STATE OF VERMONT
PUBLIC SERVICE BOARD

Docket No. 7250

Amended Petition of Deerfield Wind, LLC for a certificate	)
of public good authorizing it to construct and operate 17 turbine,	)
34 to 35.7 MW wind generation facility, and associated transmission	)
and interconnection facilities, on approximately 80 acres in the	)
Green Mountain National Forest, located in Searsburg and	)
Readsboro, Vermont, with 7 turbines to be placed on the east side	)
of Route 8 on the same ridgeline as the existing GMP Searsburg	)
wind facility (Eastern Project Area), and 10 turbines along the	)
ridgeline to the west of Route 8 in the northwesterly orientation	)
(Western Project Area)	)

PREFILED REBUTTAL TESTIMONY OF JEFFREY A. NELSON and KRISTA REINHART

ON BEHALF OF DEERFIELD WIND, LLC

July 3, 2008

Summary:

Mr. Nelson and Ms. Reinhart respond to issues related to stormwater raised by Matthew Probasco on behalf of the Vermont Agency of Natural Resources and other water-related issues raised by Thomas Shea.

Q. Please state your name, occupation, and business address.

Response (Mr. Nelson): My name is Jeffrey A. Nelson. I am the Director of Environmental Services for the firm VHB Pioneer, which has its offices at 48 Green Street – Suite 2 in Vergennes, Vermont.

Response (Ms. Reinhart): My name is Krista Reinhart. I am the Senior Watershed Scientist of the firm VHB Pioneer, which has its offices at 48 Green Street – Suite 2 in Vergennes, Vermont.

Q. Have you previously prefiled testimony in this case?

Response: No.

Q. Please describe your educational background and experience.

Response (Mr. Nelson): Please refer to my resume, attached as ***Exhibit DFLD-JN/KR-1a***. I hold a B.S. degree in Geology (1982) and an M.S. degree in Civil Engineering (1992), both from the University of Vermont. My educational training includes both surface water hydrology and groundwater hydrogeology. The field of hydrology involves the study and evaluation of the quantity and quality of surface waters, including pollutant loading and transport. Hydrogeology involves the assessment of the movement of groundwater, including contaminants, and the assessment of the yields of wells and aquifers. I am also a Certified Professional in Erosion and Sediment Control (#2131) and Certified Professional in Storm Water Quality (#13).

I have completed numerous water resources evaluation studies with respect to large-scale land development proposals in Vermont involved in the Act 250 and Section 248 processes. These studies have involved participating in the planning and design efforts, developing and conducting monitoring studies to determine potential water quality impacts. Additionally, my professional background includes the completion and presentation of technical studies, evaluation and review of scientific data, determination of compliance with various State and Federal regulatory requirements, and application for various permits and authorizations. I have presented the results of such analyses to numerous review bodies, including various courts, commissions, boards, and legislative committees.

Response (Ms. Reinhart): Please refer to my resume, attached as ***Exhibit DFLD-JN/KR-1b***. I hold a B.A. degree in Geology (1994) from the Department of Geologic and Environmental Sciences at Hartwick College and an M.S. degree in Forestry (2003) with a concentration in Water Resources from the School of Natural Resources (now called the Rubenstein School of Environment and Natural Resources) at the University of Vermont. My educational training has focused on the biogeochemistry of various nutrients (e.g., nitrogen and phosphorus) during transport from soil to plants, as well as the cycling of metals, with a specific study of the transport of mercury through watersheds with differing land use (agricultural, forested, and urban). More recently, my focus has been on the management of these materials as a component of stormwater runoff, with expanded design and implementation of systems that retain/detain stormwater and associated pollutants

as a means of reducing the amount of material loading to water resource areas to protect/restore water quality and aquatic habitat. I am also a Certified Professional in Erosion and Sediment Control (CPESC, #4256), and as such provide training in Erosion Prevention and Sediment Control (EPSC) to development managers and contractors that are involved with projects that range from large-scale shopping plaza-type development to smaller-scale subdivisions and on-mountain ski area development.

