for the
20 decommissioning fund is to remove the facility at the end of its useful life, following
21 20 years or so of operation. As a result, having a fund that builds over time during
22 the non-debt period should be appropriate and pose a low risk to the public that the
23 Project will not be decommissioned when it becomes necessary.

1 **Q. A number of witnesses for RPI/UHS expressed the concern that they could**
2 **not adequately conduct their field reviews because the roads and turbine locations**
3 **were not flagged, and because UPC did not provide mapping and other information**
4 **that was sufficiently detailed (Nealon PFT pg. 5, lines 21-23; pg. 6, lines 18 to 20;**
5 **Lapin PFT pg. 18, lines 17-24; Marsh PFT pg. 3, lines 9-23). Do you agree?**

6 Response. No, we do not agree. Over the course of developing this project, we have
7 developed a wealth of geo-referenced information including the location of Bear-
8 scarred beech, topographic information, wetlands, and moose concentration areas, in
9 addition to the road and turbine layouts. All of this information is based on State
10 Plane Coordinate system (NAD 83), in feet if it is CAD based and State Plane
11 Coordinate system, in meters if it is in geo-referenced GIS shape files. All of our
12 consultants were able to find and locate all pertinent features on the layout including
13 the proposed turbine locations, the road layouts, substation, etc. using GPS or by
14 reading and following print-outs of the very detailed mapping while in the field.
15 Further, the site is laced with a network of existing roads, which provide a ready
16 framework for locating oneself while in the field. Given the common availability of
17 field-grade GPS equipment and the significant experience of the RPI/UHS
18 consultants, we frankly do not understand how they could not find the roads to be
19 upgraded for use or the other features described in our filings.

20 In response to discovery requests, we have provided all of the data in geo-
21 referenced GIS shape files, included data utilized in the wetlands, RTE and habitat
22 evaluations, visual impact and noise evaluations, and civil engineering design process.
23 In addition, we offered to provide additional formats of the data or to convert the

1 data into other formats upon request. Based on our own consultants' experience on
2 the site, we are confident that the level of information provided is more than
3 adequate to allow a detailed review of the proposed layout and project impacts by a
4 qualified team of professionals. Staking of the turbine locations and roads at this
5 stage of the project is not only unnecessary and expensive, but could lead to
6 confusion in the field. While UPC believes the Project can and will be built as
7 depicted on the plans, the precise location of all roads, turbine clearing limits and
8 other features of the project may change slightly during the final design process or in
9 response to further comments from the Board or ANR. Stakes are also prone to
10 misinterpretation, loss, damage and deliberate vandalism. Avoiding such problems
11 has been one of the great benefits of using GPS technology through the preliminary
12 design and assessment process.

13

14 **Section 248(b)(1) and (b)(4)**

15 **Q. DPS witness Ide at pages 11-12 of his testimony writes that: "The petitioner**
16 **has not to my satisfaction submitted testimony to this date that answers the concerns**
17 **of the King George School. Ms. Fitzhugh has expressed reservations about the**
18 **school's ability to remain open if the turbines are constructed. A payroll of the size of**
19 **this school's is a very significant economic generator for northern Caledonia County.**
20 **The risks raised by the King George School are unanswered at this time, but the risks**
21 **of the school's demise, in my opinion, could outweigh the benefits of the proposed**
22 **wind generation project." Do you have a response?**

1 Response. Yes we do. We want to first reiterate that UPC has attempted to listen
2 closely to concerns of the community, and the revised project layout is a reflection of
3 the company's commitment to do so. However, the King George School has not
4 filed any testimony as to the negative impact of this Project on their school, nor as to
5 whether or why the School would need to close when the Project is constructed, or
6 substantiated this claim in any way. Therefore, any purported representations made
7 outside of this process by a school employee strike us as unfair and speculative, and
8 should not be given any weight by either the DPS or the Board.

