Record of Decision for the Electrical Interconnection of the Golden Hills Wind Project August 2009

INTRODUCTION

Bonneville Power Administration (BPA) has decided to offer contract terms for interconnection of up to 200 megawatts (MW) of power to be generated by the proposed Golden Hills Wind Project (Wind Project) into the Federal Columbia River Transmission System (FCRTS). BP Alternative Energy North America, Inc. (a subsidiary of BP America Production Company) proposes to construct and operate the proposed Wind Project in Sherman County, Oregon, and has requested interconnection to the FCRTS. Interconnection will be at the existing Biglow Canyon Substation in Sherman County, Oregon.

BPA had previously prepared an Environmental Impact Statement (EIS) that included the Biglow Canyon Substation in its analysis. Environmental information from that EIS, referred to as the Klondike III/Biglow Canyon Wind Integration Project EIS (DOE/EIS-0374, September 2006), has been considered in this ROD. In addition, BPA's decision to offer terms to interconnect the Wind Project is consistent with BPA's Business Plan Final Environmental Impact Statement (Business Plan EIS) (DOE/EIS-0183, June 1995), the Business Plan Record of Decision (Business Plan ROD, August 15, 1995) and the Supplement Analysis to the Business Plan EIS (April 2007). This decision thus is tiered to the Business Plan ROD.

BACKGROUND

BPA is a federal agency that owns and operates the majority of the high-voltage electric transmission system in the Pacific Northwest. This system is known as the FCRTS. BPA has adopted an Open Access Transmission Tariff (Tariff) for the FCRTS, consistent with the Federal Energy Regulatory Commission's (FERC) *pro forma* open access tariff.[1] Under BPA's Tariff, BPA offers transmission interconnection to the FCRTS to all eligible customers on a first-come, first-served basis, with this offer subject to an environmental review under the National Environmental Policy Act (NEPA).

[1] Although BPA is generally not subject to FERC's jurisdiction, BPA follows the open access tariff as a matter of national policy. This course of action demonstrates BPA's commitment to non-discriminatory access to its transmission system and ensures that BPA will receive reciprocal and non-discriminatory access to the transmission systems of utilities that are subject to FERC's jurisdiction.

For all requests for interconnection of generating facilities that exceed 20 MW, BPA chooses to act consistently with FERC's Order No. 2003, Standardization of Large Generator Interconnection Agreement and Procedures, and Order 661, Interconnection for Wind Energy, as adopted by BPA and incorporated, with FERC approval, into BPA's Tariff. Order No. 2003 established the Large Generator Interconnection Procedures (LGIP) and Large Generator Interconnection Agreement (LGIA), which provide a uniform process for offering interconnection to any generating facilities exceeding 20 MW. Order 661 contains additional standardized processes and technical requirements specific to interconnection of wind generators. BPA has adopted its LGIP and LGIA as Attachment L to its Tariff.

In its Order 2003 Tariff filing, BPA included provisions in its LGIP to reflect BPA's obligation to complete an environmental review under NEPA of a proposed large generator interconnection before deciding whether to offer a final LGIA to the party requesting interconnection.

In April 2002, Orion Energy, LLC (Orion) submitted a generator interconnection request to BPA to interconnect its proposed Orion Wind Project to the FCRTS. Orion's request was for interconnection of 600 MW of wind generation. Subsequently, this request was split into two parts and sold to two different parties. BP Alternative Energy acquired rights to 200 MW of the original request and intends to use it to interconnect up to 200 MWs of its Golden Hills Wind Project. Consistent with its Tariff, including the LGIP, BPA must respond to this interconnection request and comply with its NEPA responsibilities.

RELATIONSHIP TO BUSINESS PLAN EIS

In response to a need for a sound policy to guide its business direction under changing market conditions, BPA explored six alternative plans of action in its Business Plan EIS. The six alternatives were: Status Quo (No Action), BPA Influence, Market-Driven, Maximize Financial Returns, Minimal BPA, and Short-Term Marketing. The Business Plan EIS examined each of these six alternatives as they relate to meeting the regional electric energy need in the dynamic West Coast energy market. The analysis focused on the relationships among BPA, the utility market, and the affected environment and evaluated transmission as well as generation, comparing BPA actions and those of other energy suppliers in the region in meeting that need (Business Plan EIS, Section 1.7).

In the Business Plan ROD, the BPA Administrator selected the Market-Driven Alternative. Although the Status Quo and the BPA Influence Alternatives were the environmentally preferred alternatives, the differences among alternatives in total environmental impacts were relatively small. Other business aspects, including loads and rates, showed greater variation among the alternatives. BPA's ability to meet its public and financial responsibilities would be weakened under the environmentally preferred alternatives. The Market-Driven Alternative strikes a balance between marketing and environmental concerns, including those for transmission-related actions. It is also designed to help BPA ensure the financial strength necessary to maintain a high level of support for public service benefits, such as energy conservation and fish and wildlife mitigation and recovery activities.

In April 2007, BPA completed a review of the Business Plan EIS and ROD through a Supplement Analysis. The Supplement Analysis was prepared to assess whether the Business Plan EIS still provides an adequate evaluation, at a policy level, of environmental impacts that may result from BPA's current business practices, and whether these practices are still consistent with the Market-Driven alternative adopted in the Business Plan ROD. Changes that have occurred in the electric utility market and the existing environment were evaluated, and developments that have occurred in BPA's business practices and policies were considered. The Supplement Analysis found that the Business Plan EIS's relationship-based and policy-level analysis of potential environmental impacts from BPA's business practices remains valid, and that BPA's current business practices are still consistent with BPA's Market-Driven approach. The Business Plan EIS and ROD thus continue to provide a sound basis for making determinations under NEPA concerning BPA's policy-level decisions.

The Business Plan EIS was intended to support a number of decisions (Business Plan EIS, Section 1.4.2), including contract terms BPA will offer for transmission interconnection services. The Business Plan EIS and Business Plan ROD documented a strategy for making these subsequent decisions (Business Plan EIS, Figure 1.4-1 and Business Plan ROD, Figure 3, page 15).

BPA's decision to offer terms for interconnecting the Wind Project is one of these subsequent decisions and the subject of this ROD. BPA reviewed the Business Plan EIS to ensure that offering contract terms for interconnecting the Wind Project was adequately covered within its scope and that it was appropriate to issue a record of decision tiered to the Business Plan ROD. This ROD for the Wind Project, which summarizes and incorporates information from the Business Plan EIS, demonstrates this decision is within the scope of the Business Plan EIS and Business Plan ROD.

This ROD describes the specific project and environmental information applicable to this decision to offer contract terms for transmission interconnection of the Wind Project, with reference to appropriate sections of the Business Plan EIS and Business Plan ROD. This ROD references information that was incorporated by reference into the Business Plan EIS from BPA's Resource Programs (RP) EIS (DOE/EIS-0162, February 1993). The RP EIS contains an analysis of environmental effects and mitigation for wind projects and associated transmission. This ROD also summarizes and references Wind Project information provided by BP Alternative Energy[2], as well as the Final Order for the project Site Certificate that was issued by the Oregon Energy Facility Siting Council (EFSC) in May 2009[3].

[2] These documents include the following: Application for Site Certificate Golden Hills Wind Project, David Evans and Associates, Inc., July 2007; Addendum Application for Site Certificate Golden Hills Wind Project, David Evans and Associates, Inc., May 2008; and Revised Application for Site Certificate Golden Hills Wind Project, David Evans and Associates, Inc., August 2008.

