

**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
JEFFREY A. NELSON
ON BEHALF OF UPC VERMONT WIND, LLC**

September 25, 2006

Summary:

Mr. Nelson addresses the prefiled direct testimony of Kevin Burke (ANR), Shannon Morrison (ANR), Mary Nealon (RPI-UHS), Don Marsh (RPI-UHS), and Marc Lapin (RPI-UHS) regarding stormwater, soil erosion and water quality issues, and presents detailed stormwater plans and sizing related to the revised project layout.

Exhibits

UPC-JN-Reb1	Resume of Jeffrey A. Nelson
UPC-JN-Reb2	Watershed Map
UPC-JN-Reb3	Map of Proposed Stormwater Discharge Point
UPC-JN-Reb4	Stormwater Treatment Summary
UPC-JN-Reb5	Stormwater Treatment Sizing for Water Quality Volume
UPC-JN-Reb6	Basin Volume and Elevation Summary
UPC-JN-Reb7	Existing and Post-Development Drainage Diagrams - HydroCAD [®]

1 **Q. Please state your name and occupation.**

2 Response. My name is Jeffrey A. Nelson. I am the Senior Hydrogeologist and
3 Principal of the firm Pioneer Environmental Associates, LLC (Pioneer), which has
4 its offices at 48 Green Street in Vergennes, Vermont.

5

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

7 Response. No.

8

9 **Q. Please summarize your background and experience.**

10 Response. I hold a B.S. degree in Geology (1982) and an M.S. degree in Civil
11 Engineering (1992), both from the University of Vermont. My educational training
12 includes both surface water hydrology and groundwater hydrogeology. The field of
13 hydrology involves the study and evaluation of the quantity and quality of surface
14 waters, including pollutant loading and transport. Hydrogeology involves the
15 assessment of the movement of groundwater, including contaminants, and the
16 assessment of the yields of wells and aquifers. I am also a Certified Professional in
17 Erosion and Sediment Control (#2131) and Certified Professional in Storm Water
18 Quality (#13).

19 I have completed numerous water resources evaluation studies with respect
20 to large scale land development proposals in Vermont involved in the Act 250 and
21 Section 248 processes. These studies have involved participating in the planning and
22 design efforts, and developing and conducting monitoring studies to determine
23 potential water quality impacts. Additionally, my professional background includes

1 the completion and presentation of technical studies, evaluation and review of
2 scientific data, determination of compliance with various State and Federal regulatory
3 requirements, and application for various permits and authorizations. I have
4 presented the results of such analyses to numerous review bodies, including various
5 Courts, Commissions, Boards, and Legislative Committees. A copy of my resume is
6 attached as *Exhibit UPC-JN-Reb1*.

7

8 **Q. Does your work involve programs and issues administered by the Vermont**
9 **Agency of Natural Resources and the Vermont Agency of Transportation?**

10 Response. Yes. I have completed numerous evaluations, studies, and permit
11 applications since the mid-1980s related to programs administered by the Agency of
12 Natural Resources, including the Agency's Wetland Office, the Water Quality
13 Division – including 401 certifications, the Water Supply Division, the Stormwater
14 Management section, the Wastewater Management Division, the Water Supply
15 Division, the Public Facilities Division, and the Enforcement Division, including the
16 design and implementation of Supplemental Environmental Programs. I've also
17 more recently done a great deal of work with the Vermont Agency of Transportation
18 on water-related issues, especially regarding what is known as “the Circ highway”
19 project.

20

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

22 Response. To address the prefiled direct testimony of Kevin Burke (ANR), Shannon
23 Morrison (ANR), Mary Nealon (RPI-UHS), Don Marsh (RPI-UHS), and Marc Lapin

1 (RPI-UHS) regarding stormwater, soil erosion and water quality issues, and to
2 present detailed stormwater plans and sizing related to the revised project layout.
3

4 **Q. ANR witness Burke and RPI-UHS witnesses Nealon and Marsh have stated**
5 **that more detailed information is needed to assess the Project's potential impacts on**
6 **the environment, and thus its compliance with Section 248(b)(5) (and by reference,**
7 **Act 250 criteria 1, 1(B) 1(E) and 4). How do you respond?**

8 Response. Consistent with what I understand to be past Public Service Board
9 practice (including the recent VELCO case, among others), UPC provided an initial
10 set of plans that reflected the location of project infrastructure, and a narrative
11 description (testimony of Ralph Nelson) and illustrative exhibits of how UPC would
12 approach managing stormwater, soil erosion, and the protection of streams and
13 wetlands. These documents and testimony were submitted with the understanding
14 that eventually ANR stormwater permits for the construction and operational phases
15 of the project would be needed, and those permits would require final design level
16 plans, calculations and other details. It was, and is, UPC's position and my
17 professional opinion that compliance with ANR permitting requirements will ensure
18 compliance with the Section 248/Act 250 criteria related to water quality, and that
19 there is nothing about the physical characteristics of this site or the specific nature of
20 this Project that would prevent UPC from designing the Project to meet the ANR
21 permitting criteria.

