

**STATE OF VERMONT  
PUBLIC SERVICE BOARD**

Docket No. \_\_\_\_\_

Petition of Deerfield Wind, LLC for a Certificate )  
of Public Good pursuant to 30 V.S.A. section 248, )  
authorizing it to construct up to a 45 MW wind electric )  
generation facility, and associated transmission and )  
interconnection facilities, in Searsburg and Readsboro, )  
Vermont, and operate the same. )

**PREFILED DIRECT TESTIMONY OF  
PAUL KERLINGER  
ON BEHALF OF DEERFIELD WIND, LLC**

January 8, 2007

Summary:

Mr. Kerlinger describes the work of Curry & Kerlinger, LLC in performing an avian risk assessment, a breeding bird survey, and a supplement to the avian risk assessment for the proposed Deerfield Wind Project. Mr. Kerlinger concludes that the Project should not have an undue adverse impact to any birds, including rare, threatened, or endangered species, due to collision risks, habitat loss, habitat fragmentation, or habitat avoidance.

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

2 Response. My name is Paul Kerlinger. I am a principal in the firm of Curry &  
3 Kerlinger, LLC. My business address is P.O. Box 453, Cape May Point, NJ, 08212.

4  
5 **Q. Please describe your qualifications and experience.**

6 Response. I have a Ph.D. and M.S. in Biology and have nearly 30 years of experience  
7 studying bird behavior, ecology, and migration. For my M.S. thesis, I studied the habitat  
8 ecology of forest nesting songbirds. My dissertation research focused on migration  
9 behavior. I held academic positions and worked for a nonprofit bird conservation  
10 organization for seven years prior to starting my own business. I served as a Natural Science  
11 and Engineering Research Council of Canada postdoctoral fellow at the University of  
12 Calgary for two years and taught and conducted research at the college level for nearly three  
13 years. I served as director of New Jersey Audubon Society's Cape May Bird Observatory  
14 between 1987 and 1994, during which time I established the New Jersey Audubon Society's  
15 research program. As the director of that program, I was the director of the New Jersey  
16 Breeding Bird Atlas and supervised various migration and other avian and conservation  
17 research programs. Many of those studies resulted in peer reviewed publications on  
18 migrating songbirds, migrating hawks, other bird species, and conservation issues.  
19 Simultaneously, I served as director of the Cape May Bird Observatory, overseeing  
20 operations such as staff development, fundraising for a new observatory, a visiting scholar  
21 program, an internship program, conservation outreach, adding the center for education and  
22 research to the New Jersey Audubon Society, and growing membership.

1 I have published five books, including one with the University of Chicago Press and  
2 one with Cornell University Press. Two of my books focus on bird migration and have been  
3 used as either suggested readings or textbooks for undergraduate and graduate level biology  
4 courses. My publication record also includes several dozen scientific papers in the peer-  
5 reviewed literature including journals, chapters in symposia volumes and other books,  
6 dozens of gray literature reports, and perhaps 100 popular articles in birding and nature  
7 magazines such as Natural History.

8 Since 1994 I have operated my own business, and in 1997 formed Curry &  
9 Kerlinger, LLC with Dr. Richard Curry, former Director of Legislation for the National Park  
10 Service (Department of the Interior). My work includes field studies of birds and habitat,  
11 risk assessments, site assessments, and providing expert testimony and consulting regarding  
12 the wind power and communication industries. I have also consulted for various nonprofit  
13 conservation organizations and agencies including Audubon; Trust for Public Land; U. S.  
14 Fish and Wildlife Service; New Jersey Division of Fish, Game, and Wildlife; and the  
15 Conservation Law Foundation, among others. I have worked on existing and proposed  
16 wind power projects in three countries (Spain, Canada, and the U.S.) and more than fifteen  
17 states in the United States. I now serve on the U. S. Fish and Wildlife Service  
18 Communication Tower Working Group and have been serving since its inception in 1998. I  
19 have also been serving on the National Wind Coordinating Committee's Wildlife Working  
20 Group since 1997. I am a member of the Technical Advisory Committee of that working  
21 group and helped organize the November 2003 National Wind Coordinating Committee  
22 symposium on the biological significance of wind power impacts to wildlife. My specific  
23 expertise is in bird collisions with wind turbines, communication towers, and other

1 structures, as well as other impacts caused by these types of structures. Please see my  
2 resume and list of publications for a more complete description of my qualifications and  
3 experience, ***Exhibit DFLD-PK-1***.

