PRE-DEVELOPMENT PROJECT RISK ASSESSMENT

This session included presentations on the practices and methodologies used in the wind energy industry for assessing risk to birds and bats at candidate project sites. Presenters offered examples of pre-development siting evaluation requirements set by certain states.

Practices and Methodologies and Initial Screening Tools[4]

by

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The wind industry is working to develop standardized siting practices, however at this point in time there is only a roughly uniform approach.

Fatal Flaw Analysis. Generally, when wind facility developers identify a strong potential wind site, the first step is to conduct a "fatal flaw analysis." This initial step involves doing a quick environmental assessment to determine if there are any obvious flaws about the site that would preclude proceeding with a wind resource assessment or permit application. A "fatal flaw" analysis may consist of a basic desktop review of maps, existing literature, or other readily available information about the area and its proximity to known highly sensitive habitat or protected areas. It is wise to start the "fatal flaw" analysis as soon as a potential site is identified, because it takes up to a year to assess the wind resource, and it is advantageous to get the initial environmental assessments completed in that time frame.

Phase One Risk Assessment. If a site presents no obvious "fatal flaws," the next step is a Phase One Risk Assessment. At this stage, the objectives are to: 1) establish a project- and locale-specific information base, 2) determine the general scope and design of additional information to be gathered, and 3) estimate the general level of risk to the developer – including the possibility that the site will have to be abandoned. Phase One activities include visiting the site to gather information about terrain and land use, habitat, observed species, prey potential, how the proposed project would fit on the site, as well as habitat and land use information about the surrounding area. Developers will supplement this information with a literature search (including databases compiled by Federal and state agencies and non-governmental organizations), and by consulting with government agency biologists, environmental groups, or local bird enthusiasts who may possess unrecorded knowledge about bird activity. Requests by consultants working for the developer for information about the proposed project area from other stakeholders should be taken seriously and responded to in a timely manner.

Pre-Development Studies. The next stage of pre-project assessment involves a more substantial investment of resources. The objectives include: 1) developing a baseline of

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[4] Mr. Curry chose to present a very brief summation of his prepared presentation at the workshop. This summary includes additional details from Mr. Curry's slide presentation, which is also available as a supplement to these Proceedings.

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information about avian and bat use of the site, including use by rare or endangered species or species of special concern; 2) identification of potential avian (or bat) risk factors present at the site; 3) consideration of site topography and turbine layout options for mitigating that risk; and, 4) formulating recommendations for post-construction monitoring and evaluation. A variety of activities are employed to achieve these objectives, including abundance and use surveys (point counts), diurnal migration and nesting surveys, surveys focused on rare, threatened, endangered, or "special concern" species; and, radar and other types of studies to learn about night-time avian and bat activity within the site.

At this stage, all stakeholders need to address the following questions:

- How should this project's impacts be compared with the impact of alternative means of supplying energy?
- What are the site-specific concerns being raised, and are these concerns supported by available and applicable data?
- If there is an absence of applicable information regarding a potential risk, what applicable information *can* be gathered, and how good an indicator is that information as a predictor of the risk in question?
- What methodologies should be used?
- What tools can be used to estimate cumulative impacts?
- What criteria will be used to determine levels of risk and their significance?
- How do these criteria compare with those used to assess the impact of other kinds of projects?

State of the Industry in the Pacific Northwest

by

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This presentation focused on the regulatory framework and evolution of permitting processes in the Pacific Northwest, with an emphasis on Oregon and Washington. Topics covered included site risk assessment and tools and processes used to assess the potential biological impact of wind energy projects. Other states can learn about pre-development assessment of environmental risk from the rigorous siting processes required of wind energy plants in the US Pacific Northwest (PNW), because that region has among the most rigorous and well-developed frameworks for environmental analysis to support permitting, and the techniques and processes used in the PNW may provide a sense of the direction that the industry is heading.

