



# United States Department of the Interior



## FISH AND WILDLIFE SERVICE

Pennsylvania Field Office  
315 South Allen Street, Suite 322  
State College, Pennsylvania 16801-4850

September 5, 2003

Michael Zilkha  
Zilkha Renewable Energy  
1001 McKinney, Suite 1740  
Houston, Texas 77002

Theo de Wolff  
Atlantic Renewable Energy Corporation  
3311 Church Street, Suite 210  
Richmond, Virginia 23233

Re: Meyersdale Windpower Project

Dear Messrs. Zilkha and de Wolff:

On May 19, 2003, supplemental information regarding the subject windpower project was provided to the Fish and Wildlife Service by the office of Representative Bill Shuster. This transmittal included the *Summary Report on Avian Risk Studies at the Meyersdale Windpower Project Site, Meyersdale, Pennsylvania: 2001-2002*, dated January 25, 2003, which was prepared by Dr. Paul Kerlinger of Curry & Kerlinger, LLC. The Meyersdale Windpower Project includes construction and operation of 20 wind-powered electrical generation structures (turbines) on approximately two miles of ridgetop near Meyersdale, in Summit Township, Somerset County, Pennsylvania.

Based on our review of the above-referenced report, it appears that the proposed project may affect species under the jurisdiction of the Service, including migratory birds and endangered species. Therefore, we are providing the following comments pursuant to the Migratory Bird Treaty Act (16 U.S.C. 703-712), Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), and Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

### Migratory Birds

The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Fish and Wildlife Service. The word "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." The unauthorized taking of even one bird is legally considered a "take" under the MBTA and is a violation of the law. Bald and golden eagles are afforded additional legal protection under the Bald and Golden Eagle Protection Act.

Recognizing the potential impacts to wildlife (particularly birds) due to the development of wind power, the Service developed *Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines* ([www.fws.gov/r9dhcbfa/windenerg.htm](http://www.fws.gov/r9dhcbfa/windenerg.htm)). These guidelines include recommendations for 1) proper evaluation of wind resource areas; 2) proper siting and design of turbines within development areas; and 3) pre- and post-construction research and monitoring to identify and/or assess impacts to wildlife.

While the MBTA and BGEPA have no provisions for allowing unauthorized take, we recognize that some birds may be killed at structures such as wind turbines even if all reasonable measures to avoid it are implemented. The Service's Office of Law Enforcement carries out its mission to protect migratory birds not only through investigations and enforcement, but also through fostering relationships with individuals and industries that proactively seek to eliminate their impacts on migratory birds. Although it is not possible under the MBTA to absolve individuals, companies, or agencies from liability (even if they implement avian mortality avoidance or similar conservation measures), the Office of Law Enforcement focuses on those individuals, companies, or agencies that take migratory birds with disregard for their actions and the law, especially when conservation measures have been developed but are not properly implemented.

#### *Risks Associated with Wind Power Development*

Early wind-energy facilities were constructed in the United States without an understanding of the level of avian use of an area, and this resulted in extensive avian mortality. Although turbine design changes since that time have resulted in fewer impacts to birds, the potential for avian mortality remains an unknown for eastern, high-elevation ridgetops (e.g., such as the subject wind power site). The potential for avian mortality from these types of projects appears to be dependent on factors in the project area, such as avian abundance, the presence of a migration corridor, the geographic location, and particular landscape features.

We understand that modern turbines turn at speeds of 30 revolutions per minute. However, blade speeds are the greatest and visibility is the poorest at the distal/outer portions of the rotor so that blade speeds at the tips will, during stiff winds, exceed 200 miles per hour. Recent studies indicate that birds do not recognize blade presence at rotor tips during high blade speed (lack of visibility at the rotor tips is referred to as the "smear effect"). Birds attempting to pass through the rotor swept area face a high risk of death or injury. The rotor swept area approaching the hub also poses a threat since the distance between the blades decreases. Also, birds can be subject to collision with the tower itself, particularly during inclement weather.

In addition, it has been documented that tall, lighted structures pose collision hazards to migratory birds. This is particularly true for towers over 400 feet, and during inclement weather. Lights apparently draw birds into tower areas during times of fog, mist, and low cloud ceiling, creating opportunities for collision. Therefore, we generally recommend avoiding siting of towers in areas with high incidence of these conditions, and weather records for proposed project sites should be evaluated to determine if and when low cloud conditions and fog occur.