4  
5 **Q. Have you previously testified before the Public Service Board or in other judicial or**  
6 **administrative proceedings?**

7 Response. Yes, I testified in the GMP Searsburg Wind Project case (Docket 5823) and the  
8 East Haven Wind Farm case (Docket 6911) and before various zoning boards, Public  
9 Service Commissions, and other permitting bodies. For example, in 2001, I provided expert  
10 testimony to the West Virginia Public Service Commission for West Virginia's first wind  
11 power facility. In 2002, I testified in front of the Bureau County Zoning Board in north-  
12 central Illinois for the permitting of a 33 turbine wind farm. In early 2003, I provided  
13 testimony to the Maryland Public Service Commission regarding Maryland's first two  
14 proposed wind power facilities. I also provided testimony to the Maryland Public Service  
15 Commission in 2005 regarding a third wind power proposal in that state. Other recent  
16 testimony has been provided in front of the Massachusetts Department of  
17 Telecommunications and Energy Facility Siting Board regarding the Cape Wind Project in  
18 Nantucket Sound (2004), and in front of the Wisconsin Public Service Commission (2005)  
19 regarding the Forward Energy Project. Between 1988 and 1994, I served several times as an  
20 expert witness on endangered and threatened species for the New Jersey Department of  
21 Environmental Protection and for the U. S. Justice Department (one occasion).

22  
23 **Q. What is the purpose of your testimony?**

1        Response. The purpose of my testimony is to describe the work of Curry & Kerlinger, LLC  
2        in performing an avian risk assessment, a breeding bird survey, and writing a supplement to  
3        the avian risk assessment for the proposed Deerfield Wind Project, which is an expansion of  
4        the existing Searsburg facility. I also present my conclusion that the Project is not likely to  
5        result in an undue adverse impact to birds or their habitat.

6  
7        **Q.     Please describe the investigations you conducted regarding birds and bird habitat,**  
8        **and how you conducted those investigations.**

9        Response. My studies of avian risk at the Deerfield Wind Project site began with a standard  
10       Phase I risk assessment that focused on potential impacts to birds. The risk assessment  
11       includes three components: a literature/database search, a site visit, and  
12       meetings/discussions with agencies and experts in the field. The literature search is  
13       conducted to determine the types of birds and avian phenomena that may be present at a  
14       particular site or the area surrounding a site, as well as to determine what is known about  
15       impacts to birds resulting from the construction of wind turbines and associated  
16       infrastructure. There is a large body of empirical studies on the impacts of wind turbines on  
17       birds. That literature is growing rapidly. The risk assessment also included a site visit during  
18       which I spent three days on the site examining habitat and looking at the birds that were  
19       present. It should be noted that I spent many days on the project site prior to (1996) and  
20       after (1997) the construction of the existing Searsburg facility. During those earlier visits, I  
21       observed habitat and birds on both mountaintops of the proposed Deerfield Project,  
22       although I did not examine the expansion area thoroughly until 2003.

1           The habitat assessment includes determining the type of habitat present, the  
2           structure of that habitat (age, height, canopy coverage), and current levels of human impacts  
3           at that site. Habitat is important because it provides an indication as to the potential  
4           presence of the types of species and numbers of birds that may nest, forage, winter on,  
5           migrate over, or make migratory stopovers on a given piece of land. The third component of  
6           the risk assessment consists of discussions or meetings with wildlife agency biologists and  
7           local bird experts who may have knowledge of the project site or area, and with staffers at  
8           conservation or research organizations. Much of that component was done in association  
9           with the existing Searsburg facility, as well as during a series of meetings among stakeholders  
10          starting in 2003 and continuing through 2004 and into 2005.