The Federal regulatory framework for wind power in the PNW is largely determined by Bonneville Power Administration (BPA), which acquired the Condon and Foote Creek Rim wind projects and issued a request for proposals (RFP) for 1,000 MW of wind power

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in 2000. BPA transmits power from Stateline, Klondike, Vansycle, and other wind projects in the region, and therefore it is the key Federal agency with a National Environmental Policy Act (NEPA) role.

The other regulatory frameworks of interest are the state siting councils that oversee energy facility siting in Washington and Oregon. In Washington State, wind projects may opt into the Energy Facility Site Evaluation Council (EFSEC) process. Washington's State Environmental Protection Act (SEPA) requires a comprehensive analysis (checklist or Environmental Impact Study) of all wind projects. For biological studies, the Washington Department of Fish and Wildlife Windpower Guidelines provide standardized guidance. In Oregon, projects larger than 105 MW must apply for permits through the Oregon Energy Facility Siting Council (EFSC) process. The EFSC process requires compliance with a series of prescriptive siting standards, including Habitat Mitigation Standards. At this point, only the Stateline Wind Project (Phases 1-3), which is one of the largest in the US, has been through EFSC. Smaller projects use local land use processes (i.e., Conditional Use Permit), which are relatively robust under Oregon land use law.

EFSEC and EFSC were developed in response to Washington Power Supply System (WPSS)-era nuclear power plants and coal-fired gas projects in the 500-1,500 MW range, and have been applied to gas-fired combustion turbines, also typically in the 1,000 MW range. Permitting study requirements were developed with projects five to ten times larger than the typical wind project in mind. Thus, on a per-megawatt basis, the EFSEC/EFSC processes are expensive and time-consuming as applied to wind power projects, and agencies and developers have been struggling with the appropriate ways to "scale down" the required studies for wind projects.

The state Fish and Wildlife offices in Washington and Oregon are both very active. Both states have regional and central office biologists responsible for reviewing county and state-level permit processes. The Washington Department of Fish and Wildlife (WDFW) is an agency of "special expertise" under the SEPA, so its review carries weight. In Oregon, ODFW plays a more informal role in County-level energy permitting, although it is routinely involved in the process at this level. ODFW is mandated to participate in EFSC-level permitting. These institutional frameworks for reviewing data are critical for ensuring the value of biological study data in Oregon and Washington.

In Montana, the Montana Environmental Policy Act (MEPA) applies to state agency decisions. Idaho has no state-level NEPA-type process and therefore wind projects are permitted primarily through local land use decisions. However, both states have high proportions of federally owned lands, meaning wind projects often require NEPA review.

Environmental risk assessment is a standard element of site risk assessment in the Pacific Northwest. Early PNW wind project environmental assessment procedures were strongly influenced by the experience of wind power development in Altamont Pass, California. The number of bird fatalities at Altamont generated great concern; however, as results from studies at other western wind facilities became known and showed much less severe impacts, these concerns over avian impacts of wind turbines relaxed somewhat. Overall, bat impacts have received relatively little attention. There has been increasing focus on the

impact of habitat loss and fragmentation.

Today's standard wind industry practice for environmental risk assessment in PNW involves seven key elements: 1) Information Review; 2) Habitat Mapping; 3) Raptor Nest Surveys; 4) General Avian Use Surveys; 5) Surveys for Threatened, Endangered, and Sensitive species; 6) Rare Plants Surveys; and 7) Wetlands/Jurisdictional Waters Surveys.[7] The results of these assessments may lead developers to modify the layout of the planned wind development, or even to discontinue the project if the environmental risk is too high. The author is aware of several cases where the developer has abandoned a project because it appeared that environmental impacts would be too high.

Information Review. Information review aims at understanding sensitive habitats and species on a site, formulating study protocols, and beginning to identify mitigation needs and options. Review involves a search of the regulatory databases (i.e. Oregon Natural Heritage Program, Washington Priority Habitats and Species, and USFWS). Developers contact local biologists and/or local environmental groups to gather local knowledge about bird and bat activity. Data are also collected from nearby or similar wind projects.

