STATE OF VERMONT
PUBLIC SERVICE BOARD

PSB Docket No. 7628

Joint Petition of Green Mountain Power Corporation, Vermont Electric Cooperative, Inc., and Vermont Electric Power Company, Inc. for a Certificate of Public Good pursuant to 30 V.S.A. Section 248 to Construct up to a 63 MW Wind Electric Generation Facility and associated Facilities on Lowell Mountain In Lowell, Vermont and the Installation of approximately 16.9 miles of Transmission Line and associated Substations in Lowell, Westfield, and Jay, Vermont.

SURREBUTTAL TESTIMONY OF ERIC SORENSON

ON BEHALF OF THE
VERMONT AGENCY OF NATURAL RESOURCES

Summary of Testimony

Mr. Sorenson is the Community Ecologist with the Vermont Fish and Wildlife Department (VFWD) of the Vermont Agency of Natural Resources (VANR). The purpose of his testimony is to provide additional review and comments on potential impacts from the proposed Kingdom Community Wind project on Rare and Irreplaceable Natural Areas, state-significant natural communities, rare plant species, and habitat fragmentation.

Q1. Please state your name, place of employment, your current position, and any other position you have held with the Department.

A1. My name is Eric Sorenson. I am the Community Ecologist with the Vermont Fish and Wildlife Department (VFWD) of the Vermont Agency of Natural Resources (VANR). I have been in this position since 1996.

Q2. Have you previously prepared direct testimony in this matter?

A2. Yes. I prepared direct testimony on or about October 22, 2010.

Q3. Have you reviewed the prefiled rebuttal testimony of Petitioner's witnesses?

A3. Yes, I have reviewed the rebuttal testimony of Charles Pughe, Jeffrey Nelson, Adam Gravel, Jeffery Wallin, and Ian Jewkes.

Q4. Regarding the testimony of Mr. Nelson, do you agree that the VHB vegetation management plan, Exh. Pet.-JAN-13, will protect the Serpentine Outcrop from an undue adverse impact from the project?

A4. I believe that the management plan prepared November 18, 2010 by VHB will make a significant contribution toward protecting the Serpentine Outcrop and associated rare plants at the West Farman Hill site adjacent to Route 100 in Lowell. However, there are several additional issues that should be addressed in the management plan in order to have confidence that this Rare and Irreplaceable Natural Area (RINA) will be protected.

The following comments pertain to both the management plan (Exh. Pet.-JAN-13) and to Mr. Nelson's rebuttal testimony.

1. In Mr. Nelson's testimony (pages 16 and 17, 26.A.) he agrees with ANR that the Serpentine Outcrop at West Farman Hill should be considered a RINA "as the bedrock and accompanying flora associates are very unique to Vermont." However, Mr. Nelson states that "no mitigation should be required" for the rare large-leaved sandwort at this site. Protection of rare plants is consistent with past PSB Certificates of Public Good and Act 250 Permits, for example Section 248 Certificate of Public Good regarding VT Transco Northwest Reliability Project and Land Use Permit 5L1442 regarding the siting and development of telecommunication facilities and related infrastructure on the summit of Mt. Mansfield. Large-leaved sandwort is also a highly characteristic species of the Serpentine Outcrop community and protecting this plant is important to avoiding any undue adverse effects on this RINA. Mapping the location of this species in the vicinity of any construction work for the Project is critical to avoiding or minimizing impacts and for determining if transplanting or seed collection is necessary, based on construction impacts affecting greater than 25 percent of the rare plant population. Mr. Nelson supports the five step plan to protect RTE species and manage invasive species adopted for the National Grid G33 transmission line (Docket 7500) (pages 19 and 20, 29.A). We agree with these steps that pertain to both threatened and endangered species and to rare species and believe they will address the issues discussed above. These five steps should be incorporated into the management plan for West Farman Hill.