9 UPC believes that it has provided ample evidence under each of the
10 substantive section 248 criteria for the Board to find that the Project will promote
11 the general good and will not have undue environmental, health, aesthetic or
12 economic impacts² to the local community, including the private King George
13 School. The KGS is located more than one mile from the Project turbines, and our
14 experts have provided detailed analyses as to why project-related sound levels and
15 visual impacts would not present undue impacts. Nor should the use of an existing
16 logging road cause undue impacts. In light of this evidence, we are perplexed as to
17 precisely what additional data the Department believes that UPC should have
18 provided.

19 There is no reasonable way for UPC to address broad assertions that the
20 school is going to close, where those assertions have not been made in evidence filed
21 by the party in this case that owns and operates the King George School – UHS.

² In fact, the evidence shows that the Project will have positive environmental and economic impacts.

1 UHS has put forth no evidence through prefiled testimony as to what specific
2 impacts from the Project would cause the school to close, nor has it actually
3 confirmed through evidence that it would close the school. It thus appears that we
4 are being asked to speculate, in order to disprove the negative. We do not believe
5 that UPC is required to engage in such conjecture in order to meet its burden.

6 As we have emphasized throughout this rebuttal filing, UPC has chosen to
7 revise the Project layout to further reduce potential impacts, although we believed
8 the original project met all of the criteria. The revised layout eliminates any views of
9 turbines looking from the KGS south (the views which DPS witness Kane believed
10 were of concern), further reduces noise levels at the School, and shifts the Project's
11 primary access route away from the part of Dareios Road (which runs adjacent to a
12 portion of the school). The only remaining road to be used near the school is an
13 existing logging road, on private land owned by Meadowsend Timberlands. As this
14 road will only be used by UPC to access the two turbines on Norris Mountain, the
15 level of truck and other traffic during construction and operation will be minimal.
16 The road is located more than 700 feet west of the KGS headmaster's house and
17 girl's dormitory, and is separated from those buildings by forest.

18
19 **Section 248(b)(2) and (b)(10)**

20 **Q. Mr. Litkovitz for the DPS states that it is not possible to determine**
21 **compliance with section 248(b)(3) and (b)(10) until the second part of the ISIS**
22 **study (the dynamic analysis) is completed How would you respond?**

1 Response. This issue was previously addressed in the direct testimony of Daniel
2 Crocket. Based upon the first part of the ISIS study and Mr. Crocket's
3 understanding of the Project's components relative to the regional transmission grid,
4 a reasonable professional judgment could be made that the Project will not adversely
5 affect system stability and reliability under (b)(3). We recognize that this was a
6 preliminary opinion, and subject to confirmation by ISO-NE through the ISIS Study.
7 We would also like to observe that by adding a fault tolerant generation asset such as
8 wind turbines to a stable, well-operated transmission network, it is not possible to
9 cause a system stability problem.

10 The same would hold true for compliance with (b)(10), that the Project can
11 be served economically by existing or planned transmission facilities without undue
12 adverse effects to Vermont utilities or their customers. Because UPC would be
13 responsible for any transmission system changes that are necessitated by the Project,
14 there really is no risk to Vermont utilities and ratepayers.

15 We understand and appreciate that Mr. Litkovitz, as the Department's Chief
16 Engineer, is hesitant to express an opinion without the benefit of seeing the ISO's
17 analysis and recommendations. At the same time, private developers and utilities
18 who are proposing generation projects have little control over ISO-NE's priorities or
19 the speed at which they conduct these reviews. Moreover, these analyses can only be
20 conducted based upon a specific turbine type and configuration, rather than as a
21 generic analysis. As a result, ISO-NE's review may not always coincide exactly with
22 the section 248 process. The Board can account for this by requiring that as a

1 condition of section 248 approval, the final ISO-NE report is submitted for review
2 and approval.