Habitat Mapping. The goal of habitat mapping is to evaluate the range and condition of habitats on a site, to steer facilities toward low value habitat (such as wheat fields), and to help focus later wildlife surveys. Techniques for habitat mapping vary by state and habitat type, but typically involve a combination of photo interpretation and field work.

Raptor Nest Surveys. Surveys—typically conducted from an aerial view—are used to identify raptor nests that might be affected by construction activities or operation of the wind project. An aerial survey would cover the area within one mile of all ground-disturbing activities, or within two miles if there is a likelihood of sensitive species. For forested areas, other techniques are employed.

Avian Use Surveys. Use surveys characterize avian use of an area well enough to determine if there is significant potential for high bird mortality. Once the level of use is known, a risk index can be developed, based on avian use and bird mortality at established wind projects with similar avian use profiles. The surveys typically involve establishing a grid of 800-meter sampling points spaced one to three miles apart, surrounding the project. Weekly observations are conducted at each point for twenty to thirty minutes. An incidental (driving) survey is also conducted.

BPA funded a project called "Meta-Analysis," which evaluated the extent to which one or more seasons could predict annual avian use. A generally good correlation was found between spring and the rest of the year.[8] WDFW guidelines call for "at least one season" and "additional seasonal data (e.g. fall or winter)" if: 1) "Avian use is estimated to be high relative to other projects"; 2) "Very little existing data regarding seasonal use of area"; or 3) "The project is especially large." Typically, avian use studies of less than one year have been accompanied by a commitment to a year of post-construction mortality monitoring.

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[7] Rare plants and wetlands surveys are outside the focus of these Proceedings, and are not detailed here.
[8] Erickson, W., et al. 2002.

Avian use studies may also involve night radar monitoring in order to characterize nocturnal bird use of a site, particularly during migratory periods. Nocturnal use is characterized in terms of passage rates of "targets" (which may be bats, birds, or clouds of insects) and flight height/turbine height exposure. Sampling is carried out using mobile marine radar in horizontal and vertical mode to detect radar targets and to determine number, direction, and height. The challenges presented by night radar monitoring revolve around distinguishing among bird, bat, and insect targets, and identifying different bird species. However, improvements in radar technology are making it somewhat easier to distinguish insects from birds. Thermal imaging and bird call identification are also being employed.

The Stateline Wind Project on the border between Washington and Oregon offers an example of a case where night radar monitoring might be useful. The Blue Mountain Audubon Society expressed concern about migratory bird corridors running through the proposed northwest portion of the project. FPL Energy agreed to make the construction of 72 turbines contingent on the results of night radar monitoring. ABR Inc. conducted a total of three seasons of monitoring at two locations, one of which had actual mortality data available. Actual mortality data from the Vansycle site were used in conjunction with radar data to evaluate potential mortality at the proposed site. Data from Fall 2000 and Spring 2001 were adequate to demonstrate low potential for impact from the 72 proposed turbines. Blue Mountain Audubon Society, which was represented on the project's Technical Advisory Committee, not only approved the construction of additional turbines at Stateline, but has gone on to play an important educational role with other Audubon Societies in the state of Washington.

The methodologies used for threatened, endangered, and sensitive species surveys vary substantially by species in the PNW. Some of the key species of concern in the region are Bald and Golden eagles, Sage grouse, Prairie chickens, Spotted owls, and the Washington ground squirrel.

Standard wind industry practice for pre-development environmental risk assessment in PNW has evolved in tandem with post-construction monitoring. In general, with the exception of Altamont, post-construction monitoring at Western wind energy sites has confirmed low impact on birds. The focus of assessment continues to evolve away from avian mortality to an emphasis on habitat impacts.

References

Erickson, Wally/WEST, Inc. et al., 2002. *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting, and Mortality Information from Proposed and Existing Wind Developments.* Prepared for the Bonneville Power Administration.

Discussion, Questions and Answers

Where do study requirements—and study findings—fit into the permitting process? One participant requested clarification, noting that, in the Eastern US, the term "pre-permitting" is used (rather than "pre-project," pre-development," or "pre-construction") to mean that impact studies must be done before a permit can be obtained for the wind project, although often there is no framework for evaluating the study results.