11          The information from these diverse sources is analyzed to determine whether  
12          enough information is available to assess risk and, if not, determine the studies needed to  
13          assess risk more thoroughly. One conclusion of the avian risk assessment was that a nesting  
14          bird study was needed to determine the species that were actually present at or near the site.  
15          The presence of montane conifer in small patches at elevations slightly below or above 3,000  
16          feet ASL on site, suggested that Bicknell's Thrush, and possibly other boreal habitat birds,  
17          might be present. Nesting surveys conducted in 1995-1997 suggested that Bicknell's Thrush  
18          might be present, although it was not found nesting on the existing Searsburg facility site.  
19          The new nesting survey for the Deerfield Wind Project was used to determine if Bicknell's  
20          Thrush were present, as well as their abundance and distribution along the highest elevations  
21          of both Eastern and Western Project Areas. I produced an Avian Risk Assessment Report  
22          (***Exhibit DFLD-PK-2***) and a Breeding Bird Survey Report (***Exhibit DFLD-PK-3***). The  
23          bulk of the work on those reports was done in 2003, and the reports were finalized in fall

1 2005. The methodologies used, including numbers of days on site, dates of visits, etc. are  
2 provided in detail in those reports.

3 Because two years had elapsed between the completion of the Phase I Avian Risk  
4 Assessment and the Breeding Bird Study, I also produced a Supplement to the Phase I Avian  
5 Risk Assessment report (***Exhibit DFLD-PK-4***). The supplement includes: (i) an update of  
6 the empirical studies of wind turbine impacts to birds at sites in the United States; (ii) a  
7 review of what has been learned regarding whether night migrants follow ridges in the  
8 northeastern United States; (iii) whether Federal Aviation Administration, L-864 red flashing  
9 strobe-like lights attract or disorient birds resulting in collisions with turbines; (iv) recent  
10 references in the literature regarding wind power impacts to birds at sites in the United  
11 States and Canada; and (v) a brief review of a U.S. Forest Service survey for Bicknell's  
12 Thrush at the Deerfield site. The supplement provides information that supports the  
13 conclusions reached in the Phase I Avian Risk Assessment and the Breeding Bird Study  
14 reports.

15  
16 **Q. Please describe the topography, physiography, and habitat conditions at the project**  
17 **site and surrounding area in Readsboro and Searsburg.**

18 Response. The tops of the east and west mountains within the Deerfield Project boundary  
19 are elongated mountaintops that range in height to slightly greater than 3,000 feet (ASL).  
20 The ridgetops vary from narrow with steep hills descending from the top to broader topped  
21 with relatively flat areas extending for as much as about 100 m. The edges of the mountains  
22 drop off steeply in some places and less gradually in others. The eastern mountain is a  
23 southward extension of the "ridge" on which the Searsburg turbines are located. The

1 general area is a jumble of mountains, which surround the project site. There are no long  
2 ridges and the ridges that do exist are relatively short and are oriented in varying directions.

3 The east and west mountaintops where the Deerfield turbines would be located are  
4 entirely forested. The forests have been cleared previously such that some areas on the  
5 western mountain have dense or more open stands of smaller trees, many of which are not  
6 greater than 3" dbh (diameter breast height). Some of the forests are taller, especially on the  
7 western mountaintop. That mountain is almost entirely deciduous, whereas the eastern  
8 mountaintop consists of a mixture of deciduous and coniferous (balsam fir) trees. The latter  
9 are in small patches, although a few of those patches are relatively dense. The trees on the  
10 eastern mountaintop are not very tall and can be described as somewhat stunted from wind  
11 and extreme weather conditions. The eastern mountain extends to higher elevations.  
12 During my visits it appeared that there are no large or even smaller clearings on either  
13 mountaintop (where turbines and roads would be located), other than the meteorology  
14 tower locations and the transmission line clearing on the western mountain.