Q. What is the purpose of your rebuttal testimony?

Response: We respond to issues related to stormwater raised by Mr. Matthew Probasco on behalf of the Vermont Agency of Natural Resources ("ANR") and other water-related issues raised by Mr. Thomas Shea.

Q. Mr. Probasco of ANR questions whether the Project's proposed stormwater design meets the treatment standards of the Vermont Stormwater Management Manual ("VSMM"), and states that Deerfield should identify all waters that will receive stormwater from the Project, treatment practices to be used at each discharge location, and information on how the practices comply with VSMM. (Probasco pft at 5-7). How do you respond?

Response: Deerfield Wind believed that the level of stormwater information previously submitted through its civil engineer, Hill Associates, was appropriate for a section 248 proceeding, understanding that it would ultimately need to seek a stormwater permit. Nonetheless, in an effort to satisfy ANR's information needs at

this stage, an operational phase stormwater management summary has been prepared for the Project (modified) to demonstrate the approaches that will be used to meet the treatment standards of the VSMM. ***Exhibit DFLD-JN/KR-2*** provides the summary of the operational phase stormwater design work that has been performed to date by VHB Pioneer. This exhibit includes:

- Summary table (SN Summary table) that provides a listing of the twenty-seven (27) discharge points (SN) and associated delineated subwatersheds, impervious area, site area, receiving waters (streams or wetlands), SN elevations, and VSMM criteria data for the 10-year and 100-year storm events (pre- and post-development scenarios).
- Summary table (Basin Summary table) that provides a listing of stormwater basins, subwatersheds, SN locations, site area, site impervious area, and VSMM criteria data including what is required and what is provided for the WQv and CPv criteria.
- HydroCAD™ hydrologic modeling routing diagrams for pre- and post-development condition.
- An overall watershed map that displays the project design (turbines, roads, substation, etc.), mapped streams and wetlands, mapped bear-scarred beech trees, delineated subwatersheds under post-development conditions, permanent stormwater treatment practice locations, discharge point (SN) locations, and adjacent existing development (roads, etc).

- Two subwatershed maps that are parceled by "west ridge" and "east ridge" turbine arrays, and provide a closer depiction of those project elements noted in the previous bullet.

Applicable VSMM standards that are to be met by the proposed stormwater treatment practices include: Water Quality (WQv), Channel Protection (CPv), Groundwater Recharge (Re), Overbank Flood Protection (Q10), and Extreme Flood Protection (Q100). Proposed stormwater treatment practices that would meet required VSMM standards include wet ponds with forebays and grass channels.

Q. Mr. Probasco questions whether the Project meets ANR's Erosion Prevention and Sediment Control ("EPSC") specifications, and suggests that Deerfield should provide draft stormwater pollution prevention plans, including information on project phasing, the amount of disturbance at any one time, and details of the planned stabilization methods and schedule (Probasco pft at 5-7). How do you respond to these issues?

Response: The conceptual EPSC plan associated with the Project involves implementation of a phased approach for construction that ultimately limits the extent (in area) of exposed soil open at any one time (e.g., 7 acres). Additionally, the approach involves temporary or permanent stabilization of exposed areas as early as practicable (e.g., within 14 or 21 days of initial disturbance, with exceptions per DEC guidelines). Specific EPSC measures which are intended to be implemented include, but are not limited to:

- Up-slope diversion of run-on;

- Limits of disturbance barrier fence and flagging;
- Silt fence, with and without reinforcement;
- Grass- and stone-lined swales;
- Stone check dams;
- Temporary and permanent stream crossings (e.g., log crossing and culverts);
- Rock sandwiches;
- Temporary sediment basins;
- Temporary and permanent stabilization with seed, mulch/matting, and wood chips;
- Use of vegetative buffers;

Additionally, a Preliminary EPSC Plan narrative has been included as ***Exhibit DFLD-JN/KR-3*** that includes description of the major construction activities and associated EPSC measures proposed to be implemented at the site through the course of project construction activities.