3 In fact, ISO-NE has finally release its Draft Final ISIS Study to UPC on
4 September 18th. See Exhibit UPC-CRV-Reb9a. The study was based on the original
5 project layout using the Gamesa turbines. Consequently, ISO-NE has asked that the
6 issue of voltage regulation be studied in more detail to determine if voltage regulator
7 equipment at the substation would be needed to accommodate the change to the
8 Clipper turbines. If so, the cost would be borne by UPC and not Vermont utilities
9 or ratepayers. UPC, ISO-NE, and Clipper are continuing to discuss this issue. **See**
10 ***Exhibit UPC-CRV-Reb9b.***

11
12 **Section 248(b)(4)**

13 **Q. DPS witness Lamont discusses the Project's potential power sales, both in**
14 **terms of the level of specificity presented by UPC and the nature of the power**
15 **agreements UPC is contemplating. Do you have any response to these issues?**

16 Response. Yes, we have several comments. First, based on negotiations to date,
17 UPC is confident that all the power will be sold to Vermont utilities. However, the
18 final power purchase agreements are not signed. UPC expects all power purchase
19 agreements to be completed by the end of this year. The current status of the
20 agreements is as follows:

21 WEC: The executed agreement with WEC, referred to as an Advance
22 Purchase Fee Agreement, was previously filed with the Board and Department by
23 WEC pursuant to PSB Rule 5.200. In addition, UPC provided the agreement to the

1 parties in discovery. A formal power purchase agreement with WEC will still need
2 to be executed, however the major terms are included in the Advance Purchase Fee
3 Agreement. Although not detailed in Mr. Lamont's testimony, WEC will pay a fixed
4 price that is the lesser of the weighted average of other contracts UPC enters into for
5 the Project and at a fixed price of \$60/MWh (after certain adjustments are made),
6 less a significant fixed discount that reflects the Department of Energy grant that was
7 used for pre-construction and planning costs. In addition, WEC has the option to
8 purchase an additional 4 MW of the Project output at a fixed price which will be the
9 average of market prices, bringing the total amount of power to be sold to WEC to 6
10 MW. The term of the WEC power purchase agreement will be 20 years.

11 VEC: UPC previously filed its Memorandum of Understanding with VEC
12 (Exhibit UPC-CRV-8). Since then, the parties have continued to discuss the terms.
13 We understand that the VEC Board of Trustees has agreed to take up to 20 MW of
14 power for a 20-year period, at either a fixed price or a market-related price.

15 CVPS: UPC and Central Vermont Public Service ("CVPS") have started
16 negotiations to purchase the remainder of the Project's output. UPC is presently
17 working to memorialize the terms into a power purchase agreement. CVPS has
18 indicated a preference for a market-related price.

19 Other Vermont Utilities: UPC is still in discussions with other Vermont
20 municipal utilities which have expressed interest.
21 Regardless of the final allocation, the WEC commitment combined with the strong
22 indications shown by VEC, CVPS, other utilities make UPC very confident that the

1 Project power will be sold to Vermont utilities. Final terms, including pricing and
2 number of years, will be settled in upcoming negotiations.

3

4 **Q. Why is it that these power agreements would be tied to market prices, albeit**
5 **discounted, rather than providing long term fixed prices?**

6 Response. As noted above, UPC is discussing both market-based and fixed-price
7 pricing terms with Vermont utilities. The nature of the contracts for this Project is
8 almost entirely a function of the desires of the individual Vermont utilities, some of
9 whom appear to be hesitant to enter into long-term fixed price contracts. We
10 understand that their hesitancy may relate to the risk that if market prices should
11 unexpectedly decrease over the long-term, the utilities may be at a disadvantage
12 under a fixed price contract and may perceive that they would face the risk of
13 imprudency rulings by future Boards.

14 As noted above, discussions between UPC and VEC on the precise terms of
15 a power sale agreement are still ongoing. While a market-rate-based pricing
16 mechanism is being considered, other structures, such as fixed-price or market-based
17 price with floors and caps are also being discussed with VEC and other Vermont
18 utilities. In any event, wind power plants such as this project are one of the few
19 power technologies which can offer a long term (i.e., greater than 10 years) supply
20 contract. The predominant New England power supply sources must link their
21 power price to a volatile fossil fuel index or limit the term to 5 years or less.