15  
16 **Q. Please describe your initial visits to the site and observations that you made**  
17 **regarding bird species, prey species, and habitat.**

18 Response. My initial site visits were during the nesting season in 1996 and 1997, during  
19 which time I spent many days conducting point count studies of breeding birds on the  
20 eastern mountaintop, in the vicinity of the turbines that were erected in 1996. I conducted  
21 site visits in 2003. I spent several hours on each day walking the mountaintop and edges of  
22 the mountain. I also sat quietly to look and listen to the birds that were present. The species  
23 observed and heard are listed in the avian risk assessment report for the Project (*Exhibit*

1       **DFLD-PK-2**. The birds present are primarily northern temperate species, with a lesser  
2       number of boreal forest nesting species. This type of bird community (species composition  
3       and abundance) can be found at most sites in Vermont above about 2,500 feet ASL. The  
4       bird species observed on the western mountaintop were somewhat different from those on  
5       the eastern mountaintop, a result of the presence of coniferous patches on the latter site.  
6       There were more boreal type species on the eastern mountaintop, resulting from the  
7       presence of balsam fir. Nesting species were a rather diverse assemblage. The habitat did  
8       not appear to be suitable for nesting by any federally endangered or threatened species, nor  
9       was it judged to be suitable for Vermont listed species. In addition, the small patches of  
10      coniferous forest did not appear to be suitable for nesting by Bicknell's Thrush, a state  
11      species of concern.

12  
13      **Q.     Please describe the literature review and habitat assessment that you performed**  
14      **regarding nesting birds that may be present at this site.**

15      Response. To assess potential risk of the Project on birds that nest on the Deerfield site, I  
16      examined the habitat present and reviewed the literature regarding the species that were  
17      likely to be present. Having conducted studies between 1996 and 1997 at the existing  
18      Searsburg facility, I was already very familiar with the types of birds that were likely to be  
19      present. For that project, I conducted nesting surveys and a literature search, both of which  
20      familiarized me with the types of birds that could be found in high elevation deciduous and  
21      conifer forests in Vermont. The literature that I relied on included texts that focus on  
22      Vermont birds and bird watching in Vermont. These included the *Vermont Breeding Bird Atlas*  
23      (Laughlin and Kibbe 1985) and Murin and Pfeiffer's *Birdwatching in Vermont* (2002). Both are

1 referenced in my reports. I also read literature from the Vermont Institute of Natural  
2 Science's (VINS) report in which there is important information on habitat and distribution  
3 of this species within and beyond Vermont. Since writing the Phase I report, I have  
4 discussed Bicknell's Thrush biology with Dr. Christopher Rimmer of VINS. I have also read  
5 other reports from VINS about boreal and northern temperate nesting birds in the state.

6  
7 **Q. Please describe the literature review and habitat assessment that you performed**  
8 **regarding migrating birds that may be present at this site.**

9 Response. I examined the habitat on site to determine whether it appeared to be important  
10 habitat for migrating birds or habitat that could concentrate migrants in the areas where  
11 turbines are proposed. This was done by determining if habitat that could serve as an  
12 ecological magnet for these birds was present. The habitat was evaluated to determine if any  
13 of the major taxonomic or functional groups of birds (waterbirds, songbird and songbird-  
14 like species, shorebirds, and raptors) might concentrate or stopover at the project site in  
15 large or significant numbers. I looked for wetlands, large bodies of water, linear ridges, and  
16 other topographic features that are known or believed to attract migrants. I also examined  
17 the actual trees and shrub species, as well as other vegetation at the site as it compared to the  
18 habitat for many miles surrounding the site. Habitat islands, such as forests surrounded by  
19 coastal dunes or oases, are known to attract and concentrate migrants, whereas uniform  
20 habitat is less likely to do so.