22 Nonetheless, in the interest of providing ANR and the other parties with as
23 much information as is reasonably possible, UPC has produced plans that provide

1 details on stormwater management, soil erosion, stream crossings, and an SPCC Plan
2 to further demonstrate that the Project will not cause undue water pollution nor
3 adversely impact streams or wetlands. The current information is intended to address
4 what Mr. Kevin Burke describes as his “greatest concern,” that being the need for
5 information on the types of stormwater management measures.

6

7 **Q. In response to Mr. Burke’s comment, could you please outline the general**
8 **principles to be employed for stormwater management for the Project?**

9 Response. The overall approach to development of the EPSC plan and the
10 operational phase stormwater management plan has been to ensure that stormwater
11 runoff discharging from the project area would not adversely impact water quality
12 within the associated receiving waters. The proposed treatment and control
13 measures would be subject to ANR review and issuance of construction phase and
14 operational phase stormwater permits for the project. The intent and expectation is
15 that compliance with the VWQS be maintained throughout the entire project area
16 during construction and following construction. The current project alignment has
17 been designed to minimize impacts within these sensitive areas by locating the
18 turbines and service roads in areas of lesser sensitivity, such as avoiding Class A
19 waters, and significant wetland areas such as the rich fen and beaver pond areas.

20 Specific measures to be incorporated into the project design include:

- 21 • Minimizing stream crossings; avoiding streams, ponds, wetlands, and their
22 associated buffers; protecting watershed ecology, including special habitat values;
23 mitigating historical impacts; and improving water quality.

- 1 • Minimizing impacts associated with tree clearing and slash disposal by clearing
2 trees during frozen ground conditions in the winter or extended dry periods in
3 the summer; installing barriers, such as orange barrier fence or tape, to delineate
4 areas where tree clearing would occur, with specific attention to sensitive areas
5 that need to be protected; clearly identifying staging areas, landing areas, and
6 logging and skidder roads; where possible, locating these areas within existing
7 trails or logging and skidder roads; taking the seasonal high water table, slopes,
8 and soil stability into consideration when burying wood products.
- 9
- 10 • Avoiding earth disturbance activities during periods of snowmelt and heavy
11 rainfall; phasing earth disturbance activities to minimize the total area of exposed
12 soil; revegetating (seeding and mulching) areas once earth moving and
13 disturbance activities are complete; implementing appropriate EPSC measures in
14 all areas where earth moving and disturbance activities are to occur, per the
15 requirements of the Individual NPDES Permit.
- 16
- 17 • Using bridges for perennial stream crossings and culvert crossings for
18 intermittent streams; constructing bridges and culvert crossings during dry
19 weather conditions to the extent possible.
- 20
- 21 • Considering topsoil management, with specific considerations for the erosion
22 potential that may exist in areas where topsoil removal and/or replacement are to

1 occur on shallow bedrock; reusing of existing topsoil to reestablish ground cover
2 following construction.

3

4 • Maintaining minimum riparian buffer zone widths of 50 or 100 feet for streams,
5 as determined by the buffer width needed to maintain the functions and values
6 of the riparian area.

7

8 • Minimizing changes in subwatershed boundaries, and thus contributing drainage
9 areas as a result of proposed project grading and drainage structures.

10

11 • Ensuring compliance with Vermont Stormwater Management Manual
12 (VSWMM) operational phase stormwater treatment and control measures, to
13 minimize impacts on water quality from stormwater runoff from impervious
14 surfaces, and prevent increases to peak discharge rates in receiving streams.