Q. Please describe the work you have performed and the plans you have prepared in connection with this rebuttal testimony.

Response: VHB Pioneer has performed the following tasks, specific to the revised turbine layout, consisting of 15 Gamesa turbines:

- Field mapping of watershed boundaries.

- Detailed field reconnaissance to identify receiving stream points of compliance, potential stormwater detention basin locations, and necessary drainage channels to convey runoff to potential treatment areas.
- Field investigation of existing and proposed stream crossing locations.
- Determination of applicable criteria under the VSMM for stormwater treatment and control for both construction and operational phase impervious areas.
- Preliminary sizing and design of proposed stormwater treatment practices to ensure compliance with VSMM requirements.
- Assessment of Project EPSC measures based on *The Vermont Standards and Specifications for Erosion Prevention and Sediment Control (2006).*

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

Response: VHB Pioneer personnel have performed a detailed site review that involved:

1. Assessment of proposed turbine locations in proximity to mapped resource areas;
2. Review of potential stormwater treatment practice locations;
3. Delineation of subwatershed areas; and
4. Determination of receiving waters and discharge points.

During this investigation the receiving water locations were captured using GPS technology and photographs were taken.

Q. Please describe the watersheds within which the revised Project is located.

Response: The entire project is located within the watershed of the Deerfield River. A total of 27 proposed stormwater discharge points have been identified on named and unnamed tributaries, or wetlands that are located downslope of proposed impervious areas associated with the Project (see ***Exhibit DFLD-JN/KR-2, watershed map)***. The discharges have been grouped, based on the segment of the Deerfield River these streams drain to, as follows:

- Segment 1: discharges to waters draining to Deerfield River upstream of Searsburg Reservoir; significant tributaries within this reach include Pine Brook and Rake Branch.
- Segment 2: discharges to waters draining to Deerfield River upstream of Harriman Reservoir; significant tributaries within this reach include Bond Brook, Medbury Brook, and Wilder Brook.
- Segment 3: discharges to waters draining to West Branch Deerfield River, then to the Deerfield River, upstream of Sherman Reservoir; significant tributaries within this reach includes Lamb Brook.

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

Response: Of the 27 proposed discharge points, 13 are located above 2500 feet in elevation. Therefore, these locations are designated as Class A(1) waters in accordance with the Vermont Water Quality Standards (VWQS). The remaining 14

discharges occur in waters below 2500 feet, which are designated as Class B (see ***Exhibit DFLD-JN/KR-2, page 1)***. Nine of the discharge points are to wetlands, and the remaining 18 are at streams, all of which are designated as cold water fish habitat. Finally, from the standpoint of applicable biocriteria that are used by the Vermont Department of Environmental Conservation (DEC) to interpret the Sections 3-02(A)(1) and 3-04(A)(1) of the VWQS regarding Aquatic Biota, Wildlife, and Aquatic Habitat, these streams would be considered as "small high gradient" or SHG features. Specific numerical biological indices have been established by DEC for these stream classifications, against which the attainment status of these streams with the narrative criteria of VWQS can be evaluated.

Q. Please describe the proposed stormwater discharge points.

Response: The proposed stormwater discharge points are located down-gradient from the proposed stormwater treatment wet ponds, which would treat and detain stormwater flow off all proposed impervious area. The designated stormwater discharge points are located either on a stream or a wetland that drains to a stream. There would be six discharge points to waters within Segment 1 of the Deerfield River, 14 discharge points within Segment 2 of the Deerfield River, and seven discharge points within Segment 3 of the Deerfield River, via the West Branch of the Deerfield River. These data are summarized in the summary tables provided in ***Exhibit DFLD-JN/KR-2, pages 1 and 2***.