The altitude of migration is dependent upon the species of bird and time of day or year. Birds may fly closer to the ground because of topographical features, such as ridgetops, or because of inclement weather. During migration, songbirds generally take off shortly after sundown, gradually climb in altitude until around midnight, and then descend by daylight. Because most neotropical migrants migrate at night, radar should be considered for use in determining the altitude of bird flights at proposed wind power project locations, as well as their spatial and temporal distribution. This will help determine if the rotor-swept area is where birds generally occur and whether particular areas should be avoided for turbine sites because of a pattern of avian use. Acoustic and infrared radar devices can be used to determine dates of peak avian use, and the effect of different weather conditions on bird activity. These devices, and bat detector recordings, may aid in evaluating migratory bat use of proposed project areas.

Due to the potential for adverse effects, we believe a two-year, pre-construction study of avian use of proposed wind-energy sites is warranted. These studies should be of sufficient rigor to determine the temporal and spatial distribution of resident and migrating birds (raptors, songbirds, waterfowl, and waterbirds) in and adjacent to the project area during various weather conditions (e.g., fog, rain, low cloud ceilings, clear skies, etc.).

The Service also recommends that all wind power projects that proceed to construction be monitored for impacts to wildlife following construction. Post-construction avian and bat mortality monitoring should occur for a minimum of three years. Post-construction monitoring methods and study designs should be coordinated with the Service, appropriate State non-game agencies, and researchers.

#### *Avian Risk Assessment*

The subject report indicates that a Phase 1 avian risk assessment associated with the proposed Meyersdale project was conducted in the study area in the spring and summer of 2001, and in the fall of 2001 and 2002. During the spring and fall migration periods, a field technician spent 6-9 hours per day observing, identifying, and recording birds migrating over the study area. Although the fall 2002 monitoring period (September 17 to November 15) only included about half of the fall migration period (mid-August to mid-December), the results were sufficient to draw some preliminary conclusions about risks associated with the proposed project.

During the fall 2002 monitoring effort, 3098 raptors of 15 species were observed, including bald eagles, golden eagles, peregrine falcons, northern harriers, and broad-winged hawks. During the fall 2001 monitoring effort (October 12 to November 15), 800 raptors of 12 species were observed. During both fall monitoring studies, the report indicates that approximately "21% of the raptors observed were flying directly above the ridgeline within the rotor swept area." During the spring 2001 monitoring period, 800 raptors of 12 species were also identified, and 13% of these flew through the rotor swept area. This turbine rotor zone is considered a high risk area, since birds entering this zone could collide with the turbines or supporting structures and be killed or injured. The report did not identify which raptor species were more or less likely to fly

through the high risk area, or even include the names of all raptor species identified (with the exception of those listed above).

The report indicates that the numbers of raptors observed are not large in comparison with major hawk migration sites such as Hawk Mountain (in eastern Pennsylvania), where "more than 20,000 hawks can be seen in a given year." Unfortunately, this statement is misleading, since counts at Hawk Mountain occur between August 15 and December 15, while the 2002 monitoring study at the Meyersdale site only occurred from September 17 to November 15. Based on raptor migration data from Hawk Mountain, it appears that the exclusion of the August 15 to September 16, and November 16 to December 15 time periods would significantly under-represent the numbers of osprey, bald eagles, golden eagles, broad-winged hawks, and American kestrels at Meyersdale.

The report indicates that the risk to migrating hawks is considered to be low to moderate. Since it appears that several hundred raptors will pass through the rotor-swept area annually (risking death or injury), it is not clear how this determination was reached. At this point, we do know that the proposed project area is within a migration corridor, and the high elevation ridge, which is oriented in a northeast to southwest direction, may be a "leading line" that influences migratory travel. Meteorological data for this site may indicate that the pattern of wind flow over the ridge creates updrafts used by raptors during migration.

The report provides no data (e.g., number of species, number of birds, migration height) regarding spring or fall songbird migration; it only indicates that "songbird numbers were not great," and that there does not appear to be a strong migration of songbirds along the ridgetop. Based on this, the report concludes that the risk to songbirds is low to moderate. The information presented is insufficient to assess the risk of the proposed project to songbirds. Based on the inadequacy of this report with respect to songbirds, we recommend that two years of spring and fall monitoring be conducted before project construction.

Monitoring should be of sufficient rigor to determine the temporal and spatial distribution of migrating birds (raptors, songbirds, and waterfowl/waterbirds) in and adjacent to the project area during various weather conditions (e.g., fog, rain, low cloud ceilings, clear skies, etc.). We recommend that monitoring be done using radar and acoustical methods, supplemented by more traditional methods (e.g., visual observation) where appropriate. A draft study design should be submitted to this office for review prior to conducting the study. Survey results should also be submitted to us for review and comment, along with proposed project-specific avoidance and minimization methods to reduce the risk of bird mortality.