15

16 **Q. Ms. Nealon further suggests that the Project is likely to cause an undue**
17 **adverse impact to streams due to road construction; adverse impacts to wetland**
18 **vegetation due to changes in the water table and subsurface water flow; and expected**
19 **loss of wildlife and wetland habitat from road construction. Do you agree?**

20 Response. No, I do not, and I believe the detailed plans I am presenting
21 demonstrate how those resources will be protected and impacts minimized such that
22 they are not unduly adverse. Her conclusions regarding impacts also seem at odds
23 with her other criticism that insufficient information exists to determine if the

1 Project will have an undue adverse impact. Although she emphasizes that it is the
2 magnitude of the Project which gives rise to her concerns, the size of the project is
3 not relevant to whether a project complies with applicable regulatory requirements. I
4 would like to cite a recent example of a project that Pioneer has been involved with
5 where the design, permitting, implementation, and monitoring of stormwater
6 controls are relevant to the UPC project.

7 The Okemo Jackson Gore project involved the development of 16 ski trails
8 which resulted in the permanent clearing of approximately 108 acres, as well as the
9 development of gladed ski terrain covering 55 acres, for a total area of 163 acres.
10 The project area consisted of moderately to steeply sloping forested terrain, and
11 extensive construction involving stump removal, regrading, work road establishment,
12 and water bar/drainage infrastructure addition. The project is located within the
13 sensitive Coleman Brook watershed, at an elevation range of 1300 to 2700 feet m.s.l.
14 Project design involved the completion of detailed erosion prevention and sediment
15 control plans and narrative, construction phasing, and extensive monitoring prior to,
16 during, and following construction. The monitoring program, implemented by
17 Pioneer, has shown full compliance with all physical, chemical and biological criteria
18 of the Vermont Water Quality Standards in Coleman Brook and its small
19 intermittent tributaries as a result of this project

20 With respect to the proposed UPC project, the total area of cleared land
21 would be approximately 79 acres during construction. Of that, only approximately 15
22 acres will be permanent new impervious area. Given that the UPC project will be
23 constructed based on the higher standards for both construction and operational

1 phase stormwater now in effect, I am extremely confident that water quality
2 standards will be maintained during and following Project construction.

3

4 **Q. Please describe the work you have performed and the plans you have**
5 **prepared.**

6 Response. Pioneer has performed the following tasks, specific to the revised turbine
7 layout consisting of 16 Clipper turbines:

- 8 • Field mapping of watershed boundaries.
- 9 • Detailed field reconnaissance to identify receiving stream points of
10 compliance, potential stormwater detention basin locations, and necessary
11 drainage channels to convey runoff to potential treatment areas.
- 12 • Field investigation of existing and proposed stream crossing locations.
- 13 • Determination of applicable criteria under the VSWMM for stormwater
14 treatment and control for both construction and operational phase
15 impervious areas.
- 16 • Preliminary sizing and design of proposed stormwater treatment practices to
17 ensure compliance with VSWMM requirements.
- 18 • Assessment of Project erosion prevention and sediment control measures
19 based on the 2006 Vermont Standards and Specifications for Erosion
20 Prevention and Sediment Control.

21

22 **Q. Please describe the field reconnaissance work that Pioneer personnel have**
23 **performed with respect to stormwater design.**

1 Response. During August 2006, Pioneer personnel completed a detailed field
2 assessment of the Project site to determine the receiving stream points of
3 compliance for all subwatershed areas containing proposed impervious surface. All
4 twelve proposed points of compliance identified and documented with photographs
5 during the preliminary design steps were identified and flagged in the field. In
6 addition the potential locations of stormwater treatment basins were field-identified
7 and refined based on existing topography, wetland avoidance, and other siting
8 constraints. Again, all twelve proposed basin locations were located in the field.
9 Finally, the necessary conveyances to route runoff from proposed impervious
10 surfaces to the basins have also been identified. This level of ground-truthing has
11 provided the basis for the engineering design work performed by DTA.

12
13 **Q. Please describe the watersheds that the revised Project is located within.**

14 Response. Pioneer has completed mapping of the revised Project components
15 based on available topographic mapping refined by field observation. As a general
16 comment, the Project is located within two overall watersheds, which are the
17 Calendar Brook watershed, which includes Clark Brook as a tributary, and the
18 Willoughby Brook watershed, which includes Annis Brook as a tributary. Calendar
19 Brook is a tributary of the Passumpsic River and Willoughby Brook is a tributary of
20 the Barton River. A watershed map using USGS topographic base map information
21 is provided as ***Exhibit UPC-JN-Reb2***. More specifically, the identified
22 components of the Project are located in the following watersheds:

- 1 • Calendar Brook watershed: proposed turbines C2, C10, C13, C14, C15, and
- 2 C16
- 3 • Clark Brook watershed: proposed turbines C3, C4, C5, C6, C11, and C12
- 4 • Annis Brook watershed: proposed turbines C1, C7, C8, and C9

5

6 **Q. What are the classifications of the waters within these watersheds?**

7 Response. In accordance with the Vermont Water Quality Standards (VWQS), all
8 waters within the project area are designated as Class B. Further, the streams noted
9 above are designated as cold water fish habitat. Finally, from the standpoint of
10 applicable biocriteria that ANR would use to interpret the aquatic habitat and biota
11 criteria of VWQS, these streams would be considered as “small high gradient,” or
12 SHG features. Specific numerical biological indices have been established by ANR
13 for these streams, and ultimately instream compliance with these biocriteria would
14 indicate that there has been no undue adverse effect on water quality.