21 The habitat at the Deerfield site was not suitable for stopovers of large numbers of  
22 migrating waterbirds, shorebirds, or raptors. Therefore, it is highly unlikely that these birds  
23 will gather at the site in significant numbers. The habitat is suitable for stopovers by some

1 species of migrating songbirds, but this type of habitat is spread throughout southern  
2 Vermont and northern Massachusetts such that migrants will be spread over hundreds of  
3 square miles of habitat rather than concentrating on the mountains at Deerfield. It is also  
4 important to note that most (if not all) boreal species that nest in conifer forests switch to  
5 deciduous forest, second growth forest, and forest edge during migration and winter. These  
6 habitats are spread throughout southern Vermont and northern Massachusetts, offering  
7 stopover opportunities almost anywhere. The literature did not suggest that the habitat at the  
8 Eastern and Western Project Areas would attract large numbers of migrants. All of this  
9 suggested that the Deerfield Wind Project site was not an important migration corridor or  
10 stopover site.

11  
12 **Q. Please describe the literature review and habitat assessment that you performed**  
13 **regarding wintering birds that may be present at this site.**

14 Response. I started by reviewing the National Audubon Society's Christmas Bird Counts  
15 from the vicinity of the Deerfield site. I examined about a decade of data collected by  
16 Audubon members and reported annually by Audubon. Specifically, the database was  
17 screened for endangered and threatened species, as well as species of concern, and it was  
18 scanned for large concentrations of species. The number and diversity of birds that are  
19 found on those Audubon Counts does not suggest that large numbers of birds or rare  
20 species occupy the project site during winter. It was clear from the habitat at Deerfield,  
21 including high elevation and northerly latitude, that few birds winter near the summits of the  
22 Eastern and Western Project Areas. The strong winds, deep snow, and low temperatures  
23 require massive energy output to stay alive, so most species of birds that nest at or near the

1 Deerfield site migrate to the tropics or hundreds of miles to the south, or they move to  
2 lower elevations nearby, where temperatures are more favorable and food more abundant  
3 for survival. High elevation sites like mountaintops at and around the Deerfield site cannot  
4 support large numbers of birds or many species of birds in winter. Most birds leave the site  
5 in August through early October and do not return until late April, after they return from  
6 migration.

7  
8 **Q. Please describe your literature review and habitat assessment for *rare, threatened, or***  
9 ***endangered* birds that may be present at this site.**

10 Response. To determine whether federal or Vermont endangered or threatened species, or  
11 Vermont species of concern nested or otherwise inhabited the Deerfield Wind Project site, I  
12 consulted several sources. First, I examined nesting bird studies conducted by Dr. David  
13 Capen and others from the University of Vermont during 1995 on both the east and west  
14 mountaintops. I also consulted the point count studies I conducted in 1996 and 1997 on the  
15 east mountaintop, where the existing Searsburg facility is located. Those nesting bird studies  
16 included a large number of point count locations. Some of Capen's point count locations  
17 were within the Deerfield Project boundary. Neither the Capen study nor my study revealed  
18 the presence of endangered or threatened species.

19 Using a list of endangered and threatened species, and species of concern in  
20 Vermont, I evaluated habitat at the project site to determine whether these species were  
21 likely or possibly present. The habitat did not indicate the presence of endangered or  
22 threatened species, although the presence of balsam fir patches suggested that Bicknell's  
23 Thrush (Vermont species of special concern) might be present. I did find a singing male

1 during field work on site in 1997. A 2005 report prepared by Joe Torres of the USDA  
2 Forest Service concluded that, while it is possible that Bicknell's Thrush are transients to the  
3 area, it is "highly unlikely" that the species uses the eastern ridge of the Project area as  
4 nesting habitat (**Exhibit DFLD-PK-5**). The habitat did not appear suitable for other listed  
5 species.

6  
7 **Q. Please describe how you compared the risk to bird species at the project site with**  
8 **risks present at existing wind generation facilities or other comparable facilities.**

9 Response. I examined the potential for both disturbance and displacement of birds that nest  
10 and/or forage at the site and collision fatalities that may occur at the Deerfield site.