If this project is constructed, post-construction monitoring should be carried out for at least three years. A post-construction monitoring study design should be coordinated with this office, and monitoring reports should be submitted to us within 30 days of the end of each spring and fall migration period. This office and the Region 5 Division of Law Enforcement are to be notified within 48 hours should any birds protected under the Migratory Bird Treaty Act be found dead or

injured as a direct or indirect result of the implementation of this project. Notification should include the date, time, and location of the carcass, and any other pertinent information.

- ▶ Region 5 Division of Law Enforcement; 300 Westgate Center Drive, Hadley, MA 01035-9589 (telephone: 413-253-8343).
- ▶ Pennsylvania Field Office (Attn: Endangered Species Specialist); 315 South Allen Street, Suite 322, State College, PA 16801 (telephone: 814-234-4090).

In addition, the following recommendations (adapted from the Service's *Interim Guidance*) are relevant to this and other proposed wind power projects in Pennsylvania:

*Additional Recommendations to Avoid and Minimize Wildlife Impacts*

1. Avoid locating turbines on known local bird migration pathways or in areas where birds are highly concentrated, unless mortality risk is low (e.g., birds present rarely enter the rotor-swept area). Examples of high concentration areas for birds are wetlands, State or Federal refuges, private duck clubs, staging areas, rookeries, leks, roosts, riparian areas along streams, and landfills. Avoid known daily movement flyways (e.g., between roosting and feeding areas) and areas with a high incidence of fog, mist, low cloud ceilings, and low visibility.
2. Avoid placing turbines near known bat hibernation, breeding, and maternity/nursery colonies, in migration corridors, or in flight paths between colonies and feeding areas.
3. Configure turbine locations to avoid areas or features of the landscape known to attract raptors (hawks, falcons, eagles, owls). For example, golden eagles, hawks, and falcons use cliff/rim edges extensively; setbacks from these edges may reduce mortality. Other examples include not locating turbines in a dip or pass in a ridge.
4. Configure turbine arrays to avoid potential mortality where feasible. For example, group turbines rather than spreading them widely, and orient rows of turbines parallel to known bird movements, thereby decreasing the potential for bird strikes. Implement appropriate stormwater management practices that do not create attractions for birds, and maintain contiguous habitat for area-sensitive species.
5. Avoid fragmenting large, contiguous tracts of wildlife habitat. Where practical, place turbines on lands already altered or cultivated, and away from areas of intact and healthy native habitats. If not practical, select fragmented or degraded habitats over relatively intact areas.
6. To reduce habitat fragmentation, co-locate roads, fences, and other infrastructure in or immediately adjacent to already-disturbed areas (e.g., existing roads, pipelines,

agricultural fields). Where this is not possible, minimize roads, fences, and other infrastructure.

7. Develop a habitat restoration plan for the proposed site that avoids or minimizes negative impacts on vulnerable wildlife while maintaining or enhancing habitat values for other species. For example, avoid attracting high densities of prey animals (rodents, rabbits, etc.) used by raptors.
8. Use tubular supports with pointed tops rather than lattice supports to minimize bird perching and nesting opportunities. Avoid placing external ladders and platforms on tubular towers to minimize perching and nesting. Avoid use of guy wires for turbine or meteorological tower supports. All existing guy wires should be marked with recommended bird deterrent devices (Avian Power Line Interaction Committee 1994).
9. If taller turbines (top of the rotor-swept area is >199 feet above ground level) require lights for aviation safety, the minimum amount of pilot warning and obstruction avoidance lighting specified by the Federal Aviation Administration (FAA) should be used (FAA 2000). Unless otherwise requested by the FAA, only white strobe lights should be used at night, and these should be the minimum number, minimum intensity, and minimum number of flashes per minute (longest duration between flashes) allowable by the FAA. Solid red or pulsating red incandescent lights should not be used, as they appear to attract night-migrating birds at a much higher rate than white strobe lights.
10. Where the height of the rotor-swept area produces a high risk for wildlife, adjust tower height where feasible to reduce the risk of strikes.
11. Where feasible, place electric power lines underground or on the surface as insulated, shielded wire to avoid electrocution of birds. Use recommendations of the Avian Power Line Interaction Committee (1994, 1996) for any required above-ground lines, transformers, or conductors.
12. High seasonal concentrations of birds may occur in some areas. If, however, power generation is critical in these areas, an average of three years of monitoring data (e.g., acoustic, radar, infrared, or observational) should be collected and used to determine peak use dates for specific sites. Where feasible, turbines should be shut down during periods when birds are highly concentrated at those sites (e.g., during peak spring and fall migration periods). In addition, the turbine blades should be oriented parallel to the flight path to reduce the risk of bird strikes.
13. When upgrading or retrofitting turbines, follow the above guidelines as closely as possible. If studies indicate high mortality at specific older turbines, retrofitting or relocating is highly recommended.