15

16 **Q. Please describe the proposed stormwater discharge points.**

17 Response. As noted above, a total of eleven points of discharge to waters of the
18 state have been identified in the field. These are shown on the Stormwater
19 Discharge Point Map – *Exhibit UPC-JN-Reb3*. For each receiving stream, the
20 discharge point(s) have been identified as the most upstream point at which a
21 defined channel with bed and banks exists, that is downslope of the proposed
22 impervious surface associated with the Project. These discharge points are as

1 follows, using serial number (S/N) designations in accordance with DEC practice for
2 discharge point designation:

- 3 • S/N 001, 002 (same location): Annis Brook tributary, elevation 2,200 feet
- 4 • S/N 003: Calendar Brook tributary, elevation 2,150 feet
- 5 • S/N 004: Clark Brook, elevation 1,870 feet
- 6 • S/N 005: Calendar Brook tributary, elevation 1,920 feet
- 7 • S/N 006: Calendar Brook tributary, elevation 2,090 feet
- 8 • S/N 007: Calendar Brook tributary, elevation 2,020 feet
- 9 • S/N 008: Calendar Brook tributary, elevation 1,960 feet
- 10 • S/N 009: Calendar Brook tributary, elevation 2,150 feet
- 11 • S/N 010: Calendar Brook tributary, elevation 1,930 feet
- 12 • S/N 011: Clarke Brook tributary, elevation 2,370 feet
- 13 • S/N 012: Clarke Brook tributary, elevation 2,250 feet

14 At each location, the presence of macroinvertebrates was field-verified as an
15 indicator of a perennial channel, representing an appropriate point for designation as
16 the point of compliance for the proposed stormwater discharges.

17
18 **Q. Please describe the design process for stormwater treatment and control.**

19 Response. The Vermont Stormwater Management Rule (EPR Chapter 18)
20 implements the state stormwater permitting requirements of 10 V.S.A. sections 1263
21 and 1264. Pursuant to this rule, an operational phase stormwater discharge permit is
22 required for new impervious surface of greater than one acre, as well as certain
23 categories of expansion and redevelopment of existing impervious surface. As

1 described in the testimony of Kevin Burke, DEC has issued General Permit 3-9015
2 to implement the Rule. The requirements for stormwater treatment and control in
3 Vermont are based on five criteria. These criteria for stormwater treatment and
4 control, according to the VSWMM, are:

5 **Water Quality Criteria (WQv)** -- Goal: Provide for reliable pollutant removal
6 for runoff from impervious surfaces.

7 **Channel Protection Criteria (CPv)** -- Goal: Control of quantity of stormwater
8 to protect channel stability of receiving waters.

9 **Recharge Criteria (Rev, Rea)** -- Goal: Maintain existing ground water levels by
10 allowing infiltration of a specific quantity of stormwater on a developed site.

11 **Overbank Flood Criteria (Q10) and Extreme Storm Criteria (Q100)** -- Goal:
12 Reduce downstream flooding potential during major storm events.

13 For a particular project, the design team must first determine which specific criteria
14 are applicable, since not all criteria are required for all situations.

15
16 **Q. Which VSWMM treatment and control criteria are applicable to this project?**

17 Response. For the UPC Sheffield Project, the applicable criteria are WQv, CPv,
18 Rea/Rev, and Q10. Control of peak flow rates for Q100 is required for the portions
19 of the Project within the Calendar Brook watershed, since the total proposed
20 impervious area for this receiving water is over the 10 acres threshold specified in
21 VSWMM for Q100 control. For the project components in the Annis Brook
22 watershed, Q100 control is not required, since the total proposed impervious area

1 for this receiving water is five acres. A summary table indicating the applicable
2 VSWMM criteria by discharge point is provided as *Exhibit UPC-JN-Reb4*.