[3] Oregon Energy Facility Siting Council. May 15, 2009. Before the Energy Facility Siting Council of the State of Oregon, In the Matter of the Application for a Site Certificate for the Golden Hills Wind Project, Final Order.

PROJECT DESCRIPTION

BPA Interconnection Facilities

The Wind Project will be interconnected to the FCRTS at the existing Portland General Electric (PGE) Biglow Canyon Substation in Sherman County, Oregon. BPA will purchase part of the Biglow Canyon Substation, as well as about 1 acre of land next to Biglow Canyon Substation for expansion of the substation to accommodate new equipment required for the interconnection. BPA will string a jumper at Tower 1/1 outside Klondike Schoolhouse Substation and connect to BPA's Biglow Canyon - Klondike Schoolhouse No. 2 230-kilovolt (kV) line. Potential impacts associated with construction and operation of the Biglow Canyon Substation were previously analyzed in BPA's Klondike III/Biglow Canyon Wind Integration Project EIS (DOE/EIS-0374, September 2006). Environmental information from that EIS has been incorporated by reference where appropriate in this ROD.

Inside the expanded Biglow Canyon Substation yard, BPA will install two breakers and associated disconnect switches and a substation dead end tower. The existing substation fence will be extended to include the expanded substation yard area. A transmission line will be connected from the substation dead end tower to an existing transmission tower outside the substation fence. All new indoor equipment will be installed inside the existing substation control house. PGE will retain ownership of the control house.

Golden Hills Wind Project

Under its Site Certificate from Oregon Energy Facility Siting Council (EFSC), BP Alternative Energy is authorized to construct and operate a 400 MW[4] wind power facility with up to 267 wind turbines arranged in strings on privately-owned land in Sherman County, Oregon. The Wind Project will be south of the Columbia River, between Wasco and Moro, Oregon. The project property encompasses approximately 30,310 acres, with about 139 acres permanently used for the footprint of the proposed turbines and related support facilities. This project is expected to take about 9 months to construct, and would employ an estimated 175 workers at peak periods. The project would have a 25-30 year service life. The following summarizes BP Alternative Energy's proposed Wind Project.

Turbines

BP Alternative Energy would install up to 267 wind turbines. The wind turbines would likely be 1.5 MW turbines or some other combination of turbines authorized in the Site Certificate. Turbine towers would be up to 263 feet tall at the turbine hub and would have an overall height

[4] Although BP Alternative Energy has obtained permission for a 400-MW wind facility from Oregon EFSC, BP Alternative Energy has requested interconnection from BPA of only 200 MW under Open Access Same-time Information System (OASIS) Generation Interconnection (GI) request number 99. This ROD documents BPA's decision to issue a LGIA for the 200 MW request. If BP Alternative Energy should seek interconnection of additional megawatts from its project, it would be through a new request under the Open Access Transmission Tariff. BPA would review any such request under NEPA and prepare any necessary NEPA documentation before making a decision regarding the request.

of up to 420 feet. Each turbine would sit on a concrete pad that accommodates the turbine pedestal, a step-up transformer, and a turnout area for service vehicles. The purpose of the step-up transformer is to increase the output voltage of the wind turbine to the voltage of the power collection system. Underlying the pad would be a deep concrete turbine foundation with a surface area dependent upon the type and size of wind turbine selected.

The wind turbines would be sited within corridors about 900 feet wide. The number of turbines in each corridor, the spacing between turbines, and their precise locations within the corridor will be determined prior to construction by BP Alternative Energy, based on the wind turbine models selected and various siting criteria, such as terrain and noise.

Project Roads

Existing roads within the Wind Project area are typically 16 to 24 feet wide. Improvements for construction vehicles generally will involve providing an all-weather surface for roads with a gravel surface. Existing intersections will be widened as needed to allow trucks to maneuver into and out of the construction area. A turning radius of 130 to 150 feet is needed.

In areas where there are no roads near proposed wind turbine strings, new access roads (16 feet wide with 2-foot shoulders) will be constructed. Permanent turnaround areas will be situated at the end of each turbine string. About 50 miles of new access roads and turnaround areas will be constructed. During construction, an average of 8 feet on each side of the road would be disturbed temporarily.

Meteorological Towers and SCADA

Up to six meteorological towers will be placed throughout the project site. The meteorological towers will collect wind resource data. These towers will be unguyed tubular structures up to 280 feet tall. In addition, a supervisory control and data acquisition (SCADA) system will be installed at the Wind Project. The SCADA system will assist with the remote operation of the wind turbines; collect operating data from each wind turbine; and archive wind and performance data from various sources. The SCADA system will be linked (via fiber optic cables or other means of communication) to a central computer in the operations and maintenance (O&M) facility. Where linked via fiber optic or other type of cables, those cables will generally be installed alongside the power collection conductors.

Power Collection System

The Wind Project electrical system will include a power collection system, which will collect energy generated by each wind turbine, increase voltage through a pad-mounted transformer, and deliver it via electric cables to project substations built within the Wind Project area (see below).

Each wind turbine will generate power at approximately 690 volts (voltage could vary, depending on the turbine model ultimately selected for the Wind Project). A transformer next to each tower will increase the voltage to 34.5 kV. From the transformer, power will be transmitted via electric cables. The cables will be buried 3 or more feet below the ground surface, in a trench up to 3 feet wide. In areas where collector cables from several strings of turbines follow the same alignment (for example, near a Wind Project substation); multiple sets of cables could

be installed in parallel trenches up to 50 feet wide. There will be about 62 miles of underground electric cable corridor.

In some locations, the collector lines may be constructed aboveground, on pole or tower structures. Aboveground structures allow the collector cables to span terrain such as canyons, native grasslands, wetlands and intermittent streams, thus reducing environmental impacts, or to span cultivated areas, reducing impacts to farming.

Substations and Transmission Lines

Two project substations will be built within the Wind Project area that will further increase the voltage of the energy generated by the wind turbines so that it can be transmitted via high-voltage transmission lines to interconnections with the existing BPA high-voltage transmission system. One substation will be located in the eastern portion of the Wind Project area, and one will be located in the western portion. Each substation will occupy a graveled and fenced area about 2 acres in size in order to site a transformer, switching equipment and a parking area at each substation.

The substation in the eastern portion of the project area will provide the interconnection to BPA's transmission system authorized by the LGIA that will be offered as a result of this ROD. The eastern substation will interconnect with an existing PPM Energy transmission line (which interconnects to PGE's Biglow Canyon 230-kV Substation) by means of an aboveground 0.7-mile 230-kV transmission line.

The substation in the western portion of the project area has been proposed to interconnect with the existing BPA system by means of an aboveground 500-kV transmission line about 11 miles long to a new BPA substation. However, this proposed second interconnection is not being authorized by this ROD. Development of a second interconnection would require appropriate NEPA analysis and documentation before such an interconnection could be granted.

Operations and Maintenance Facility

The O&M facility will be built on about 5 acres of land. The facility will have about 5,000 square feet of enclosed space, including office and workshop areas, control room, kitchen, bathroom, shower, and other amenities typical of this type of facility. Water will be acquired from an onsite well constructed by a licensed contractor according to local and state requirements. Water use is not expected to exceed 5,000 gallons per day. Domestic wastewater generated at the O&M facility will drain into an onsite septic system. A graveled parking area for employees, visitors, and equipment will be located in the vicinity of the building.