22

1 **Q. RPI-UHS witnesses Copp and Carr suggest that UPC should have provided a**
2 **financial and management plan for the Project in order to assess whether the Project**
3 **will be “successful”, and to ensure that the economic benefits will be realized. Do**
4 **you agree?**

5 Response. No, we do not agree. First, as discussed further by Tom Kavet in his
6 rebuttal testimony, the financial management plan for the Project is not needed to
7 assess overall economic benefit of the Project. The information already provided to
8 the Board and the parties in this matter sufficiently detail the estimated expenditures
9 for the Project to allow for the type of analysis typically conducted in order to
10 determine relative economic benefits of the Project. It is also our understanding that
11 in the East Haven Windfarm case, this issue was specifically addressed, and the
12 hearing officer found that this type of financial information was not necessary given
13 that a decommissioning fund would be in place to protect against the possibility that
14 the project might prematurely cease to operate. The same logic applies here. UPC
15 has committed to a decommissioning fund, and the public will not bear any burden
16 should the Project prematurely cease to operate because of financial issues (an
17 extremely remote possibility).

18 We would also note that the types of projects identified by Mr. Copp and Mr.
19 Carr in discovery responses which have provided such detailed financial management
20 plans are completely distinct from this wind farm project (*See* Response to
21 UPC:UHS/RPI.2-6.) The cases they highlight, including numerous PURPA
22 hydroelectric cases, were projects that were seeking levelized rates of return (and
23 which would require Vermont utilities to purchase the power under long term

1 contracts). In those cases, the risk to Vermont ratepayers justified disclosure of
2 detailed financial details. Merchant plant developers, on the other hand, do not have
3 public utility responsibilities, nor do ratepayers bear any risk if a private power
4 producer is financially unsuccessful, particularly when, as here, the developer has
5 committed to providing a decommissioning fund.

6
7 **Q. RPI-UHS witnesses Copp and Carr claim that UPC's estimate of Project**
8 **operating costs (used by Tom Kavet in his economic analysis) were overstated by as**
9 **much as \$1.5 million (Copp and Carr PFT pg. 8, lines 8-9). Do you have a response?**

10 Response. Yes, they simply do not have the experience in the wind industry to make
11 such judgments. Our estimate was reasonable and we stand by it, subject to the
12 revisions reflected in Mr. Kavet's revised economic analysis. Mr. Kavet addresses
13 many of their specific claims, and we won't repeat them. UPC Vermont Wind - its
14 employees and founder - have a great deal of collective experience on wind projects
15 both domestic and abroad. UPC has 30 MW of wind power operating in Hawaii, 20
16 MW of wind power under construction in New York, and 42 MW under
17 construction in Maine. We understand the costs of building and operating a wind
18 power project, and are applying that expertise to the Sheffield Wind Farm Project.

19
20 **Section 248(b)(5) - Burden on Municipal Services; Public Health and Safety**

21 **Q. The Town of Sutton has expressed concern that its municipal resources could**
22 **be strained by the Project, including town roads and fire protection (McCue PFT pg.**
23 **5, lines 10-21; pg. 6, lines 1-10). The Burringtons have also expressed similar**

1 **concerns regarding roads in Sheffield, and an increased need for municipal services**
2 **for road repair, or icing or fire hazards (Burrington PFT pg. 16, lines 7-22; pg. 17,**
3 **lines 17-22; pg. 18 and pg. 19). How would you respond?**

4 Response. As UPC has stated in testimony and in response to discovery, it does not
5 expect that the Project will impose any undue burdens on municipal services. Roads
6 in Sutton are not expected to be used during the construction phase to transport
7 over-sized loads to the Project area. Further, with the new access configuration, it is
8 likely that very limited construction traffic will be on the Sutton town roads since
9 there is a more direct route to the site via I-91, Barton and New Duck Pond Road.
10 Even if they were used, in general only minor improvements such as culvert
11 strengthening would be needed, at UPC's expense. The preferred transport route
12 follows a partially paved town road in Barton and Sheffield (New Duck Pond Road),
13 and then utilizes a Sheffield town trail that would be upgraded for use by the Project.
14 Once the Project is operational, use of local town and state roads should be light and
15 not create the need for additional maintenance activities.