11 Including those mentioned in the Supplement to the Avian Risk Assessment (**Exhibit**  
12 **DFLD-PK-4**), I reviewed more than 20 post-construction studies from wind power projects  
13 throughout the country and some from Europe. The studies examined both collision  
14 fatalities and disturbance/displacement impacts. With respect to displacement impacts, these  
15 have principally occurred in grassland or open country habitats, but few studies have been  
16 conducted at forested sites. The existing Searsburg facility is the only site where forest-  
17 nesting bird impacts have been studied. That study documented small impacts to those  
18 species nesting near the turbines, but the impacts were only studied in one year post-  
19 construction. However, during the nesting bird study in 2003, point counts were established  
20 and sampled at each of the 11 existing turbines at Searsburg. There were some uncertainties  
21 with this risk assessment because of the paucity of relevant data, although it appeared that  
22 most of the species found at the turbine sites prior to construction of the Searsburg turbines  
23 were present in 2003, six years after the turbines were built. It is noteworthy that the

1 clearings around the turbines are now growing up, with some trees being 1-2 m in height.

2 Fragmentation does not seem to have greatly impacted the site.

3 Collision risk has been studied at many locations and the information for bird  
4 collision fatalities at wind turbines and at communication towers is quite abundant. On  
5 average, about 2-4 birds have been found to be killed per turbine per year at wind power  
6 facilities in the United States. However, the average at a particular site can range between  
7 less than 1 to somewhat more than about 7 birds per turbine per year. With respect to night  
8 migrants, the range is similar, although at most sites, night migrants account for less than or  
9 equal to about three-quarters of the birds found dead. In the eastern United States at sites  
10 on mountaintops in West Virginia and Tennessee, the rates of night migrant fatalities per  
11 turbine per year have ranged between 3 and 7 birds per turbine per year, respectively. These  
12 fatality rates are not likely to be biologically significant, particularly given the population size  
13 of common bird species (hundreds of thousands to tens of millions).

14 It should be noted that several dozen different species of birds were involved in  
15 these collisions such that the numbers of fatalities are therefore divided among many species,  
16 as opposed to one or two species. Thus, the numbers of fatalities incurred per species is  
17 small, both in absolute numbers and relative to each species population. The studies  
18 examined in the literature do not suggest that there will be large numbers of collision  
19 fatalities at the Deerfield Wind Power Project and it is very unlikely that such collision  
20 fatalities would be biologically significant. It is noteworthy that no fatalities were found  
21 during systematic searches of the turbines during 1997.

22

1 **Q. How do you define a “biologically-significant” impact to birds?**

2 Response. Although definitions vary, biological significance usually pertains to whether or  
3 not impacts result in population decline of a particular species or a set of species. That  
4 population decline can be local, regional, or global (often meaning continent-wide for species  
5 restricted to North America). When I discuss risk with respect to birds that nest at the  
6 Deerfield Project, my focus is on the local population. When I refer to biologically-  
7 significant risk to migrating birds, I am referring to regional or global/continent-wide  
8 populations because the birds that migrate during spring and/or fall over the Deerfield site  
9 originate in areas to the north including Ontario, Quebec, or even northern Vermont, Maine,  
10 or New Hampshire. Thus, the impacts are potentially lessened with respect to those species  
11 that arrive at a site from a broad geographic origin during migration.

12  
13 **Q. Please describe the recommendations that you made as a result of the avian risk**  
14 **assessment.**

15 Response. The following four recommendations were made in my risk assessment reports:

- 16 1. Electrical lines between wind turbines should be underground.
- 17 2. FAA lighting for turbines would ideally be the lowest intensity red strobe-like lights  
18 possible (no steady burning/constant-on beacons) with the longest time-off cycle  
19 allowable to reduce the probability of attracting night migrating songbirds. All other  
20 forms of lighting should be extinguished at night at or adjacent to the project site to  
21 avoid attracting night migrants to the vicinity of the turbines.