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

Response: The Vermont Stormwater Management Rule (EPR Chapter 18) implements the state stormwater permitting requirements of 10 V.S.A. sections 1263 and 1264. Pursuant to this Rule, an operational phase stormwater discharge permit is required for new impervious surface of greater than one acre, as well as certain categories of expansion and redevelopment of existing impervious surface. ANR has issued General Permit 3-9015 to implement the Rule for proposed discharges to both Class A(1) and Class B waters.

The requirements for stormwater treatment and control in Vermont are based on five criteria. These criteria for stormwater treatment and control, according to the VSMM, are:

Water Quality Criteria (WQv) -- Goal: Provide for reliable pollutant removal for runoff from impervious surfaces, and capture 90 percent of the annual storm events and remove 80 percent of average annual total suspended solids load.

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

Recharge Criteria (Rev, Rea) -- Goal: Maintain existing ground water levels and the average annual recharge rate by allowing infiltration of a specific quantity of stormwater on a developed site.

Overbank Flood Criteria (Q10) and Extreme Storm Criteria (Q100) -- Goal: Reduce downstream flooding potential during major storm events by controlling post-development peak discharge rates so that the pre-development peak discharge rate is not exceeded.

For a particular project, the design team must first determine which specific criteria are applicable, since not all criteria are required for all situations. Then existing and proposed topography and drainage features are reviewed and subwatersheds are delineated for pre-development and post-development conditions. Digital Elevation Model (DEM) data were used to delineate the pre-development condition subwatersheds. For proposed conditions subwatersheds, data collected during the site visit and the proposed site design are analyzed and subwatersheds collecting runoff from all proposed impervious areas are delineated. Discharge locations (SN) are identified where treated stormwater runoff from the site first reach a water of the State. Stormwater treatment practices are then selected that best fit the site, which are designed to provide water quality and quantity treatment according to State regulations and the VSMM. The HydroCAD™ hydrologic modeling program is used to help size the stormwater treatment practices, and to analyze peak storm discharges. The proposed land cover and underlying soils are geoprocessed with the subwatersheds in ArcView GIS environment to produce the Curve Number (CN) runoff coefficient used in the hydrologic modeling.

Q. Which VSMM treatment and control criteria are applicable to this project?

Response: All five treatment and control criteria are applicable to all 27 proposed discharge points associated with the Project. As described above, these include: WQv, CPv, Rev/Rea, Q10, and Q100.

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

Response: Wet ponds (37) are proposed to meet the WQv, CPv, Q10, and Q100 criteria for the entire project site. Grass channels are proposed to meet the Rev/Rea standard for the site, and are proposed in areas of existing low slope. Opportunities for supplement swales to provide additional recharge and infiltration beyond VSMM requirements are also under consideration for areas where site conditions would facilitate such practices.

Q. Have you evaluated the performance of the basins for a range of storm events?

Response: The proposed wet ponds have been evaluated for performance and peak discharge rate reduction for the 1-year, 10-year, and 100-year storm events, and flows have been compared to pre-development conditions at downstream analysis locations, using the HydroCAD™ hydrologic modeling program. Projected reductions during the 1-year, 10-year, and 100-year storms associated with detention provided in the wet ponds indicate that the CPv, Q10, and Q100 criteria would be met for the entire project site. ***Exhibit DFLD-JN/KR-2***, page 1, provides an SN Summary table that includes the Q10 and Q100 criteria results. This summary demonstrates that there would be no significant increases in peak discharge rates from pre- to post-development conditions at any of the receiving waters for these design storm events. The Basin Summary table, also provided in ***Exhibit DFLD-JN/KR-2***, page 2, includes the detention time provided, associated with the CPv requirement, indicating that this criterion would be met.