2. The map on page 8 of the management plan shows proposed utility poles within a few feet of Green Mountain maidenhair fern individual plants and clusters. Given the proximity of the new poles to the state-threatened plant and the area of construction disturbance around the new pole, it seems likely that there will be impacts to Green Mountain maidenhair fern. It seems that new poles could be located further from the state-threatened plants in order to avoid direct impacts. Otherwise, an Endangered Species Taking Permit will have to be obtained from ANR prior to construction in anticipation of likely impacts – ANR does not issue after-the-fact permits for projects where impacts can clearly be determined prior to construction. Any takings, even inadvertent, would be a violation of the state law.
3. In order to address Mr. Nelson's concerns regarding invasive species management expressed in his rebuttal testimony (pages 18 and 19, 29.A), I want to clarify that comments in my prefiled testimony (page 17, A16) cover only those sections of the project utility ROW where there are threatened or rare species, namely the Serpentine Outcrop site.
4. We are concerned with the lack of detail regarding exposed soil stabilization in the vicinity of the proposed utility poles. Although the area of exposed soils is small, standard stabilization methods may not be appropriate, due to the sensitivity of this RINA. Any seeding or planting in this area should be done in consultation with ANR.

5. The "post-construction management plan" portion of the VHB Serpentine Outcrop management plan is inadequate. The following additional conditions should be adopted:

- Monitoring for a minimum of three years for invasive species. Any species on the state Quarantine or Watch Lists will be removed by hand or per conditions below.
- Prior to any routine vegetation management occurring in this area a qualified botanist will flag and delineate the Green Mountain maidenhair fern and large-leaved sandwort or alternatively the area containing them.
- Mechanical clearing would be done during the dormant season.
- There will be no foliar herbicide application within this area.
- Cut stump application of herbicide may occur if farther than one meter from any individual of the Green Mountain maidenhair fern or large-leaved sandwort.

Q5. Do you believe that the VHB vegetation management plan, JAN-13, will protect the West Farman Hill site from undue adverse impacts from the project?

A5. I believe that if the VHB vegetation management plan is revised to include recommendations and additional conditions identified in my A4 above and the five steps supported by Mr. Nelson to protect RTE species and manage invasive species adopted for the National Grid G33 transmission line (Docket 7500) (pages 19 and 20 of his rebuttal testimony) that undue adverse impacts on this RINA can be avoided.

Q6. Mr. Nelson, Mr. Gravel, and Mr. Wallin all disagree with your testimony regarding the KCW project's effects on habitat fragmentation and the adverse effects of this fragmentation on the natural environment. Do you have a response?

A6. Frankly, I am very surprised by the level of disagreement from these respected professionals on the adverse effects of habitat fragmentation from this large project. This project will result in the construction of 6.5 miles of 65 to 205 foot wide, mostly rock-blasted road and turbine pads in mature montane forests along a ridgeline in one of the larger blocks of unfragmented habitat in the region. Habitat fragmentation and loss are commonly viewed by the professional conservation science community as some of the greatest threats to wildlife and the conservation of biological diversity, along with climate change and invasive species. I am surprised that we continue to disagree on the scale of habitat fragmentation associated with this project and its adverse effects on the natural environment instead of focusing on what mitigation is most appropriate to offset these impacts.

I recently conducted a search for articles concerning the topic "habitat fragmentation" in the journal Conservation Biology and identified 1,297 articles from 1987 through 2010. This is a well-studied field with the incremental adverse effects of habitat fragmentation well known.

From this large body of study, I would like to reference just one summary article: Trombulak and Frisell's (2000) article titled "Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities." The habitat fragmenting effects of the KCW Project are really the result of an especially wide road (including proposed side slopes and turbine pads) and so this summary article (Trombulak and Frisell 2000) is relevant.

The article provides a summary of many other studies and breaks the adverse ecological effects of roads into seven categories: mortality from road construction, mortality from collision with vehicles, modification of animal behavior, disruption of the physical environment, alteration of the chemical environment, spread of exotic species, and changes in human use of land and water. These categories are generally self explanatory, although the article provides numerous examples for each. This article summarizes studies on the effects of roads from across the world, emphasizing the widespread interest and concern in the effects of roads and habitat fragmentation in the scientific community.

Most of the seven categories of ecological effects of roads summarized in this article (Trombulak and Frisell 2000) also apply to the KCW project. Wildlife issues for the project have been clearly discussed by Mr. Austin and Mr. Darling and include direct mortality of birds and bats associated with the turbines, loss of bear-scarred beech, and alteration in behavior by bear and interior forest songbirds. Alteration of the physical environment includes direct impacts to state-significant natural communities, as well as loss of topsoil, and expected increase in susceptibility to tree blowdowns, changes in drainage patterns on upper mountain slopes, changes in soil temperature and moisture, and changes in amount of light and dust reaching the forest adjacent to the project road. Effects on the chemical environment from the road and turbine pads are unknown but are expected to be much less than would be expected from a road that is heavily travelled by vehicles, especially given the stormwater management proposed with the KCW Project. Spread of invasive species is a significant concern along the project road at this time, and

with expected climatic warming there will likely be additional invasive species with more southern distribution moving north. The Project represents a major change in human use of the land, converting a "working forest" into an industrial wind site for the life of the Project, and without adequate mitigation in the forms of restoration and conservation easements, providing the infrastructure for future ridgeline development.