16 With respect to the need for emergency personnel to respond to accidents,
17 fires, etc., UPC has received letters from Lyndon Rescue and St. Johnsbury
18 Emergency Dispatch indicating that they can handle necessary emergency services.
19 See ***Exhibits UPC-CRV-Reb11a-b.***

20 As discussed in our prefiled direct testimony, the risk to the public due to
21 icing hazards is extremely remote. Ice accumulation is directly related to the
22 elevation of the turbine and the elevation of the cloud base during freezing
23 conditions. With the G87 array, the turbines would be subject to icing conditions

1 approximately 3.8% of the time. The elevation increase of approximately 21 feet due
2 to the longer blades on the Clipper turbines would not increase the development of
3 icing. Further, the closest seasonal or year-around residences (1/2 mile or more) are
4 further from the revised layout than the previous layout, and substantially beyond the
5 maximum theoretical distance ice could be thrown. Therefore, as stated in our
6 prefiled direct testimony and confirmed for the revised layout, there is no significant
7 risk to the public from ice accumulations on the turbines. See our ***original Exhibit***
8 ***UPC-CRV-19***.

9 The risk of fires (due to lightning or equipment failures) is also small because
10 there are very limited fuel sources available in modern wind turbines. Further, if one
11 were to catch on fire due to unforeseeable circumstances, no specialized equipment
12 would be necessary to combat the fire. No efforts would be, or should be, made to
13 extinguish a fire on top of a wind turbine. The fire should be allowed to burn itself
14 out with local crews set to extinguish any secondary ignition sources on the ground.
15 Therefore, no special equipment would be needed in the event of a fire. To the
16 extent fires have occurred, they have been extremely rare events.

17
18 **Section 248(b)(5) – Water Pollution**

19 **Q. Donald Gregory and others have expressed the concern that lightning or other**
20 **cause could result in large volumes of oil leaking from the turbines and**
21 **contaminating area streams or springs (Gregory PFT pg. 15, lines 1-6). How would**
22 **you respond?**

1 Response: Lightning has been identified as a potential source of damage to modern
2 wind turbines, but not with respect to damage or rupturing of any internal
3 equipment that could leak oil – there is simply no chain of events that would result in
4 lightning causing this to occur. To reduce the real potential effect of lightning
5 strikes, specialized features are constructed into modern wind turbines which include
6 metal disks in the tips of the blades, which are connected via the interior of the blade
7 to the rotor shaft and hence to the tower and ground. In addition, with the Clipper
8 machine, efforts have been made to protect the interior workings of the turbines via
9 a Faraday cage, grounding provisions, and other features. Further, if lightning were
10 to strike a turbine the most likely target would be the rotor blades. The most likely
11 significant failure would be blade delamination of the trailing edge of the blade. In
12 other words, the trailing edge of the blade would come unglued. This would cause
13 an unbalanced condition, and would trigger a turbine shut down. Repairs could be
14 accomplished by a person in a man-lift, or by replacement of the individual blade or
15 replacement of the entire rotor. Again, as with fires, we are not aware of modern
16 turbines having such failures, as they are constructed in compliance with standards
17 recommended by the National Renewable Energy Laboratory, (see Wind Turbine
18 Lightning Protection Project, www.nrel.gov/docs/fy02osti/31115.pdf). The Clipper
19 turbines are constructed to meet the appropriate standards.

20 With regard to potential oil spills from transformers, it should be noted that
21 UPC intends to use bio-degradable fluids if oil-filled transformers are used for the
22 turbines. This fact, combined with the small probability of a large spill or release and
23 the implementation of a spill prevention and cleanup plan, leads UPC to believe that

1 there is no undue risk to environmental resources associated with potential oil spills
2 from transformers. Because some of the turbines, transformers and other features
3 on-site are within the vicinity of wetlands and surface waters, we have commissioned
4 a Spill Prevention, Control and Countermeasure (SPCC) plan. This plan is written in
5 compliance with the SPCC regulations contained in 40 CFR 112 and covers all fluid
6 storage vessels within the project. These include the nacelles of the wind turbines,
7 the transformers located at the base of the towers, the transformers located within
8 the substation and the vehicles and temporary containers associated with the
9 construction phase. This plan, which is considered Draft at this time since the final
10 layout, type and size of vessels may change slightly, will be finalized prior to the
11 commencement of construction operations. See ***Exhibit UPC-CRV-Reb12***.