Laydown Areas and Access Roads

Construction of the Wind Project will require improving and widening some existing county roads and constructing new roads to provide access for construction vehicles, wind turbines, and materials. Use of the new roads will continue during operation of the Wind Project. The Wind Project will also require laydown areas during construction for the delivery of wind turbines and other parts and equipment. There will be up to seven principal, temporary laydown areas for the staging of construction equipment, wind turbines and their components, towers, and other parts,

facilities, and equipment. Each laydown area will be covered with gravel. Gravel will be removed and each area restored after construction. In addition to the permanent access roads, temporary access roads or areas, each up to 36 feet wide, might be required for construction of some facilities.

Public Safety and Fire Prevention

The wind turbines will be equipped with built-in fire prevention measures that allow the turbines to shut down automatically before mechanical problems create excess heat or sparks. The use of underground power collector cables substantially reduces the risk of fire from system faults caused by wildlife or lightning. Most of the Wind Project's new access roads are oriented perpendicular to the prevailing winds and thus serve as effective fire breaks. After construction, there will be no welding, cutting, grinding, or other flame- or spark-producing operations near the turbines. All onsite employees for both construction and operations will receive annual fire prevention and response training by a professional fire safety training firm. The appropriate Sherman County volunteer fire departments will be asked to participate in this training. Employee smoking will be restricted during dry summer months.

Each onsite company vehicle will contain a fire extinguisher, water, shovel, Emergency Response procedures book, and a two-way radio for immediate communications with the O&M facility. The O&M facility staff will coordinate fire response efforts. Water-carrying trailers (water buffaloes) will be present at appropriate locations around the Wind Project to be determined in consultation with the local fire departments. A water buffalo will be brought to any job site where there is a substantial risk of fire. Each water buffalo will have a capacity of 500 gallons and be equipped with a pump and hoses. The water buffaloes can be towed by a number of vehicles, including service trucks and pickup trucks; such vehicles will be on site in sufficient numbers at all times during construction and operation of the Wind Project. All local fire departments will have maps and gate keys for the project.

PUBLIC PROCESS AND CONSIDERATION OF COMMENTS

Consistent with BPA's strategy for tiering appropriate subsequent decisions to the Business Plan ROD, BPA provided opportunities for public involvement. On May 30, 2008, BPA sent written notice to adjacent property owners and interested parties describing the proposed interconnection of the Golden Hills Wind Project into the FCRTS at Biglow Canyon Substation. The notice requested comments on the proposal by June 30, 2008. BPA also posted information about the proposed interconnection at http://www.efw.bpa.gov/environmental_services/Document_Library/Golden Hills/, and in BPA's monthly information periodical, the "BPA Journal."

Comments from seven individuals were received by BPA through its public process for this project. The comments from six of these individuals were supportive of the project and wind energy development in Sherman County. The remaining commenter expressed concern about not being consulted by the developer on the siting of wind towers on her land.

Public review processes for BP Alternative Energy's EFSC site certificate and other permits also provided opportunities for public comment. Oregon's Department of Energy (ODOE) issued

public notices (April 23, 2007, August 4, 2008, and October 20, 2008), held public hearings on the proposed Wind Project (May 16, 2007, October 27, 2008, and October 31, 2008), and invited comments on the Wind Project. All comments and EFSC's responses to comments are contained in the Final Order for the Site Certificate. The following issues were identified in these comments to ODOE:

- Concern about inadequate notice and an inaccurate mailing list and the adequacy of the public notification, including an incorrect location description.
- Concern about noise from the wind turbines and meeting state ordinances for noise.
- Concern that the project comply with Sherman County's one-mile set-back ordinance for wind turbines.
- Concern about the potential disturbing effects of flashing lights on turbine towers close to residential property.
- Concern about the health impacts of "wind turbine syndrome."
- Concern about the visual impacts of the proposed facility.
- Concern that the turbines could create a safety hazard when navigating to and from Wasco State Airport.
- A suggestion that Oregon Trail interpretive signage be place at an appropriate location with the project area so that there is lasting recognition of the history of the area.

ENVIRONMENTAL ANALYSIS

Consistent with the Business Plan ROD, the Business Plan EIS was reviewed to determine whether offering terms to interconnect the Wind Project is adequately covered within its scope. The Business Plan EIS alternatives analyzed a range of marketing actions and response strategies to maintain a market-driven approach. The Business Plan EIS showed that environmental impacts are determined by the responses to BPA's marketing actions, rather than by the actions themselves. These market responses include resource development, resource operation, transmission development and operation, and consumer behavior.

BPA's Business Plan EIS described generating resource types, their generic environmental effects on a per-average-MW (per-aMW) basis, and potential mitigation. The discussion of generic environmental impacts of renewable energy resource development, including wind, is provided in Section 4.3.1 of the Business Plan EIS. The RP EIS also described the environmental effects and potential mitigation associated with the construction or upgrade of transmission facilities to integrate the resources with the existing transmission system (Section 3.5). The per-aMW impacts for wind projects (RP EIS, Table 3-19) were incorporated and updated in the Business Plan EIS (Table 4.3-1). The Business Plan EIS contains an analysis of generic environmental impacts, including resource development and operation (Section 4.3.1) and transmission development and operation (Section 4.3.2).

The Market-Driven Alternative anticipated unbundling of products and services, constructing transmission facilities for requests for non-federal power transmission, and providing transmission access to wholesale power producers (Section 2.2.3). The Business Plan EIS also noted that, under the Market-Driven Alternative, new transmission would depend more on generator and other customer requests than on new resource development by BPA (Section 4.2.3.2). Finally, the Business Plan EIS identified the associated need to enhance transmission facilities (Section 4.2.4.1) as one consequence of all resource development. One example would be customer requests for new transmission line and substation facilities for interconnection of generation resources.

In light of the analyses contained in the Business Plan EIS and RP EIS, interconnection of the Wind Project falls within the scope of the Business Plan EIS. Site-specific impacts that would result from the Wind Project are of the type and magnitude reported in the Business Plan EIS and the RP EIS. The following discussion describes the site-specific environmental impacts that would result from the transmission line interconnection and the Wind Project, and provides additional information on potential cumulative impacts.

BPA Interconnection Facilities Impacts

The one-acre area where there will be new BPA interconnection facilities (substation expansion and substation tower) was analyzed in the Klondike III/Biglow Canyon Wind Integration Project EIS. The following discussion describes environmental impacts from these facilities based on information contained in this EIS and updated as necessary.

Land Use and Recreation

Land surrounding the substation is agricultural. BPA will expand the substation by about 1 acre and permanently remove this area from dryland wheat production. Most land in Sherman County is zoned for farming and removing this small parcel will have a negligible effect on total county agricultural production.

Biglow Canyon Substation is not near any existing recreation areas. No recreation resources will be affected.

Transportation

Construction vehicles will use Interstate 84, and US 97 from Biggs Junction at I-84, then a series of local Sherman County roads to reach the construction sites. Traffic volume levels along local roads currently are low. Short-term traffic delays on US 97 and local roads may occur. Some local roads were improved to accommodate construction vehicles when Biglow Canyon Substation was built. Construction impacts to transportation will be temporary. After construction, occasional maintenance trucks and other vehicles will need to use the local roads. Impacts to the transportation system will be minimal.