Q7. Are there more specific issues brought up in recently submitted testimony by Mr. Nelson and Mr. Gravel that you would like to address?

A7. Yes. Mr. Nelson (page 21, 30.A.) downplays the impacts of habitat fragmentation from the Project and summarizes that the "project will undeniably result in a change in land cover and vegetation types from which currently exist." To refer to the approximately 124 acres on which roads and turbines will be constructed as a "change in land cover and vegetation types" is a gross misrepresentation. These areas will largely remain as rock sideslopes or packed rock fragments for the roads and turbine pads for the life of the project. There is currently no plan to hasten recolonization of these barren substrates if and when the project is decommissioned. There is also currently no plan to remove the road and its associated stormwater management system or to restore these areas to natural vegetation. At the construction site for this Project there will not merely be a change in vegetation type, but instead there will be a complete conversion from mature montane forests to industrial wind farm.

Mr. Nelson (page 21 and 22, 30.A.) concludes that he does not expect the Project to result in significant changes to colluvial action as this will be prevented by Best Management Practices (BMP). The downslope movement of soils and nutrients is a natural process on upper mountain slopes. However, the proposed Project will result in removal of the thin layer of soil and all vegetation along four miles of the Lowell Mountain ridgeline. In these areas, colluvial action will be completely stopped as there will be no soils and no vegetation to generate new soils. Maintenance of colluvial action is not protected by any BMP I am aware of.

Q8. Do you have any specific comments in response to Mr. Gravel's rebuttal testimony?

A8. Mr. Gravel also discounts the adverse effects of the Project on habitat fragmentation, arguing that "most studies of wind facility development and displacement of songbirds are inconclusive, due to study designs that do not utilize ... before-after-control-impact assessments." (page 5, 6.A.) My understanding was that the Petitioner needs to demonstrate that there is no undue adverse effect on the natural environment from the Project, not rely on a defense based on the opined inadequacy of past studies. Mr. Gravel provides a quote from the 2002 Kerlinger report for the Searsburg wind project that indicates that the long-term effects of construction on forest interior songbirds is unknown but "interior nesting birds may move back to those areas they seem to have abandoned." This is hardly a conclusive argument that there will be no undue adverse effect on forest interior songbirds from the KCW Project. In fact, on the same page, the

author (Kerlinger 2002) concludes his discussion of nesting songbirds, with the following caution:

"The Searsburg wind power station is the first such facility in the heavily forested eastern part of North America. Other projects will follow and the experience at Searsburg should be noted. Fragmentation of forests via wind turbine erection can impact interior nesting birds in a adverse manner. The size and number of wind power developments in the future are also of concern with respect to habitat loss and fragmentation. This may become the primary ecological consideration in future wind power developments in these habitats. Whether the impacts at Searsburg are ameliorated over several years as the forest reverts and disturbance from human activity remains low is yet to be determined."

Kerlinger's (2002) caution is even more significant when one considers the scale of the Searsburg project relative to the KCW Project. Kerlinger states that there will be seven acres of actual habitat loss at the Searsburg project. In contrast, there will be approximately 124 acres of habitat loss at the KCW project.

Q9. Do you have a response to Mr. Gravel's statements comparing the project to timber harvesting?

A9. Yes. Mr. Gravel continues to describe the Project impacts as being similar to those associated with timber harvesting. I think this is a misleading comparison. Mr. Gravel states that clear cuts "result in habitat loss, creation of forest edge, and reduction in size of contiguous forest patches." (page 7, 6.A.)