- 1           3. Natural reforestation should be allowed to proceed around turbines and along new roads  
2           to reduce the potential for forest fragmentation and subsequent impacts to forest nesting  
3           birds.
- 4           4. A breeding bird study of the site was recommended for determining if Vermont listed  
5           species or species of concern – particularly Bicknell’s Thrush - are present, and for  
6           establishing baseline data on these and other birds. Baseline data might also be used to  
7           assess the types of disturbance and fragmentation impacts that might occur as a result of  
8           the Project and to determine potential mitigation strategies.

9

10 **Q.     Please summarize the major points of your supplement to the Phase I Avian Risk**  
11 **Assessment.**

12           Response. The Supplement to the Phase I risk assessment report was done in an effort to  
13           include new literature and findings from studies at wind power facilities since my original  
14           report in 2003 (**Exhibit DFLD-PK-4**). These studies have added to the literature on  
15           impacts of wind power facilities in the United States and Canada. At least five new post-  
16           construction mortality studies at wind power facilities were available in 2005 that were not  
17           available in 2003. In the eastern United States, new studies have been conducted or  
18           completed at two sites in Ontario and sites in West Virginia and Tennessee. In addition,  
19           there have been new studies in the western and midwestern United States. These studies  
20           revealed fatality rates in the range of about 1 to about 7 birds per turbine per year, none of  
21           which were biologically significant.

22                     In addition, the results from five radar studies on Appalachian ridges have become  
23           available since 2004, showing that night migrants do not follow these ridges and they do not

1 fly at low altitudes over the ridges. This is significant because prior to these radar studies, it  
2 had been suggested by some that birds followed ridges. The studies show that migration  
3 proceeds broad-front over a wide geographic area. These results have been confirmed more  
4 recently at sites in New York, Pennsylvania, and Vermont.

5 Perhaps the most important new finding that is presented in the Supplement is the  
6 result of recent analyses of the effects of FAA lighting on night migrating birds. An analysis  
7 of studies from 17 wind power sites across the United States and in Canada revealed that red  
8 flashing lights do not attract or disorient night migrating birds, which partially explains why  
9 no large-scale fatality events have occurred at these structures. This stands in contrast to the  
10 different type of lighting used at communication towers, which have experienced large-scale  
11 fatality events. Those large-scale fatality events at communication towers were the  
12 foundation for the concerns about night migrating birds colliding with wind turbines. This  
13 new study now refutes that connection.

14  
15 **Q. What were the objectives of your breeding bird survey at this site?**

16 Response. The nesting study was conducted to determine whether endangered or  
17 threatened species, those listed federally or by the state of Vermont, or Vermont species of  
18 concern were nesting at the Deerfield site. The Phase I risk assessment concluded that no  
19 listed species were present, but Bicknell's Thrush might nest on site. The habitat present  
20 suggested this as a possibility, and the literature stated that Bicknell's Thrush did nest on the  
21 top of the eastern or western mountaintops at Deerfield.

22  
23 **Q. Please describe the methodologies employed for the survey.**

1        Response. On May 30 and 31, 2003, two transects were established along the tops of the  
2        eastern and western mountains at the Deerfield Project where turbines and other  
3        infrastructure would likely be located. A total of 32 point-count locations were established  
4        along this transect, with 12 being on the eastern mountaintop and 20 being on the western  
5        mountaintop. These points were separated by about 165 meters (543 feet). A GPS  
6        coordinate for each point was recorded and the points were flagged to facilitate locating each  
7        point during surveys. A highly experienced and competent field birder-technician, James  
8        Dowdell, conducted the surveys on June 11, 12, 13, and 17 and July 2, 3, and 4, 2003. The  
9        surveys themselves were commenced about 30 minutes prior to sunrise. In addition, the  
10       observer walked the site after the surveys on each day to determine if species were present  
11       that were undetected during the systematic point count observations. None were detected.  
12       During the actual surveys, any bird that was heard at a point count location was recorded, as  
13       were the distance and direction of each bird from the point count location. In this way, all  
14       birds on the mountaintops were basically mapped. Further detail can be found in the  
15       nesting bird report (***Exhibit DFLD-PK-3***).