## Federally Listed Species

Section 9 of the Endangered Species Act prohibits the take of any federally listed animal species by any person subject to the jurisdiction of the United States. The term "person" is defined as ". . . an individual, corporation, partnership, trust, association, or any other private entity; or any officer, employee, agent, department, or instrumentality of the Federal government, of any State, municipality, or political subdivision of a State, or any other entity subject to the jurisdiction of the United States." Section 11 of the Act provides for both civil and criminal penalties for those convicted of section 9 violations.

As defined in the Act, take means ". . . to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." "Harm" in the definition of take means an act which kills or injures wildlife. Such act may include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering (50 CFR part 17.3). "Harass" means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.

Take incidental to an otherwise lawful activity may be authorized by one of two procedures. If a Federal agency is involved with the permitting, funding, or carrying out of the project and a listed species will be adversely affected, then initiation of formal consultation between that agency and the Service pursuant to section 7 of the Act is required. Such consultation would result in a biological opinion addressing the anticipated effects of the project to the listed species, and may authorize a limited level of incidental take. If a Federal agency is not involved in the project, and federally listed species may be taken as a result of the project, then an incidental take permit pursuant to section 10(a)(1)(B) of the Act should be obtained. The Service may issue such a permit upon completion of a satisfactory habitat conservation plan for the listed species that would be taken by the project.

One of the purposes of this letter is to advise you of the risk the Meyersdale project poses to federally listed species, provide preliminary recommendations to avoid or minimize take, and advise you of the prohibitions and permitting aspects of the Endangered Species Act. This is being done so you can make an informed decision regarding project design, the risk of violating section 9 of the Act, and whether application for a section 10 permit is appropriate (or whether section 7 consultation should be pursued through the appropriate federal agency). With respect to this project, it is not clear whether any federal agency is involved in project permitting, funding, or authorization.

The Service's *Interim Guidance* recommends that the windpower industry avoid placing turbines in documented locations of any species of wildlife, fish, or plant protected under the Endangered Species Act.

Species listed pursuant to section 4 of the Act that could be affected by the proposed project include the endangered Indiana bat (*Myotis sodalis*) and the threatened bald eagle (*Haliaeetus leucocephalus*).

#### *Indiana bat*

An abandoned limestone mine located approximately four miles from the project area serves as a bat hibernaculum for approximately 1200 bats, including the federally listed Indiana bat. Bats at this and other nearby hibernacula could be affected by the proposed wind turbine project, especially during migration.

Bat mortality at turbine sites has occurred during late summer and early fall migration and during inclement weather (i.e., fog and low clouds). For example, we were recently advised that 230 dead bats of five species were found between August 18 and 20, 2003, at the Backbone Mountain wind turbine site in West Virginia.

The potential for adverse effects to bats, including the Indiana bat, at this particular location is not known. To determine the potential risk, we recommend that two years of pre-construction monitoring of bats be conducted at this location using radar, acoustical studies, and other appropriate sampling techniques. A draft study design should be submitted to this office for review prior to conducting the study. Survey results should be submitted to us for review and comment, along with any project-specific methods proposed to avoid adverse effects to Indiana bats. Post-construction monitoring sufficient to detect and quantify bat mortality is also recommended.

#### *Bald Eagle*

According to the avian risk assessment, bald eagles migrate through the project area. During the fall 2002 monitoring effort, eight bald eagles were observed passing through the study area. These eagles were among the 3098 raptors of 15 species that were observed. Unfortunately, both fall monitoring periods (2001 and 2002) missed the mid-August to mid-September time period when bald eagles are most likely to be observed, so actual bald eagle numbers are likely to be higher.

During both fall monitoring studies, the report indicates that approximately "21% of the raptors observed were flying directly above the ridgeline within the rotor swept area." During the spring 2001 monitoring period, 13% of the raptors flew through the rotor swept area. This turbine rotor zone is considered a high risk area, since birds entering this zone could collide with the turbines or supporting structures and be killed or injured.