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

Response: Specific areas that will be initially constructed as gravel areas to provide load-bearing and stabilization but then restored to vegetated areas following construction include: turn-around areas and staging/stockpiling areas. Per input from Mr. Matthew Probasco of ANR, it was indicated that these areas may be considered pervious if the intent is restore to vegetated areas within two years of establishment as a gravel surface. This is a decision that is pending per further discussion amongst ANR staff. In the meantime, all areas associated with the construction, including these temporary gravel surfaces, have been considered as impervious in the operational phase to remain conservative.

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

Response: It is necessary to first focus on the operational phase stormwater treatment and control requirements, since the structural treatment requirements necessary to comply with the Stormwater Rule will determine the full extent of earth disturbance necessary for the Project's construction. Once these features have been located and sized, the overall disturbance associated with Project-related grading can be determined. From this information, the construction phasing and sequencing and associated best management practices can be established. Thus, this sequence of design work is both proper and necessary. Having said that, we remain fully

confident that all elements required for construction phase stormwater permitting will be achieved.

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

Response: Vermont DEC implements the NPDES construction stormwater permitting program in Vermont though a risk-based analysis of potential impacts of a construction project to water quality. Low and moderate risk projects are eligible for coverage under General Permit 3-9020, while other projects are required to obtain an Individual Discharge Permit. The risk analysis method involves the completion of a risk evaluation worksheet. VHB Pioneer has completed the risk evaluation for the Deerfield Wind project and determined that the project could be eligible for coverage under General Permit 3-9020 as a Moderate Risk construction activity. However, to provide greater flexibility with respect to planning and executing the construction sequence, the Project is better suited for an Individual Discharge Permit for Stormwater Runoff from Construction Sites. Therefore, it is the current intent of the developer to seek authorization from ANR for issuance of an Individual Discharge Permit with preparation and submittal of a complete application, including an EPSC narrative and associated EPSC plans and EPSC Plan Summary Forms that are in conformance with the most recent edition of *The Vermont Standards and Specifications for Erosion Prevention and Sediment Control (2006).*

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

Response: During the site visit conducted by VHB Pioneer personnel, receiving waters were photographed, including streams that would have crossings associated with the proposed development.

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

Response: Culverts are proposed for two types of locations: stream crossings and drainage locations. In both instances, these culverts would be designed according to a design storm (25-year as rule of thumb), where peak flows would not cause erosive conditions through overwhelming the culvert and crossing, thereby minimizing road and ditch erosion. Stream-crossing culverts have been minimized in number and length. In addition, these structures would be pipe arches or similar designs, to enable passage of streamflow, bedload, and aquatic organisms. Additionally, these culverts would be constructed to match existing slopes and would have stabilized entrances and outlets through hard bank armoring and/or headwalls. Outlet designs for drainage culverts would provide for releasing flows onto stable slopes and into areas in order to maximize the trapping of sediment wherever feasible. During the construction phase, best management practices would be utilized, consistent with Vermont DEC construction stormwater permitting requirements. These practices would include temporary erosion prevention and sediment control devices, which would remain in place and be maintained until ground is stabilized. In addition,

temporary diversion of streamflow around the construction site will occur while the crossing is constructed.

Q. Mr. Shea expresses his concerns about the Project's potential impact (from leaked oil) on his spring-fed water supply, and states that Deerfield does not have a SPCC plan for the Project (Shea pft at 5-6). How do you respond to these issues?

Response: First, regarding the spring owned by Mr. Shea. Under the previously proposed 17 turbine layout, his water source is located approximately 2,400 feet from any project related earth disturbance, associated with the nearest proposed turbine (W-8). This represents a large distance, which far exceeds the likely groundwater recharge area of the spring.