Geology and Soils

The Biglow Canyon Substation expansion area is on an upland basalt plain south of the Columbia River. The basalt is overlain by wind-deposited silt. The soil in the area of the substation is silt loam. This soil type is common in the area.

BPA will require site-specific erosion and sediment controls (best management practices [BMPs]) for soil stabilization, hazardous material and petroleum product releases, and will follow notification procedures. During construction, any spills or leaks of hydraulic fluid or oil from construction equipment will be cleaned up to prevent spills from reaching the soil or groundwater and causing contamination. To reduce disturbance to soils and vegetation, vehicle use will be restricted to access roads and immediate work areas. Access road drainage structures shall be kept functional and the road surface will be maintained to minimize erosion, run-off, and sedimentation.

Vegetation

The area around the existing substation is agricultural land planted that has been plowed, seeded, and harvested annually, mainly with wheat species. No threatened or endangered plant species were identified in the area during studies for the Klondike III/Biglow Canyon Wind Integration Project and none were found during field visits for that project.

Expanding the substation will remove about 1 acre of cropland. Impacts would be minimal because little vegetation is being removed. Following construction, BPA will manage any vegetation at the substation site in accordance with BPA's Transmission System Vegetation Management Program Environmental Impact Statement (DOE/EIS-0285, 2000).

Water Resources and Wetlands

The Biglow Canyon Substation expansion area is located in upland with no water present and no topographical features that could collect water. The site possesses neither soil qualities nor vegetation species indicative of wetlands.

Fish and Wildlife

No aquatic or riparian habitats occur at the site and no fish are present. Agricultural areas provide little habitat for wildlife, other than for small mammals and forage for ungulates and raptors. During construction, any small mammals in or near the area will be displaced temporarily. Nearby populations or migrating individuals will also be temporarily disturbed during construction. The project area is next to an existing substation and transmission line structures and conductors and thus the new facilities do not pose an additional threat to birds or animals.

BPA obtained an updated federal threatened or endangered species list from the U.S. Fish and Wildlife Service for the Biglow Canyon Substation expansion area.[5] There are no federal endangered, threatened or proposed species listed for Sherman County and none are known to occupy the habitat at the substation expansion site based on a site assessment completed for Biglow Canyon Substation. Using this information, BPA has made a determination of no effect to federally-listed species.

[5] U.S. Fish and Wildlife Service. May 16, 2009. Federally Listed, Proposed, Candidate Species and Species of Concern Under the Jurisdiction of the Fish and Wildlife Service Which May Occur Within Sherman County, Oregon. Accessed May 21, 2009 at http://www.fws.gov/oregonfwo/Species/Lists/Documents/County/SHERMAN%20COUNTY.pdf.

Historic/Archeological Resources

The Biglow Canyon Substation expansion area was surveyed for cultural resources and local tribes were consulted as part of the cultural resources work conducted before the Biglow Canyon Substation was built. No cultural resources were found. The expansion area has been disturbed by wheat production activities for many years, and construction activities for Biglow Canyon Substation also disturbed this area. For these reasons, the new BPA interconnection facilities are not expected to affect cultural resources or historical properties.

If any cultural resources are uncovered during construction, work will immediately cease and BPA, state archeologists, and tribes will be notified to ensure proper procedures are implemented to protect the site until it is properly assessed.

Visual Resources

The substation expansion site is next to the existing Biglow Canyon Substation. The area is not near residences or highways and is only visible to travelers on local roads. The substation expansion and added dead end tower will not greatly alter existing visual resources in the area because the area has already been impacted by utility development.

Noise

Intermittent noise will be generated at the site during construction. Construction will be limited to daytime hours. This noise will be minimal, temporary and will cease once construction is complete.

Public Health and Safety

To prevent public access to the substation expansion area, the existing fencing around the Biglow Canyon Substation will be extended to enclose this area. During construction, access to the substation site will be limited to authorized personnel and the general public will be excluded. Authorized visitors will be required to check in with security, and construction personnel will be diligent in identifying and excluding non-authorized visitors. During operation, access gates for the substation will be locked and accessible only by authorized personnel.

During construction, BPA will use standard construction safety procedures to reduce the risk of fire or other safety risks. BPA requires that the construction contractor develop an emergency response plan that includes procedures for responding to a potential accidental fire during construction. BPA will also use standard industry traffic controls to inform motorists and manage traffic during construction activities. All equipment fueling operations will use pumps and funnels and absorbent pads. A supply of sorbent materials will be maintained on-site in the event of a spill. Response measures and procedures will be put in place in case of an accidental release of petroleum products and/or hazardous substances. BPA's Pollution Prevention and Abatement (PP&A) Program will create an environmental requirements document that will guide construction personnel. A member of the PP&A staff is assigned to the project, and will be notified immediately in the event of any hazardous material spill.

Socioeconomics and Public Services

No increase in public services is anticipated from the construction and operation of the substation expansion and tower because of the project's small size and lack of need for services. During construction, the presence of 10 to 15 workers per day will cause a small, short-term economic benefit to the local community as the workers patronize local businesses.

Air Quality

Small amounts of dust will be temporarily created by construction activities. BPA requires that the construction contractor develop and implement a suitable dust abatement plan to control and minimize dust. BMPs, including using water for dust control; proper storage of disturbed soils; minimizing the amount of disturbed soil at any given time; and restoration seeding of disturbed areas will be used to control dust. Construction and maintenance vehicles and equipment will be in good running condition, minimizing emissions. Water trucks will be used for dust control. No water will be withdrawn from any stream, ditch or water body in the project area unless previously approved.

Wind Project Impacts

The following summary of environmental impacts is based on information submitted by BP Alternative Energy to BPA and to EFSC's site certificate process referenced previously. For each environmental resource, the maximum potential Wind Project impact from potential turbine siting and design is identified. For example, for the scenic and aesthetic evaluation, the turbine layout and design having the maximum impact is described. Similarly, for wetlands, fish and wildlife habitat, and threatened and endangered species, all areas within the proposed turbine corridors have been surveyed and the impact calculations for these resources reflect the maximum potential impacts from the Wind Project.

Land Use and Recreation

The Wind Project will be located primarily on agricultural land used primarily for dry land wheat production, with some portions located on undeveloped land. Of the 30,310-acre project area, project facilities will permanently occupy about 127 acres of agricultural land and 12 acres of undeveloped land. Temporary impacts from construction will disturb an additional 746 acres of agricultural land and 279 acres of undeveloped land. BPA Alternative Energy has leased all portions of the project area where Wind Project development will occur from project area landowners.

Because farming operations would be expected to continue around the turbines and access roads after construction, the Wind Project would not cause a significant change in accepted farm practices and would not significantly increase the costs of farm practices. Land use impacts therefore will be minimal.

The Wind Project also will not have a significant impact on recreation in the area. Although turbines would be visible from DeMoss Springs Memorial Park and from the local roads and highways, including the Journey Through Time Scenic Byway, these turbines would be expected to only temporarily affect the recreational experience. In addition, these recreation facilities do not have visual objectives that would be affected by the Wind Project.

Transportation

Construction vehicles for the Wind Project will use Interstate 84, US 97 from Biggs Junction at I-84 to the US 97/OR 206 intersection near Wasco, Oregon, then a series of local Sherman County roads to reach construction sites within the site boundary. Construction traffic may also approach the site from the south on US 97. Traffic volume levels along local roads currently are low. Short-term traffic delays on US 97 and local roads from use of these roadways by slower-moving project construction vehicles may temporarily affect access to the Journey Through Time Scenic Byway and DeMoss Springs Memorial Park.