Responses: In the PNW, there are regulations that say environmental assessments should be carried out as part of project development, and usually before a permit will be issued. However (another participant noted), there is at least one case of a project in Oregon that was issued county permits prior to conducting a full year of avian impact studies.

Would it be possible, after construction, to require wind project managers to modify their operations as new information about bird impacts is made available? The participant raising this question asked whether, for example, if researchers identified new information about migration patterns once a project was operating, whether it might be possible to shut down turbines with higher mortality rates for certain periods of time when migrating birds are at risk.

Responses: 1) Wind power developers are likely to resist the idea due to the large amount of capital invested in the turbines. 2) There is an example of a wind project in Spain, near the Straits of Gibraltar, at which radar studies revealed bird "migration pulses" — times when many birds passed through the area of the wind farm. Based on this information, the operators were able to shut down operations for a specific period of time to avoid significant mortality risk. In addition, one or two turbines were removed.

Are there permitting conditions or thresholds regarding size and scale of projects?

Responses: 1) Project size is a valid consideration, but in at least some locations (e.g., the state of New Jersey), small projects are subject to the same regulations as large ones. 2) Under NEPA, projects for which it is proven that significant impacts will not result are able to go through a less stringent permitting process—that is, the determination of significance is independent of the size of the project.

How do you "prove" that "significant impacts" will not result? In other words, what is a "significant impact" and what is the threshold of acceptability for impacts? There are a wide variety of standards across locations and jurisdictions when it comes to standards for measuring bird and bat impacts and what is an acceptable level in terms of issuing permits to developers. This variability raises many questions. For example, how many years should an impact study be? How many bird fatalities amount to a significant impact? Is there a

fixed threshold for permitting?

Responses:

1) One organization's policy for dealing with these issues in the state of Washington is that the state should be completely mapped to indicate potential wind project areas, mitigation areas, etc.

2) If the standard approaches for diurnal and nesting surveys are used consistently throughout regions and the US, there are sub-regional conclusions that can be developed.

3) Wisconsin undertook a collaborative statewide monitoring effort that brought state and federal agencies together with local groups. The group examined formal bird viewing areas as well as local viewing spots and drew red lines around sensitive bird areas. It was noted that it is helpful if the methods necessary to carry out surveys could be performed by volunteers.

Other discussion of mapping efforts:

There are similar statewide mapping processes taking place in other parts of the US as well. One participant described a statewide process that is taking place in Virginia, using GIS technology to map bird activity and habitat. In Maryland, researchers are in the process of developing a layered GIS-analysis of bird activity that is intended to be a model for this type of work. There are also plans to incorporate conditions for limited turbine shutdowns into the policy recommendations developed out of the Maryland effort. However, there is no strict standard or threshold for determining how significant mortality must be to recommend turbine shutdowns. In New Jersey, critical wildlife areas have been mapped in relation to development, but state agencies are still trying to get funding to specifically map bird activity and habitat. California has also done work along these lines. Public and private funding will be necessary in order for mapping to proceed efficiently and effectively and for comprehensive databases on par with those for fish for example, to be compiled.

Caveats about mapping and assessing risk based on avian use:

1) While GIS is good for mapping large areas, wind development permitting often comes down to very site-specific issues, requiring intense surveying/data-gathering that cannot be afforded for very large (e.g., state-wide) efforts. Moreover, there are significant data gaps in GIS information because there is no data on nocturnal mortality for much of the US and about half of fatalities occur at night.

2) Avian "use" does not necessarily connote risk, even among bird species on a single site. Behavioral aspects must be considered as well. Data from Altamont Pass underscores this point.

3) The wind industry is definitely interested in how GIS information can help in the siting process to minimize impacts on birds and bats—for example, by providing pre-

construction baseline information. On the other hand, waiting to complete statewide mapping efforts before pursuing wind energy development would mean considerable delay in the construction of new wind projects, and the construction instead of more polluting conventional generation.