In any event, a Draft Spill Prevention, Containment and Countermeasures Plan (SPCC) specific to the Deerfield Project is attached to the Habig/Goland/Cherian rebuttal testimony as ***Exhibit DFLD-HGC-3***. The SPCC Plan outlines the procedures, methods and equipment used at the facility to comply with the US Environmental Protection Agency's oil spill prevention, control, and countermeasures standards and must comply with the inspection, reporting, training and record-keeping requirements. Among other things, the SPCC plan notes that gear boxes are equipped with low level alarms to detect leaks. Active containment measures will be employed upon discovery for small spills that may occur from the nacelle. These may drip along the upper portion of the outside of the tower base or remain inside the nacelle. The O&M facility will be equipped with spill response equipment for both large and small spills. Should a larger spill inside the nacelle

occur, it will be contained by the closed tower base, as EPA recognized in recent proposed amendments to the federal SPCC regulations. All oil-handling employees will be trained on such matters as the SPCC Plan, laws and regulations regarding spills, releases and pollution control, and operation and maintenance of equipment to prevent discharges. If a spill were ever to contact soils, it would be remediated by qualified and properly licensed contractors. Ibredrola Renewables' Director of Environment Health and Safety oversees all programs to ensure environmental protection and full compliance with all applicable state and federal law.

Given these considerations, it is our professional opinion that the prior 17 turbine project layout would not have any significant or measurable impact on the water quantity or quality of Mr. Shea's existing spring. Furthermore, the newly redesigned 15-turbine project eliminates the three southern-most turbines in the western array. Therefore, there are no turbines or roads located upslope of Mr. Shea's spring, further ameliorating any concern regarding potential project impacts to this water source.

Q. Mr. Metz of ANR recommends that any Certificate of Public Good issued by the Board in this case include a condition limiting construction to the winter months and constructing a snow fence around Turbine 4E (Metz pft at 5). Please comment on these recommendations.

Response: As part of the Stormwater Discharge Permit application process, a comprehensive EPSC plan will be prepared that includes specific measures to be implemented during active construction to minimize the potential for disturbance to

resource areas, including wetlands and streams. In particular, per *The Vermont Erosion Prevention and Sediment Control Standards and Specifications* (2006), the contractor is required to demarcate the limits of disturbance (the "project area") prior to any earth-disturbing activities, using a barrier that is appropriate for the location. More specifically, per *The Vermont Erosion Prevention and Sediment Control Standards and Specifications (2006)*, barrier tape/rope may be used "where proposed disturbance borders non-wooded, vegetated areas more than 100 feet from the nearest water resource (stream, brook, lake, pond, wetland, etc.)", while construction fence/snow fence/boulders are to be used "where the proposed disturbance is within 100 feet of a water resource." In our professional experience, this approach has been successful in identifying important areas, such as wetlands, that are to be protected from disturbance during construction. Therefore, a winter-only requirement for construction is unnecessary given that there are these required measures that would be implemented as standard practice to avoid impacts to wetlands and streams.

ANR has acknowledged that appropriate protections can be implemented through its own permit processes rather than imposing a winter-only requirement for construction. In response to Deerfield Wind's discovery requests, Mr. Metz stated:

> My request for winter construction along the site of headwater streams and high elevation wet areas stemmed from my concern with sedimentation downstream. I have been assured by Matthew Probasco, Environmental Analyst, that my concerns will be addressed by the NPDES Construction Stormwater Permit, the Erosion Prevention and Sediment Control Plan, and the State Operational Phase Permit. The placement of snow fence along the limits of disturbance for Turbine 4E will avoid encroachment into the adjacent wetlands, The Agency will request such a condition be included in any CPG.

Q. Please provide your opinion as to whether the Project would maintain the natural condition of streams to the extent feasible.

Response: With the implementation of the operational phase stormwater treatment practices as described above, and the construction phase sequence of work and EPSC measure implementation, inspection and maintenance as presented, it is our opinion that the Project would maintain the natural condition of the streams in the vicinity, to the extent feasible. In addition, it is our professional opinion that the Project would comply with applicable VWQS criteria, including classification-specific biological criteria applicable to waters in the project vicinity.

Q. Does this conclude your testimony at this time?

Response. Yes, it does.