Several passing lanes on US 97 will alleviate potential construction vehicle impacts along this travel corridor. In addition, some local roads will need to be improved to accommodate heavier construction equipment, which could result in traffic delays during road improvement periods. Given the low volume of traffic on these roads and the temporary impacts, these effects from the Wind Project would be negligible and would not be expected to have a detrimental impact on use of the byway or access to the park. In the long term, these road improvements would result in a benefit to the local road system.

After Wind Project construction is completed, vehicles associated with operation of the Wind Project will generally be limited to the vehicles of the 10 to 15 employees working at the Wind Project, as well as occasional maintenance trucks and vehicles. Given their extremely low volume and occasional nature, transportation impacts from these additional trips will be negligible.

Geology and Soils

The Wind Project area is an upland on a basalt plain south of the Columbia River. The basalt is overlain by wind-blown deposits. A relatively thin veneer of soil exists throughout most of the study area. Where the soil thins, and the underlying basalt is exposed, the soil is a gravelly/cobbly loamy sand with boulders. The proposed wind turbine sites are not located on or near unstable slopes that would pose a significant risk of ground movement or other geologic hazards.

Facility construction will temporarily disturb soils on up to 1,025 acres. Permanent project facilities such as structures and gravel roads will impact about 139 acres. Erosion control measures used during construction will include the following:

- Installing sediment fence/straw bale barriers at down slope sides of excavations and disturbed sites.
- Straw mulching and disking at locations adjacent to roads that could be affected.
- Providing temporary sediment traps downstream of intermittent stream crossings.
- Planting designated seed mixes at affected areas adjacent to roads.
- Seeding areas affected by construction when there is adequate soil moisture.

Vegetation

The Wind Project area is primarily in use for dryland wheat production. The small amount of native plant communities that remain within the project site occurs predominantly along the plateau margins and steep side slopes of Grass Valley. These communities consist of sage and rabbit brush-dominated shrub lands and native bunchgrass grasslands, each with varying degrees of invasive species present. Agricultural areas enrolled under the Conservation Reserve Program (CRP), a voluntary federal program to assist private landowners to convert highly erodible and environmentally sensitive cropland to permanent vegetative cover, occur as narrow strips in previously plowed drainage ways, and as large blocks in other areas. CRP areas have been planted with a mix of native and non-native bunchgrass with the primary intent of increasing wildlife habitat in the area.

No federally listed or state listed plants were found in the project area during surveys. No impacts to such plants will result from construction or operation of the project.

Facility construction will temporarily disturb vegetation on up to 1,025 acres. Permanent project facilities such as structures and gravel roads would impact about 139 acres. BP Alternative Energy has developed a Habitat Mitigation and Revegetation Plan for the areas impacted that will be implemented after construction.

Water Resources and Wetlands

The major drainage features (water of the state) include Locust Grove Canyon, China Hollow, Mud Hollow, Spanish Hollow, and Grass Valley Canyon. These major drainage features are all tributaries of the Columbia River and are considered jurisdictional waters. Mud Hollow joins Spanish Hollow and heads north to the Columbia River as does Locust Grove Canyon. The Grass Valley Canyon heads eastward and continues out of the area to join the John Day River north to the Columbia River.

Project facilities have been sited to avoid impacts to these drainage features. No impacts are expected from the project.

Groundwater in this arid area is deep, in some areas tens to hundreds of feet deep. The facility will use a small amount of groundwater. The new O&M facility will be served by a new well. Twelve wetland areas were identified within the Wind Project area. Project facilities have been sited to avoid impacts to these wetland areas. Four potential impact locations could occur where the collector system will cross drainage channels. Impacts will be temporary and will affect about 0.05 acre. The channels will be restored and revegetated with native wetland shrubs and grasses after construction.

Fish and Wildlife

Fish Species

There is no suitable habitat for listed fish species within the site boundary and no aquatic habitat will be impacted by project construction or operation. There are dry channels that may eventually lead to the Columbia River, but these channels will not be impacted by the project.

Terrestrial Wildlife Species

Wildlife that may be found in the area include mule and black-tailed deer, antelope, badgers, coyotes, porcupines, jackrabbits (white- and black-tailed), gophers, ground squirrels, voles, mice, and various species of lizards and snakes.

Impacts to wildlife will mostly be local and temporary due to construction disturbance. Construction activities would tend to displace those wildlife species in and around the construction sites, but would not result in permanent displacement over time in those areas where temporary disturbance will take place. Approximately 12 acres of wildlife habitat would be permanently lost due to infrastructure. BA Alternative Energy will enhance or create this amount of habitat to replace the habitat lost.

Avian Species

Avian surveys identified 82 species of birds present in the project area. Horned larks, European starlings, Canada goose, western meadowlarks, and red-winged blackbirds comprised most of the birds detected. The most common observed raptors included red-tailed hawks, rough-legged hawks, northern harrier and American kestrel. No federally listed threatened or endangered species have been identified as having the potential to exist within the project area. Some state-listed species are known to use the project area or surrounding areas.

Raptors

The bald eagle is state listed as threatened in Oregon. No bald eagles were observed in the Wind Project area during surveys. The potential for impacts to bald eagles from the Wind Project is low.

The peregrine falcon is state-listed as endangered in Oregon. Peregrine falcons may occur in the analysis area year-round. However, the nearest known peregrine falcon eyrie is about 5 miles north of the Wind Project area. The potential for impacts to peregrine falcons from the Wind Project is low.

Four active raptor nests were identified in upland tree habitat within 750 feet of the Wind Project footprint. Raptor species included: Swainson's hawk (1 nest site), red-tailed hawk (2 nest sites), and great horned owl (1 nest site). The trees containing these nests will not be removed for the construction of the Wind Project. During construction, construction buffers will be used if the nests are active.

Surveys showed higher raptor use in the Wind Project area than at other Sherman County wind facilities. Raptor fatality rates for the Wind Project are expected to be less than 0.14 per MW per year.

Passerines

One active western loggerhead shrike nest was found in CRP land. No impacts are expected to this nest. Two loggerhead shrike nests were found in understory shrubs of upland tree habitat. The nest sites will not be impacted by construction of the Wind Project.

The range of passerine fatalities is expected to be from 1-3 fatalities per MW per year, with the most common fatality being horned larks. No other species is expected to make up a large proportion of fatalities.

Waterfowl

The project area is used by Canada geese, especially during winter. Waterfowl mortality is expected to be low, based on monitoring results of existing facilities in the region and relatively infrequent use of the Wind Project area by Canada geese year round.

Other Birds

Some upland birds may be displaced by the Wind Project, but impacts will be minimal.

Bat Species

The primary impact to bats will be collision mortality. Bat mortality is expected to range from 1 to 2.5 bats per MW per year. Bat mortality will mainly involve migratory silver-haired and hoary bats. Little risk is expected to nonmigratory bat populations in the Wind Project area, given the lack of habitat and fatality results of other facilities in similar habitats.

Historic/Archeological Resources

The project area has one historic property, DeMoss Springs Park, listed on the National Register of Historic Places (NRHP). The project also crosses portions of the Oregon Trail and the Barlow Cutoff, which are potentially eligible for the NRHP. Farming activity has obliterated most traces of these trails.

A survey of part of the project area found archeological sites, including prehistoric and historic sites. In addition, isolated finds were identified. The project design has been revised so that these sites can be avoided and protected.