3
4 **Q. What types of stormwater treatment practices are proposed for the Project?**

5 Response. In all cases, the design involves wet ponds, which are design variant P-1
6 of the VSWMM to provide WQv, CPv, Q10, and, as required for Q100. The main
7 pool of the pond is preceded by a forebay, which provides sediment removal. The
8 main cell provides peak discharge rate control, as well as additional water quality
9 treatment. A summary table showing the elevation and water quality volume
10 information for the twelve proposed basins is provided as *Exhibit UPC-JN-Reb5*.
11 All basin locations are shown on my map *Exhibit UPC-JN-Reb3*, as well as the
12 detailed project plans, *Exhibit UPC-CRV-Reb4b*.

13
14 **Q. Have you evaluated the performance of the basins for a range of storm
15 events?**

16 Response. Yes. In accordance with DEC stormwater permitting requirements, we
17 have analyzed basin performance for storm events ranging from 1 year through 100
18 year recurrence intervals. These results, which are presented in *Exhibit UPC-JN-*
19 *Reb6*, show that the basins have been sized to appropriately manage the flows from
20 these storm events.

21

1 **Q. How have the basins been sized in recognition of the unique circumstances**
2 **of the Project with respect to impervious surfaces that will exist for construction,**
3 **then be removed during the operational phase?**

4 Response. As UPC witnesses Cowan/Vavrik/Rowland described in their prefiled
5 direct testimony, to enable crane access to construct the turbines, the roads between
6 individual turbine sites must be initially constructed to a 36-foot road width. This
7 road width would be reduced to 16 feet following construction. It may be possible to
8 utilize innovative construction techniques for the temporary wider road shoulders,
9 such as coarse crushed stone which would provide similar infiltration characteristics
10 as the shallow native soils which have limited infiltration capabilities. However, as a
11 conservative assumption, the initial basin sizing has been performed considering the
12 total area of the temporary 36 foot wide road as impervious area that would be
13 present on the site during the construction phase. This represents a worst-case,
14 extremely conservative approach, since the actual impervious area, and thus the basin
15 sizing requirements would be considerably lower following construction.

16
17 **Q. Do you agree with Dr. Lapin's claim that "there would be great potential for**
18 **disrupting the natural hydrology..."?**

19 Response. No, I do not. The VSWMM requirements are specifically designed to
20 minimize impacts to both groundwater and surface water hydrology, and are quite
21 comprehensive, and successful in achieving this objective. In addition, a particular
22 design consideration that has been employed for the Project has been to maintain, as
23 close as possible, the actual area of land draining to individual tributaries which

1 would be receiving waters for stormwater discharges from the Project. Table 1
2 summarizes the comparison of existing and post-development drainage areas.

S/N	Existing Drainage Area (acres)	Post-Development Area (acres)
001, 002	53.1	61.8
003	56.1	60.3
004	25.9	30.7
005	18.3	33.3
006	20.6	20.9
007	39.4	53.3
008	34.1	35.8
009	20.2	23.3
010	86.1	100.5
011	20.4	21.7
012	34.4	36.0

3

4 **Q. Can you provide further evidence regarding the maintenance of watershed**
5 **hydrology?**

6 Response. Yes. Pioneer has completed detailed hydrologic modeling using the
7 HydroCAD, which implements the NRCS TR-55 methodology for determination of
8 peak flow rates at specific locations on receiving streams. Simulations have been
9 completed for existing conditions, and post-development conditions with the above-
10 described stormwater management practices in place. Results are presented at three
11 locations, which are in all cases downstream of all project activities: Annis Brook,
12 Calendar Brook above Clark Brook confluence, and mouth of Clark Brook.
13 HydroCAD routing diagrams for existing and post-development conditions are
14 presented as *Exhibit UPC-JN-Reb7*.

1 Table 2 presents model results for the 1 year storm event, which corresponds
 2 to 2.1 inches of rainfall in 24 hours. This rainfall amount is as specified for a 1 year
 3 recurrence interval storm event in Caledonia County pursuant to VSWMM.

Table 2: Peak Discharge Rate Results for 1-Year Storm Event			
Location	Existing (cfs)	Post-Development (cfs)	Percent Change (%)
Annis Brook	22.6	19.9	-11.9
Clark Brook	71.2	69.7	-2.1
Calendar Brook	150.4	140.9	-6.3

4

5 These results show that there would be no increase in peak discharge rate at any of
 6 these locations for this storm event.

7 Table 3 presents model results for the 10 year storm event, which
 8 corresponds to 3.1 inches of rainfall in 24 hours.