12

13 **Q. In response to the testimony of RPI/UHS witness Guldberg, please address**
14 **the issue of whether the wind turbines at this Project could be expected to produce a**
15 **rhythmic beating noise, and if so, what efforts could be taken to mitigate this effect.**

16 Response. A question has been raised that the wind farm would produce a rhythmic
17 beating noise by operating in a synchronized fashion (i.e., several or all of the turbine
18 blades operating in the same position and at the same speed). The source of this
19 noise is believed to be related to the blades of several turbines all passing in front of
20 the tower sections at the same time. Synchronized operation of multiple rotors
21 within a wind farm, while theoretically possible, is very unlikely to occur in this
22 location. This is the case because each turbine operates in an independent manner,
23 and the rotation of the blades is based solely on the wind speed and direction that

1 each individual turbine is experiencing. For wind turbines distributed over hilly
2 terrain, as at Sheffield, the prevailing condition will be asynchronous operation, and
3 in fact the likelihood of any two turbines experiencing identical conditions at the
4 same time is remote. At existing wind farms it is very common to observe some of
5 the turbines standing still while others are rotating. Such asynchronous operation
6 would be more pronounced at Sheffield, where all 16 turbines would be at different
7 elevations and experience different wind regimes. This is supported by actual wind
8 data produced from UPC's three met towers currently operating within the project
9 area. The met tower data have been used to estimate the power output on an
10 individual turbine basis, with each turbine site generating different results.

11 In other wind sites, synchronous operations may be an issue, if largely a
12 theoretical one. These environments include very flat environments with nearly
13 identical wind at each location, e.g., a flat site with wind variation between met
14 towers of about 0.2 meters per second. In such a location, there is a greater
15 possibility of synchronous operations. Here, with the variations in terrain and the
16 obvious differences in wind speed at each turbine location, there is not. Finally,
17 there is currently approximately 10,000 MW of wind-based electrical generation in
18 operation in the United States. We are not aware of synchronous operation being an
19 issue at any of these wind farms, nor are we aware of any turbine manufacturers
20 developing or offering control mechanisms to prevent synchronous operations that
21 could cause the rhythmic beating effect.

1 **Q. RPI/UHS witness Lapin has stated his belief that the Project site contains a**
2 **number of important natural resource features that make it a “rare and irreplaceable**
3 **natural area.” He further claims the Project would have a variety of adverse impacts**
4 **including: destruction of parts of hardwood forest, fragmentation of currently**
5 **unfragmented landscape in the “globally important Northern Forest.”,**
6 **fragmentation of high-quality wetland natural communities, and destruction of**
7 **portions of A-ranked plant populations. Do you have a response?**

8 Response. Art Gilman responds to Mr. Lapin’s claims in detail, and we believe Mr.
9 Gilman has effectively shown a much more detailed and clearer understanding of the
10 wetland, plant and forest resources of the site and their relative value and
11 importance. In essence, Mr. Gilman concludes that the area does not comprise a
12 rare and irreplaceable natural area, nor will it be unduly impacted by the Project.

13 We would simply add this perspective. The Project is on timberlands that are
14 actively owned and managed by a logging company. Meadowsend Timberlands has
15 every intention of sustainably harvesting their land under a forest management plan
16 approved by the Vermont Department of Forests Parks and Recreation as part of
17 the Use Value Appraisal program. In fact, we recently asked the company what their
18 plans were regarding this land, and we were informed that they will be cutting an 80
19 acre area around Libby Hill in the near future, in accordance with their management
20 plan. Meadowsend’s forester also provided some useful information on the area that
21 Mr. Lapin considered to be potential “Old Growth” forest. See **Exhibit UPC-**
22 **CRV-Reb13**. We think this puts our project into perspective, and certainly refutes

1 Mr. Lapin's notion that the forest on this land will (or should) be preserved and
2 protected rather than harvested.

3

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

5 Response. Yes it does.