16  
17    **Q. Please summarize the results of the survey.**

18       Response. A complete list of birds that, in all likelihood, nest on the eastern and western  
19       mountains that are within the Deerfield Project Area is provided in the breeding bird study  
20       report, tables 3 and 4 (***Exhibit DFLD-PK-3***). A total of 37 bird species were found at the  
21       point count locations and another 16 species were found while driving into the site or while  
22       walking to and from the transects. No endangered or threatened species were found on or

1 near the project site. No Bicknell's Thrushes were detected, even while using taped  
2 playbacks in the densest areas of balsam fir on the eastern mountaintop.

3

4 **Q. Based upon the survey, did you further assess the risks to nesting bird populations**  
5 **due to the Project, and if so, how?**

6 Response. Yes, I did. Based on the list of species found on and adjacent to the Deerfield  
7 site and what is known about the behavior and ecology of those species, I concluded that the  
8 potential impacts to nesting birds would not likely be biologically significant. It is not likely  
9 that many of the nesting birds on site will collide with wind turbine rotors. However, it is  
10 likely that construction of the project site and the presence of new infrastructure may affect  
11 resident birds, but those impacts should not be biologically significant. Some species may be  
12 displaced by turbine presence and avoid the vicinity of the turbines. These birds may not  
13 approach within certain distances of turbines, at least temporarily. These impacts are not  
14 likely to result in significant declines in the local populations of these birds in the region or  
15 in southern Vermont. It should be remembered that birds found nesting on the adjacent  
16 Searsburg facility were not greatly disturbed by the existing infrastructure at that site. At the  
17 Searsburg turbines, most nesting birds seem to habituate to the presence of turbines and the  
18 limited visitation by humans. The impacts of the existing turbines do not appear to be  
19 significant in terms of greatly reducing bird populations in those forests.

20

21 **Q. Please describe any additional recommendations that you have, based upon the work**  
22 **you have performed to date.**

23 Response. I have three recommendations:

- 1           1. Project construction should be timed, if feasible, to minimize disturbance to nesting  
2           birds.
- 3           2. The areas surrounding turbines, meteorology towers, roads, and other  
4           infrastructure should be allowed to naturally reforest when construction is complete.
- 5           3. A limited post-construction study of nesting birds at the Project site may be undertaken,  
6           the timing and details of which will be worked out with federal and state wildlife  
7           agencies.

8                       Other recommendations were made in the Phase I risk assessment report, as  
9           noted previously in my testimony.

10

11   **Q.     To summarize your conclusions, based upon your review of all of the relevant**  
12 **information summarized above, will the Project have an undue adverse effect on any bird**  
13 **species or destroy or significantly imperil any necessary wildlife habitat used by bird species**  
14 **(including threatened or endangered species) at or near the site?**

15       Response. No, I do not anticipate that the Project will have an undue adverse impact to any  
16       birds due to collision risks, habitat loss, habitat fragmentation, or habitat avoidance. Nor is  
17       there likely to be any impact to threatened or endangered bird species resulting from the  
18       Project, as no T&E species were found on site, nor was habitat suitable for existence of  
19       these birds found on site. While it is likely that some nesting birds will be displaced after the  
20       construction of the turbines, the footprint of the Project is small and the habitat along the  
21       tops of both eastern and western mountains of the Deerfield Project will be fragmented only  
22       minimally. This displacement may result in somewhat reduced numbers of some nesting  
23       species in the area, but with respect to southern Vermont or Bennington County, the impact

1 is not likely to be significant from a biological perspective. Those species that are likely to be  
2 impacted are relatively common and widely distributed. It is also quite possible that they will  
3 habituate to the new structures within a short time of construction, as suggested by the  
4 experience at the existing Searsburg facility.

5

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

7 Response. Yes it does.