The size of any patch cut or clear cut is clearly important to the discussion of forest edge. However, I strongly disagree that the creation of patch cuts or clear cuts in forests result in habitat loss in the same way that the construction of roads results in habitat loss. The

time period required for a forest patch cut to regenerate and provide habitat for forest interior birds will clearly vary, but there is no question that a closed canopy forest will regenerate in most Vermont forest settings. Forests will not regenerate on the road or turbine pad surfaces, the stormwater structures, and likely not on road sideslopes for the life of the KCW Project. It is unlikely that forests will regenerate on these compacted rock surfaces for the foreseeable future, especially given the lack of an ecological restoration plan for the Project. Whereas forest management creates temporary canopy gaps and temporary effects on interior forest birds, the Project will effectively result in permanent loss of forest and the creation of permanent forest edge in what is now forest interior. A study in Illinois (Robinson and Robinson, 1999) showed that the displacement of forest interior bird species around patch cuts of up to one acre (0.4 ha) lasted only 4 to 10 years. Longer periods of displacement are expected for some forest cuts, but overall it is misleading to suggest ecological similarities between any types of forest management occurring in Vermont and the conversion of forest to rock-based roads and turbine pads.

Q10. Did you review the restoration plan prepared by the Davey Resource Group (Exh. Pet.-CP-13)? What is your opinion of that plan?

A10. Yes, I reviewed this plan and its introduction in Mr. Pughe's rebuttal testimony (page 11, 18.A.). The plan consists of covering exposed rock surfaces with a six inch layer of wood mulch and planting grass seed for a cost of approximately $2,000,000. Although I appreciate the Petitioner's effort to explore site revegetation after decommissioning, this

plan is completely inappropriate. The plan proposes to hydroseed five species of warm-season grasses. These warm season grasses are unsuitable for high elevation restoration or site stabilization. Vermont's high elevation forests only have a small number of tree, shrub, herb, and bryophyte species because the conditions are harsh and nutrient-poor. None of the five species proposed in the Davey Group plan occur in Vermont's cool, moist high elevation forests. These proposed grass species are very slow to germinate and are unlikely to survive past one growing season.

Q11. Do you have an opinion on whether the project in its current form and with the changes and alterations proposed by Petitioner will result in an undue adverse effect on the natural environment?

A11. Although the Petitioner has provided meaningful revisions to the project (Variable Road Location Detail and some important on-site conservation land) and we have had productive discussions regarding mitigation of Project effects on the environment, my opinion is that the Project as currently proposed will have an undue adverse effect on the natural environment. I believe the following issues still need to be addressed in order to avoid undue adverse effects:

1) Revise the management plan for the Serpentine Outcrop RINA as discussed above in my testimony.

2) The proposed mitigation lands adjacent to the Project should both be permanent conservation easements to offset the permanent nature of the Project impacts.

3) A permanent easement should be established to conserve the high elevation forests and the disturbed area on the ridgeline of the site. This easement should provide for restoration of the construction site after decommissioning and guarantee no future development along the ridgeline.

4) Establish conservation easements to secure the connectivity of the Lowell Mountain habitat block with large habitat blocks to the south. We have discussed potential locations for this conservation work, including locations along Boomhour Branch.

5) A decommissioning plan with much more detail on restoring native vegetation to the site is needed than has been proposed. We have had meaningful discussions on this. Elements of this plan should include redistribution of stockpiled soil on the road and turbine pad sideslopes as part of the construction process, "deep ripping" of the road and turbine pads after decommissioning to break up these compacted surfaces and establish a substrate with micro-topography that will be more conducive to colonization by vegetation, establishment of organic material on this recontoured substrate, planting of native tree species in this prepared substrate, and monitoring and management of the restoration area for success for 10 years.

6) Develop a 10-year non-native, invasive species monitoring and control plan for the project area as described in my prefiled testimony. The Petitioner has agreed to develop this plan but it has not yet been produced.

Q12. Why is it important to have permanent conservation easements as part of the Project mitigation package?

A12. The Project will result in road and turbine construction on at least 124 acres (Mr. Jewkes rebuttal testimony, page 5, 4.A.). This area will be permanently altered by removal of soil, bedrock blasting, and regrading. We cannot predict what will grow on this disturbed site after decommissioning, but we can be confident that it will not be the mature Montane Spruce-Fir Forest or Montane Yellow Birch-Red Spruce Forest that occurs there now. Similarly, we cannot expect to recover nut-producing beech trees or functional wetlands on any of this altered land. Therefore, the conservation easements to offset these permanent alterations to the natural environment should also be permanent. A permanent conservation easement is critical for the 124 acres and adjacent montane forests in order to preclude future development on this land and to provide the legal protection under which long-term restoration of the disturbed land can occur.