Table 3: Peak Discharge Rate Results for 10 -Year Storm Event			
Location	Existing (cfs)	Post-Development (cfs)	Percent Change (%)
Annis Brook	83.8	78.4	-6.4
Clark Brook	251.3	245.9	-2.1
Calendar Brook	543.4	509.9	-6.2

9

10 These results show that there would be no increase in peak discharge rate at any of
 11 these locations for this storm event.

12 Table 4 presents model results for the 100 year storm event, which
 13 corresponds to 5.4 inches of rainfall in 24 hours.

Table 4: Peak Discharge Rate Results for 100 -Year Storm Event			
Location	Existing (cfs)	Post-Development (cfs)	Percent Change (%)
Annis Brook	294.7	317.9	+7.9
Clark Brook	873.6	875.2	+0.2
Calendar Brook	1,890.7	1,843.3	-2.5

14

1 For Calendar Brook the analysis results show no increase in peak flow rates, and the
2 increase for Clark Brook is insignificant. For Annis Brook, a small increase in peak
3 flow rate is projected, which is not unexpected since Q100 control is not required.
4 This increase is overstated, since the analysis is done based on the temporary
5 impervious area, not the permanent area. Nonetheless, given that no increases are
6 projected for smaller storms which are considered channel-forming, this increase is
7 not considered significant.

8

9 **Q. Why has the focus been on operational phase design, as opposed to**
10 **construction phase stormwater permitting?**

11 Response. It is necessary to first focus on the operational phase stormwater
12 treatment and control requirements, since the structural treatment requirements
13 necessary to comply with the Stormwater Rule determine the full extent of earth
14 disturbance necessary for the Project's construction. Once these features have been
15 located and sized, the overall disturbance associated with Project-related grading can
16 be determined. From this information, the construction phasing and sequencing and
17 associated best management practices can be established. Thus, this sequence of
18 design work is both proper and necessary. Having said that, I remain completely
19 confident that all elements required for construction phase stormwater permitting
20 will be achieved.

21

22 **Q. What will the permitting approach be for the construction phase of the**
23 **Project?**

1 Response. ANR has recently issued final General Permit 3-9020. This permit uses a
2 risk-based method to determine what type of coverage a particular Project will need.
3 This approach is described in the prefiled testimony of Kevin Burke, with respect to
4 the then-draft 3-9020 permit. For this Project it is anticipated that an Individual
5 NPDES construction phase stormwater discharge permit would be required. This
6 permitting approach provides maximum opportunity to ANR to ensure that the
7 Project is constructed in a manner that protects water quality. For example, very
8 strict limits on the amount of exposed soil at any one time, and the duration of time
9 that exposed soil could remain unstabilized would typically be included as conditions
10 to an individual permit.

11

12 **Q. Please describe the field reconnaissance work that Pioneer personnel have**
13 **performed with respect to stream crossing locations.**

14 Response. During August 2006, Pioneer personnel completed a detailed field
15 assessment of the Project site to determine locations where project-related activities
16 would either utilize existing stream crossings or require new ones. These locations
17 and the existing status of each are described in detail below. The majority of these
18 crossings are depicted on the Proposed Stormwater Discharge Point Map - *Exhibit*
19 *UPC-JN-Reb3* – with the exception of Crossing D, E and N, which are not
20 included because of the scale of the map. The location of all stream crossings,
21 including D, E and N, can also be identified on the Natural Resource Maps, *Exhibit*
22 *UPC-CRV-Reb4a*.

- 1 • Crossing A: proposed crossing of a small perennial tributary of Clark Brook
2 at elevation 1,930 feet, just upstream of existing 12 inch corrugated metal
3 pipe (CMP) culvert on an existing access road to the eastern part of the array.
4 Permanent culvert to be designed.
- 5 • Crossing B: existing 21 inch CMP on existing east access road, crossing
6 perennial tributary of Clark Brook at elevation 1,890 feet. No modifications
7 or upgrades needed or proposed.
- 8 • Crossing C: existing 42 inch CMP on existing east access road, crossing
9 perennial tributary of Clark Brook at elevation 1,870 feet. No modifications
10 or upgrades needed or proposed.
- 11 • Crossing D: existing 12 inch CMP on Dareios Road, crossing small
12 perennial tributary of Calendar Brook at elevation 1,690 feet. No
13 modifications or upgrades needed.
- 14 • Crossing E: existing culvert of unknown characteristics on Dareios Road,
15 crossing perennial tributary of Calendar Brook at elevation 1,650 feet.
16 Deeply incised banks of six to eight feet with a channel composed of
17 boulders and large-sized rocks. Possible modifications or upgrades needed.
- 18 • Crossing F: existing culvert of unknown characteristics on existing east
19 access road, crossing perennial tributary of Calendar Brook, at elevation
20 2,060 feet. No modifications or upgrades needed or proposed.
- 21 • Crossing G: existing 12 inch culvert on existing east woods road, crossing
22 small perennial tributary of Calendar Brook, just upstream of the fen, at
23 elevation 2,270 feet. Permanent culvert to be designed.