During construction in archeologically sensitive locations, such as near recorded archeological sites, on-site archeological monitors will be present to ensure that no accidental damage to known cultural resources occurs. A Cultural Resource Management Plan will be developed with specific protocols and procedures for protecting cultural resources, including any discovered during construction.

Visual Resources

The project area is characterized by rolling terraces and agricultural fields above the Columbia River. Highway 97, which runs through the Wind Project area, is part of the Journey Through Time Scenic Byway.

The project will be seen both by travelers and local residents from many locations along highways 97, 206 and 14. The wind turbines will not block or obstruct views, but they will alter the visual landscape. About 50 homes are located in the vicinity of the turbine corridors; residents of these homes will have foreground views of the wind turbines. Depending on the level of sensitivity to turbines, there may be adverse visual impacts to these residents from views

of project turbines. The following describes potential visual impacts from other locations with greater visual sensitivities in the vicinity of the Wind Project.

Columbia River Gorge National Scenic Area

Some elements of the Wind Project will be visible from some viewpoints within the Columbia River Gorge National Scenic Area, which is located about 15 miles northwest of the Wind Project area. However, the locations in the National Scenic Area that the Wind Project will be visible from are generally not publicly accessible. Where visible, the Wind Project will be subordinate to the landscape, which includes rail and interstate highway corridors, transmission corridors and urban and rural development. The Wind Project will be visible in the background of these features.

Lower Deschutes River Canyon

The Wind Project will be visible from only a few isolated rims of the Lower Deschutes River Canyon that have very limited access. The project will not be visible from the canyon's interiors or from the river and its shorelines. The Wind Project will be compatible with Bureau of Land Management (BLM) visual resource management objectives for the Deschutes River Area of High Visual Quality and will not create significant adverse impacts to this resource.

John Day River Canyon

Similar to the Lower Deschutes, the Wind Project will be visible from only a few isolated rims of the John Day River Canyon that have very limited access. The project also will not be visible from this canyon's interiors or from the river and its shorelines. The Wind Project will be compatible with BLM visual resource management objectives for the John Day River Area of High Visual Quality and will not create significant adverse impacts to this resource.

Journey Through Time Scenic Byway

Portions of the Wind Project will be visible to varying degrees in the foreground and middleground from the Journey Through Time Scenic Byway for about 12 miles between Biggs and Moro. The Wind Project will be compatible with the Byway's stated goals and would not be expected to significantly affect views from this Byway.

Noise

The project area is rural, and ambient noise levels are low with infrequent noise from agricultural activities. Construction of the wind project will cause localized, short-duration noise. Temporarily increased noise levels will result from normal construction activities and construction equipment.

In the Wind Project area, residences are the only noise sensitive properties that would be exposed to elevated noise levels from operation of the Wind Project. New noise sources on sites that have not previously been used for commercial or industrial purposes have a limit on the allowable increase over existing ambient noise levels. Generally, these sources may not increase the noise levels to noise sensitive properties by more than 10 A-weighted decibels (dBA) unless

the person who owns the property executes an easement or real covenant that benefits the property on which the wind energy facility is located. Wind turbines and transformers can cause noise that may exceed the noise limit and would require mitigation, but in no case can the noise increase beyond the maximum of 50 dBA set by state law. The Site Certificate requires BP Alternative Energy to meet specific conditions if noise limits are exceeded at residences including obtaining noise easements or implementing measures such as moving or eliminating turbines.

Public Health and Safety

The Wind Project will have fencing around substations and other electrical equipment. Turbine generating equipment will be high above ground, and access to turbine towers will be secured and limited to authorized personnel. The 34.5-kV collector system will be located at least three feet below ground.

During construction, access to the site will be limited to authorized personnel and the general public will be excluded. Authorized visitors will be required to check in with security and construction personnel will be diligent in identifying and excluding non-authorized visitors from the site.

During operation, all electrical components, such as substations and turbines, will be locked and accessible only by authorized personnel.

Tower and blade design will be by a major wind turbine manufacturer, and the structures will be installed in accordance with the manufacturers' specifications. The turbines will have automatic cutoff devices to shut down the equipment when the wind is very strong and turbines reach the cutout speed. Periodic inspections of all turbine equipment will be conducted in accordance with the manufacturers' specifications. Each turbine will be equipped with vibration sensing equipment that would shut down the turbine in the event abnormal levels of vibration were detected.

The Site Certificate requires a basic safety setback of 110 percent of maximum blade-tip height from all leased property boundaries, road rights-of-way edges and residences. For turbines having a maximum blade-tip height of 420 feet, a setback of 110 percent of maximum blade-tip height would be 462 feet.

Socioeconomics and Public Services

The project will not appreciably increase the need for public services. There will be no significant increase in the permanent population of the area as a result of construction and operation of the Wind Project. During construction most workers will permanently or temporarily reside in the local area (approximately 100 to 120 workers at peak construction periods). The number of people expected to need temporary lodging or permanent housing will be small enough that adequate housing, and other lodging, will be available. Operation will not require a large number of people (only about 10-15 full-time and part-time employees). The project will not result in a significant increased need for public services, including fire and police protection.

The project will have a net economic benefit to the landowners participating in the project because wind lease payments to landowners will provide a supplementary source of income that could help farmers retain their farms when farm prices reduce other sources of farm income. A substantial increase in the county's tax base will provide benefits to all county residents. Indirect economic benefits will accrue to businesses in the area from construction workers purchasing goods and services.

Air Quality

Air quality in the area is generally good, with windblown dust the only pollutant typically found. Fugitive dust emissions will result from dust entrained during project site preparation including road building, on-site travel on unpaved surfaces, and soil disrupting operations. Wind erosion of disturbed areas will also contribute to fugitive dust.

Construction activities also temporarily generate small amounts of carbon monoxide (CO). Heavy trucks and construction equipment powered by gasoline and diesel engines will generate CO from exhaust emissions. If construction traffic were to delay or reduce the speed of other vehicles in the area, CO emissions from traffic will increase slightly. CO emissions will be temporary and limited to the immediate area surrounding the construction site.

The proposed construction time varies and the project may be completed in phases. Overall, air quality impacts will be low because impacts will occur in the short term in a localized area, during construction only, with very unlikely health and safety risks.

When the Wind Project is operational, minimal emissions from any project-related source are expected. In fact, unlike more traditional energy sources such as a gas or coal-fired turbines, the portion of the Wind Project that will generate electricity – the wind turbines – will not emit any air pollutants. Accordingly, the Wind Project will not contribute to the accumulation of greenhouse gasses from traditional energy sources and other sources, which has been identified as a source of climate change and global warming.

Cumulative Impacts

The Business Plan EIS and RP EIS provide an analysis of potential cumulative impacts resulting from development of generation resources and transmission facilities in the region. Many other wind projects have been built or are reasonably certain to be built in the region. There are currently over 2,000 MW of wind energy connected to the transmission grid within BPA's Balancing Area, and several thousand more megawatts of wind power are expected to be developed and connected to the grid in the next few years.[6] In addition, according to a cumulative impacts analysis prepared for a proposed nearby wind farm[7] approximately 4,060 MW of wind power are proposed in the Columbia Basin within 60 miles of that project

[6] BPA. Factsheet: *How BPA Supports Wind Power in the Pacific Northwest.* DOE/BP-4002. March 2009.