Q13. In your direct testimony, you described concern over the decommissioning plan. Has the Petitioner altered its decommissioning plan? Has your opinion on the plan changed?

A13. Although ANR has had productive discussions with the Petitioner regarding the decommissioning plan and other mitigation measures, these discussions have not been used to revise the decommissioning plan in a meaningful way. As currently proposed, the Petitioner's decommissioning plan is to effectively walk away from the 124 acres of roads and turbine pads after removing the turbines and other structures to a depth of two feet. This will leave a barren, rocky, post-industrial site with few or no ecosystems functions and no protection from future development. Contrary to the content of our

productive discussions regarding the decommissioning plan, in his rebuttal testimony Mr. Pughe states that no additional measures are needed as "the proposed decommissioning plan is consistent with other wind projects that have been approved in Vermont." (page 10, 17.A.) First, the Agency disagrees that the currently proposed decommissioning plan is consistent with other wind projects. Second, it seems to me that each proposed wind development project in the state should be evaluated based on the specific environmental conditions present and designed and permitted using the most appropriate mitigation measures for those conditions, not using a one-size-fits-all approach as Mr. Pughe seems to suggest. I believe that all of the items identified in my answer to Question 8 above need to be resolved in order to avoid an undue adverse impact to the natural environment from the KCW Project.

Q14. Petitioner appears to suggest that the request for a permanent easement exceeds what has been required by the Board in other wind cases. Petitioner has also stated that the landowner from whom they will lease land is not agreeable to all of the conservation easements being permanent and does not agree to an easement on the ridgeline. How do you respond?

A14. It is my understanding that in the Georgia Community Wind Project, the Board has ruled that permanent easements are appropriate for permanent impacts to the significant natural communities on Georgia Mountain. It is my position that permanent easements are necessary to offset the permanent impacts from projects such as KCW. Regarding the landowner, it is clearly their right to decide what projects and conservation easements

they will agree to on their property. However, a project of this scale and with such significant adverse effects on the natural environment should be designed and constructed with appropriate mitigation measures to offset these impacts. If the landowner does not agree to mitigation measures that are necessary to offset project impacts, that may be considered a site constraint significant enough to make the Lowell Mountain property unsuitable for the KCW Project.

Q15. What is the purpose of the conservation easements or land acquisitions you propose along Boomhour Branch at the south end of the Lowell Mountain habitat block?

A15. The main purpose of this proposal is to maintain the existing habitat connectivity between the Lowell Mountain habitat block and the large habitat block to the south that includes Green River Reservoir State Park. Maintaining habitat connectivity in this case really means reducing further degradation of the habitat connectivity that currently exists between these two unfragmented habitat blocks across East Hill Road in Eden. The goal is to maintain wildlife movement and species migration and shifts as ecological conditions change over time. Although East Hill Road is clearly a fragmenting feature between these two large habitat blocks, there are locations along this road where there is no development and natural forest and wetland cover extends to the road edge. It is in these locations, especially along Boomhour Branch, where we expect habitat connectivity to be greatest. Conservation easements or land acquisitions that restrict development of this connecting habitat will help to maintain connectivity into the future. Maintaining habitat connectivity between these two habitat blocks is one way to help offset the

adverse effects of habitat fragmentation from the KCW Project in the Lowell Mountain habitat block.

Q16. Petitioner has proposed to pay for the conservation of the 110-acre Villeneuve parcel in Lowell which will be acquired by the Green Mountain Club. Does that provide the habitat connectivity you recommend?

A16. Although this 110-acre parcel along the Long Trail in Lowell appears to have some important ecological values, conservation of this parcel provides little or no mitigation for the fragmentation occurring in the Lowell Mountains resulting from the KCW Project. Mitigation efforts that are focused on the Lowell Mountains would be much more appropriate for the project. In my opinion, these measures should include Lowell Mountain ridgeline restoration and permanent conservation, other permanent habitat conservation, and conservation of habitat connectivity between the Lowell Mountain habitat block and the habitat block to the south.

Q17. Does this conclude your testimony at this time?

A17. Yes.

References

Trombulak, S.C. and C.A. Frissell. 2000. Review of ecological effects of roads on terrestrial and aquatic communities. Conservation Biology. Vol. 14: 18-30.

Robinson, W.D. and S.K. Robinson. Effects of logging on forest bird populations in a fragmented landscape. Conservation Biology. Vol. 13: 58-66.