- 1 • Crossing H: proposed crossing of perennial tributary of Clark Brook along
2 road segment between turbines 3 and 6, at elevation 2,390 feet. The
3 permanent crossing will be a bridge or natural bottom culvert, with details
4 and specifications to be designed.
- 5 • Crossing I: proposed crossing of perennial tributary of Annis Brook along
6 road segment between turbines 8 and 9, at elevation 2,290 feet. The
7 permanent crossing will be a bridge or natural bottom culvert, with details
8 and specifications to be designed.
- 9 • Crossing J: proposed crossing of perennial tributary of Calendar Brook
10 along road segment between turbines 13 and 15, at elevation 2,190 feet. The
11 permanent crossing will be a bridge or natural bottom culvert, with details
12 and specifications to be designed.
- 13 • Crossing K: proposed crossing of perennial tributary of Calendar Brook
14 along New Duck Pond Road at elevation 1,920 feet. A permanent culvert
15 would be proposed at this location to replace an existing improperly located
16 and sized culvert.
- 17 • Crossing L: existing 15 inch RCP culvert crossing of perennial tributary of
18 Clark Brook along New Duck Pond Road, at elevation 1,930 feet. No
19 modifications or upgrades needed or proposed.
- 20 • Crossing M: proposed crossing of perennial tributary of Calendar Brook
21 along New Duck Pond Road to replace existing open channel covered by
22 wooden planks, at elevation 1,990 feet. The permanent crossing will be a

1 bridge or natural bottom culvert, with details and specifications to be
2 designed.

3 • Crossing N: proposed crossing of perennial tributary of Calendar Brook
4 along road segment to replace existing crossing with insufficient load-bearing
5 capacity, at elevation 1,640 feet. The permanent crossing will be a bridge or
6 natural bottom culvert, with details and specifications to be designed.

7 • Crossing O: existing crossing of intermittent tributary of Calendar Brook
8 along New Duck Pond Road at elevation 1,920 feet. Specifications for
9 permanent crossing remain to be designed.

10 • Crossing P: existing 6 inch culvert crossing of intermittent drainage ditch of
11 Calendar Brook along New Duck Pond Road at elevation 1,920 feet. No
12 modifications or upgrades needed or proposed.

13

14 **Q. How will proposed crossings be designed to avoid impacts to stream**
15 **stability?**

16 Response. Where crossings are necessary to effect project construction, or for
17 operational phase of the Project, the protocols established by the ANR Vermont
18 Stream Geomorphic Assessment Protocols for Bridge and Culvert assessment will be
19 used to verify that proposed crossing designs would not result in significant impacts
20 to existing channel characteristics. Since all of the proposed crossings are located on
21 small channels, generally first order, and are relatively incised, it is not anticipated
22 that culvert or bridge design to avoid impacts will be problematic.

23

1 **Q. Have the revisions to the layout improved the Project from a stormwater and**
2 **water quality perspective?**

3 Response. Yes, there are several improvements. First, the overall area of proposed
4 clearing and grading has been reduced significantly. The initial plan called for
5 approximately 119 acres of total clearing and disturbance, which is now reduced to
6 79.24 acres. Second, the initial plan involved work in areas above 2,500 feet in
7 elevation, thereby involving areas of Class A waters. This is no longer the case.
8 Third, the revised plan makes greater use of existing woods/logging roads to
9 minimize new road construction needs. The total length of new roads has been
10 reduced from 6.1 miles to 5.6 miles. In particular, a very steep section of new road
11 up to Norris Mountain, which would have been necessary under the prior plan has
12 been eliminated. Finally, the proposed road crossing the beaver pond wetland
13 (wetland 22) has been eliminated, avoiding potential future water quality impacts at
14 that location.