[7] Caithness Shepherds Flat, LLC. Application for a Site Certificate for the Shepherds Flat Wind Farm, Prepared for the Oregon Energy Facility Siting Council. Amended February 2007, and supporting documents.

area (Gilliam County) and are reasonably certain to be built. Results from these analyses are used in the following sections discussing cumulative impacts.

Land Use and Recreation

Overall, wind projects and associated facilities have relatively little direct impact on land use because the footprint of the facilities is small even if they occur across large areas. Additionally, wind projects tend to reinforce the existing agricultural land uses (the primary land uses in most areas proposed for wind energy). Wind projects are compatible with all types of agriculture. Wind lease payments provide a supplemental source of income for farmers, helping them weather the uncertainties of agricultural yields and prices.

State and local land use regulations in Oregon and Washington require, depending on the size of the project, either county land use approval or State approval, prior to construction of additional facilities. This permitting process is designed to prevent incompatible uses and the degradation of farmland. The potential for cumulative impacts to land use is substantially minimized by these regulations.

Wind projects and associated facilities have little direct impact to recreation in agricultural areas. Dispersed hunting that may occur in the region normally could continue after construction and during turbine operation.

Transportation

If two or more wind projects are built at the same time in an area where the construction traffic uses the same road network, the construction-related traffic would have a cumulative effect. These effects would be temporary. To minimize these effects during construction, the projects involved could investigate coordinating delivery schedules and routes, use of shared resources to minimize trips, and coordinating construction schedules to address any temporary constraints on traffic flow that develop. The Public Works Departments in each county could work with project developers to ensure shared responsibility for any road improvements or repair.

Geology and Soils

Cumulative wind project development has resulted in soil disturbance at wind project sites throughout the region. However, the amount of cumulative ground disturbance is very small due to the small actual footprint of wind project facilities. Ground disturbance from construction of energy projects close together could increase erosion potential in some areas as a result of the decrease in soil storage area. Additional wind projects and associated facilities needed in the future could also increase the potential for erosion, but the relatively small footprint of wind projects and standard control and containment measures would limit these impacts.

Vegetation

Native plant communities are being lost in the region because of past and current development and actions, and these trends will likely result in the further reduction of native plant communities and will remove small amounts of agricultural land and native habitats. Additional projects in the area combined with the acreages already planned for development would increase

the total acreage in the region used for wind development. The permanent footprint (during operations) of wind projects is small compared to the total acreage of the projects. The area taken up by each turbine and associated facilities, including roads and substations, would be

changed and could no longer be habitat. The acreage not used for facilities would remain unchanged. No land use changes and subsequent potential habitat changes would occur. Some projects will set aside acreage to mitigate impacts to wildlife habitat.

Most vegetative communities in the analysis area have been previously disturbed by human activities. The actions associated with the proposed wind projects would contribute incrementally and in a relatively minor way to the continuing cumulative loss of native vegetation communities.

Water Resources and Wetlands

Water quality, water use, and wetland impacts related to new wind generation projects would be temporary and minor, and subject to further regulatory approvals. Most wind project infrastructure is located on ridgetops and upland areas away from wetlands and water resources. In areas where wetland and water resources are present, wind project facilities almost always can be located to avoid these resources. Cumulative impacts to wetlands and water resources from the Golden Hills Wind Project and other wind projects in the region are expected to be negligible because wetlands and water resources are scarce in the area, and wind project infrastructure would be located in upland areas where these resources generally are not present.

Fish Species

Potential cumulative impacts to fish and other aquatic resources from past, present, and future development in the region include the loss of riparian habitat, increased sediment loading, increased stream temperatures, pollution from herbicide and insecticide use, changes in peak and low stream flows, fragmentation of fish habitat, decreases in streambank stability, and altered nutrient supply. Since the regional wind projects currently proposed are typically located in upland areas and generally well away from fish habitat, the proposed regional projects would not be expected to contribute to direct cumulative impacts to fish species.

However, the interconnection of existing and proposed wind-powered generation projects in the region to the BPA transmission system does pose the potential for cumulative impacts to listed Columbia River fish species through a somewhat complex relationship between the wind projects, Columbia River hydro operations, and operation of this hydrosystem to meet Clean Water Act (CWA) and Endangered Species Act (ESA) requirements for listed fish species.

Many of the region's wind generators are located within what is known as the BPA Balancing Area. In BPA's Balancing Area, like all balancing areas, there must be a match between generation and loads at all times. Within this balancing area, most existing and proposed wind projects are concentrated in one geographic area, located to the east of the Columbia River Gorge. Because of this concentration, the amount of wind power on BPA's transmission system tends to vary with the sometimes widely fluctuating wind velocities (and hence wind project output) in this area. That is, when wind speeds are low in this area, there is very little wind power generated, and the amount of wind power on BPA's system is low. Conversely, when

wind speeds are high, the wind projects are generating close to or at full capacity, and the amount on BPA's system is high.

The proportion of wind power on BPA's transmission system has grown quickly and dramatically in recent years, and even greater future growth is expected. As of May 2009, there was approximately 2,100 MW of total wind generation interconnected to the BPA system. In addition, BPA currently has contracts in place that will allow for the interconnection of an additional 2,100 MW of wind generation to the BPA system; these projects may be built and operational within the next few years.

The combination of an increasingly large proportional share of wind power on BPA's system and the natural fluctuation of this power results in large, unscheduled swings in wind generation of up to several hundred megawatts within a single hour. To address this situation, BPA currently reserves capacity in the hydrosystem to provide balancing services for these swings when needed. At times maintaining the reserve can cause additional spill to occur.

The potential for impacts to Columbia River fish arises when the electrical output from wind generators in the region exceeds their hourly generation schedules. In such situations, BPA must immediately decrease generation in the BPA Balancing Area to maintain the constant balance of generation and load needed to keep the system stable. This can be accomplished in one of three ways. First, BPA could reduce overall Columbia River water flows and generation by releasing less water from Columbia River hydro projects and putting the water into storage. Second, BPA could decrease hydro project generation by spilling water over the dams rather than running it through the dam turbines. Third, BPA could reduce other sources of generation within the BPA Balancing Area.

During certain times and conditions, the first option of storing the water is not available because room is being maintained for flood protection at the hydro projects. At these times, river flows are already high due to spring runoff or other required drafts to maintain flood control space. Moving to the second option – spilling water over the dams – runs the risk that standards under the CWA for total dissolved gases, that are established to protect fish, would be violated and ESA-listed fish species would be impacted because water being spilled over the dams results in elevated levels of dissolved gases developing in the river. As the amount of water spilled increases, so does the level of dissolved gases. The CWA standards for total dissolved gases limit the level of dissolved gas saturation permissible in the river when migrating salmon are present. Gas supersaturation can lead to gas bubble trauma in fish or other aquatic organisms as a result of excessive uncompensated gas pressure which they cannot avoid.

Species, life-stage, size and genetics are all important factors in determining the tolerance of fish to supersaturated waters. Acute mortality will occur when gas bubbles are present in the heart in sufficient quantity to prevent the movement of blood. Various sublethal effects have also been reported to significantly impact mortality, most importantly blindness, decreased tolerance to stress, loss of lateral sense, and secondary infections. Acute affects may be reversed by exposure to equilibrated water or to increased hydrostatic pressure. However, permanent affects to individuals and large-scale mortality in populations may occur after only short-term exposure to high levels of gas, especially in environments where compensating pressures do not exist. In these settings, large-scale mortality can occur in a matter of hours.