Based on the information presented in the report, and assuming continuous operation of the turbines, we have concluded that 13-21% of the bald eagles migrating through the study area

could be killed or injured, unless they perceive the turbines as risks and alter their flight patterns accordingly. This would represent an unauthorized "take" of at least two bald eagles annually. To avoid impacts to bald eagles, we recommend that the wind turbines be sited at an alternate location where pre-construction monitoring indicates bald eagles will not be affected. If this is not feasible, we recommend that you reduce the risk of incidental take of bald eagles by 1) reducing the vertical profile of the turbines (e.g., by positioning the turbines lower on the ridge rather than on the crest, or reducing the height of the turbines); 2) turning the turbines off during bald eagle migration; 3) orienting the face of the blades parallel to the birds' flight path during bald eagle migration; and 4) monitoring the effectiveness of these measures by conducting frequent mortality counts during migration, and reporting results to the Fish and Wildlife Service. In order to implement measures 2 and 3, daily on-site monitoring during the spring and fall migration periods will be necessary. We recommend that such monitoring include visual and radar detection methods sufficient to identify bald eagles. If these measures are not sufficient to avoid take, a section 10(a)(1)(B) incidental take permit should be sought. You should be aware, however, that there is no mechanism for authorizing incidental take "after-the-fact."

The Service's Pennsylvania Field Office and Region 5 Division of Law Enforcement are to be notified within 24 hours at the above-listed addresses should any endangered or threatened species be found dead or injured as a direct or indirect result of the implementation of this project. Notification must include the date, time, and location of the carcass, and any other pertinent information.

### Summary

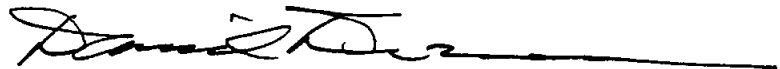
Based on the avian risk assessment, it appears that mortality rates for migrating raptors may approach 20%. This project also poses a risk to songbirds and bats, although the degree of risk is not currently known. Considering the sparsity of site-specific, pre-construction monitoring data, and the absence of avian mortality data for wind-energy sites in the East with these particular landscape features, we believe that a rigorous pre-construction analysis of the potential effect of the project on avian and bat species is warranted.

Considering the rapid development of wind power in Pennsylvania (with this and several other wind power projects anticipated during the next few years), we request an opportunity to meet with you and your consultants to discuss pre-construction study plans for avian and bat species, and to identify appropriate survey methods. If, after these studies are completed, take of migratory birds seems likely, the Service is available to work with you to avoid or minimize these impacts by potential changes in siting of turbines, changes to tower height, use of deterrents, or temporal operational changes. We recommend that you contact us early in the project planning process, and familiarize yourself with the Service's *Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines*.

Finally, as mentioned above, further coordination with regard to requirements of the Endangered Species Act is necessary for this project. It remains your responsibility to obtain an incidental take permit or avoid take of any federally listed species. If take cannot be avoided, and you elect to apply for an incidental take permit pursuant to section 10 of the Act, we recommend that you contract with a consultant who is skilled in developing Habitat Conservation Plans and drafting the NEPA documents associated with section 10 permits. If it is determined that a federal agency is involved in the funding, permitting, or authorization of this project, further consultation between that agency and the Service will be necessary, pursuant to section 7 of the Act.

If you have any questions regarding this matter, please contact Carole Copeyon of my staff at 814-234-4090, ext. 223.

Sincerely,

A handwritten signature in black ink, appearing to read "David Densmore", followed by a long horizontal line extending to the right.

David Densmore  
Supervisor

#### References

Avian Power Line Interaction Committee. 1994. Mitigating bird collisions with power lines: The state of the art in 1994. Edison Electric Institute, Washington, D.C. 78 pp.

Avian Power Line Interaction Committee. 1996 (reprinted 2000). Suggested practices for raptor protection on powerlines: The state of the art in 1996. Edison Electric Institute/Raptor Research Foundation, Washington, D.C. 125 pp.

Federal Aviation Administration. 2000. Obstruction marking and lighting. Advisory Circular AC 70/7460-1K; Air Traffic Airspace Management, March 2000. 31 pp.

cc:

Congressman Shuster

Curry & Kerlinger - Paul Kerlinger

PGC - Caupuliz

- Brauning

RO - Alex Hoar

- Glenn Smith

LE - Bill Anderson

- Barry Jordan

Todd Hutzell & Karen Ervin

Project file

Readers file

T&E file -- windpower - custom

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