15

16 **Q. RPI-UHS witness Lapin raised concerns about impacts to the rich fen and to**
17 **other wetlands due to changes in hydrology, soil erosion and compaction from road**
18 **construction, and the effect of spills or leakage of pollutants. How would you**
19 **respond?**

20 Response. I consider these comments to be generalized, and non-site specific.
21 Unlike an ideal world that Dr. Lapin may seek, the Project is not held to a “no
22 change” standard. There are specific criteria and standards in place, and I have every
23 intention and expectation that a full and complete demonstration of compliance with

1 these will be made, such that all necessary permits are obtained for the Project. The
2 project design is proceeding in full accordance with the construction and operational
3 phase stormwater permitting requirements of the State of Vermont, which have been
4 specifically developed in accordance with 10 V.S.A. §1264, which states, in part:

5 The general assembly finds that the management of stormwater runoff is
6 necessary to reduce stream channel instability, pollution, siltation,
7 sedimentation, and local flooding, all of which have adverse impacts on the
8 water and land resources of the state. The general assembly intends, by
9 enactment of this section, to reduce the adverse effects of stormwater runoff.
10 The general assembly determines that this intent may best be attained by a
11 process that: assures broad participation; focuses upon the prevention of
12 pollution; relies on structural treatment only when necessary; establishes and
13 maintains accountability; tailors strategies to the region and the locale; assures
14 an adequate funding source; builds broad-based programs; provides for the
15 evaluation and appropriate evolution of programs; is consistent with the
16 federal Clean Water Act and the state water quality standards; and accords
17 appropriate recognition to the importance of community benefits that
18 accompany an effective stormwater runoff management program. In
19 furtherance of these purposes, the secretary shall implement two stormwater
20 permitting programs. The first program is based on the requirements of the
21 federal National Pollutant Discharge Elimination System (NPDES) permit
22 program in accordance with section 1258 of this title. The second program is
23 a state permit program based on the requirements of this section for the
24 discharge of "regulated stormwater runoff" as that term is defined in
25 subdivision (11) of this subsection.

26
27 While Dr. Lapin may be an experienced ecologist, he does not appear to have any
28 demonstrated experience in the design, construction or monitoring of projects
29 pursuant to these statutory requirements for stormwater management, erosion
30 prevention, or sediment control. In contrast, Pioneer has worked on a large number
31 of projects in the past and on an ongoing basis, which must demonstrate compliance
32 with all of the myriad permitting criteria to obtain permits, and which are judged
33 through the course of operation with respect to compliance with the VWQS. Thus,
34 appropriate construction practices, stormwater controls directing stormwater to

1 appropriate areas, buffers, and an SPCC plan will all be utilized to protect the
2 wetland and water resources in the Project area, such as the rich fen.

3

4 **Q. ANR witness Morrison notes in her testimony that “stormwater should be**
5 **strictly diverted away from the fen...” Does the revised plan accomplish this?**

6 Response. Yes, it does. The temporary and permanent impervious surface from the
7 nearest upgradient proposed turbines (C7 and C9) will not be directed toward the
8 fen, but rather to stormwater basin #1 located in the Annis Brook watershed. The
9 existing access road would be maintained with minimal widening and improvements
10 to address runoff from the existing roadway impervious surface. Thus, this concern
11 has been addressed.

12

13 **Q. Several witnesses have raised the concern that pollutants from project**
14 **construction and operation could leak into area streams and wetlands,**
15 **contaminating them as well as downgradient streams and springs. How has this**
16 **been addressed?**

17 Response. The combination of construction phase erosion prevention and sediment
18 control measures that are designed, implemented, and maintained in accordance with
19 individual NPDES permit conditions, an operational phase stormwater management
20 system that collects and treats runoff from proposed surfaces, and an SPCC Plan to
21 be implemented by UPC personnel and contractors provide reasonable assurance
22 that no contamination of nearby waters would occur. Such measures are routinely
23 implemented at ski resorts in Vermont, and under current regulatory requirements

1 have been found to be compatible with maintaining the quality of both surface water
2 (streams and wetlands) and groundwater (wells and springs)

3

4 **Q. ANR witness Morrison notes in her testimony several specific comments**
5 **regarding wetland 22. Could you comment on this with respect to flooding and**
6 **water flow issues associated with beaver activity at that location?**

7 Response. Yes. The revised Project design eliminates a road that was previously
8 proposed to cross a tributary of Calendar Brook at a beaver wetland (wetland 22).
9 Therefore, any flooding associated with the periodic natural breaching of the beaver
10 dam in that area would no longer be affected by Project activities. The natural
11 channel of the stream and its riparian buffer would be completely maintained in an
12 undisturbed condition, thus eliminating the risk to water quality if the road were to
13 wash out, and obviating any need for maintenance activities in that area. Thus, this
14 concern has been addressed.

15

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

17 Response. Yes, it does.