In natural circumstances, the limit of safe gas supersaturation levels depends on the depth within the water column a specific fish species swims. The naturally occurring levels of gas in the Columbia and Snake rivers varies between 105 percent and 120 percent of equilibrium total gas saturation pressure (ambient atmospheric pressure). Within the Columbia and Snake rivers, the state standards for saturation are limited to 110 percent of saturation at any point of sample collection without a state waiver. The U.S. Army Corps of Engineers has obtained a state waiver from Oregon and Washington. Because of this waiver the standard level of gas in the river is 120 percent. Running the river to this level but, no higher has become a fundamental component of how spill and resultant fish passage has been managed at hydroelectric power generation facilities.

An example of the potential for cumulative impact of wind development occurred in spring 2008, when wind turbines in BPA's balancing area produced significantly more power than scheduled over several hours. During this time, wind generation peaked at over 400 MW above the prescheduled amount. BPA was forced to reduce hydrosystem generation to accommodate this unscheduled wind generation and provide necessary balancing services. Due to high water flows in the Columbia River at the time, water was already spilling over dams above that needed for fish protection. Decreasing hydro generation at that time meant increasing water spill, and nitrogen saturation in the water rose nearly to levels dangerous to fish species.

BPA is currently taking steps to ensure that wind power on BPA's transmission system does not cumulatively impact Columbia River hydro operations necessary for listed fish species. As part of a comprehensive review of wind project interconnections and their effects that was conducted in winter 2008, BPA has established transmission operation protocols under which BPA's dispatch system would automatically instruct wind project operators to reduce their generation to specified levels if necessary for reliability and ESA or CWA compliance (visit *http://www.bpa.gov/corporate/WindPower/WIT-DSO.cfm* for more information).

Terrestrial Wildlife

The current and proposed wind projects near the analysis area would have low impacts to non-avian terrestrial species because much of area is under agricultural cultivation and disturbance to these species occurs regularly. Additional fragmentation and reduction will be offset by mitigation (low-quality habitat restoration, or conservation easements). Likewise, operation of these facilities is not expected to adversely affect most terrestrial species.

Bird Species

Annual avian mortality estimates at six recently constructed wind farms in the Columbia Plateau Ecoregion ranged from 0.9 to 2.9 birds per MW, averaging 1.9 avian deaths/MW/year. Assuming that mortality rates are representative of the region, new wind power generation could cause between approximately 3,650 and 11,775 and on average 7,715 avian deaths per year in the region (based on 4060 MW of power generated).

Raptors

At modern wind power projects in the Columbia Plateau Ecoregion, raptor mortality has been low, ranging from 0 to 0.14 raptor fatalities per MW per year. An added 4,060 MW of capacity

in the region could result in between 0 and 568 fatalities, on average about 280 raptor deaths per year. Red-tailed hawk, American kestrel, and northern harrier account for most of the summer raptor use at other projects where avian use was studied while rough-legged hawk and red-tailed hawk account for majority of the winter use. These four species are expected to be the raptor species with the highest collision risk across all the projects. The potential exists for other species to collide with turbines, including Swainson's hawk, ferruginous hawk, turkey vulture, golden eagle, Cooper's hawk, sharpshinned hawk, prairie falcon, and bald eagle; however, the mortality risk associated with these species is expected to be lower due to the lower use by these species in general.

Red-tailed hawk and American kestrel account for more than 69 percent of the raptor fatalities recorded at the regional wind projects studied. Assuming this trend holds true for all proposed wind projects in the Columbia Plateau, it would be expected that on average 70 red-tailed hawk and 70 American kestrels would be killed each year. Approximately 18 redtails and kestrels fatalities would occur during the breeding season. An estimate of the breeding population in the Columbia Plateau based on the long-term average data is approximately 6,820 breeding red-tailed hawks and 6,288 breeding American kestrels. The impact to the breeding population would represent approximately 0.26 percent and 0.28 percent respectively, which is likely to be below background mortality for these species and is not considered to have an effect on the regional populations. The other species of raptors have been impacted far less and would represent a much smaller number of fatalities.

Passerines

Passerines have been the most abundant species among the avian fatalities at the wind projects studied. For projects in the Columbia Plateau Ecoregion, about 69 percent on average of the avian fatalities have been passerine. Both migrant and resident passerine fatalities have been observed, with migrants generally making up 20 to 30 percent of the avian fatalities. Assuming that 69 percent of all bird mortality would be passerine fatalities, between approximately 2,518 and 8,125 (on average 5,323) passerine deaths per year would occur in the region.

Some impacts are expected for nocturnal migrating species; however, impacts are expected to be low for the Columbia Plateau Ecoregion. Estimates for nocturnal migrant mortality at the regional wind projects have ranged from 0.27 to 0.73 per MW per year, or approximately 1,090 to 2,960 nocturnal migrant fatalities, for the 4060 MW of wind power expected to be constructed.

Passerine species most common to the project sites, including horned lark and western meadowlark, will likely be the species most at risk. Horned larks represent approximately 35 percent of the avian fatalities in the Columbia Plateau Ecoregion at existing wind projects. Local populations of horned larks are difficult to define because of the vast amount of suitable habitat for this species in the Columbia Plateau. However, based on data from the United States Geological Survey Breeding Bird Survey routes in the Columbia Plateau, the breeding horned lark population in the Columbia Plateau is calculated to be approximately 127,500 horned larks. If it is further assumed that the 2,715 horned lark fatalities are spread equally over the year, then roughly one-quarter of these fatalities (approximately 680) would be during the breeding season. This number represents approximately 0.5 percent of the breeding horned larks and is not

considered high enough to affect population dynamics. It is likely that other background mortality of breeding horned larks is greater than this estimate. Similar calculations for other passerine species indicate that impacts to these species would be minor and unlikely to have any population effects.

In general for wind projects in the Columbia Plateau, approximately 25 percent of the fatalities have been to migrants spread over many species. The most common migrant fatality (9 percent) was golden-crowned kinglet. Goldencrowned kinglets are typically associated with tree or wooded habitats during the breeding season so it is assumed that many of the impacted individuals were from surrounding more mountainous ecoregions or populations further north (e.g., Canada). As with horned lark, estimating the potential population size from which these birds came requires a number of assumptions. However, while it is unknown, it is possible that the individual fatalities came from multiple populations in surrounding or more northern ecoregions, thus diluting the impacts on any one population. Other potential migrant species were found in lower numbers. Cumulatively the impacts to migrants would be spread over a much larger population base and are not considered to have population effects.

Upland Gamebirds

For projects in the Columbia Plateau Ecoregion, upland gamebirds have composed a higher percentage of avian fatalities than in other regions of the U.S., approximately 18 percent of all avian fatalities. Estimates for upland game bird mortality in the Columbia Plateau Ecoregion have varied from 0.27 to 0.47 per MW per year, or between 1,090 and 1,910 upland gamebird fatalities per year. The upland game bird species most commonly impacted, (ring-necked pheasant, gray partridge, and chukar) are introduced species common in mixed agricultural native grass/steppe habitats. There is generally low concern over impacts to upland gamebirds. These species are regulated by state agencies as game species. Impacts from wind farms to these species are not expected to have population level effects given the vast amounts of suitable habitat and other impacts to these species (i.e., hunting).

Bat Species

Results of fatality monitoring for the Columbia Plateau Ecoregion wind projects indicate mortality ranges of approximately 0.63 to 2.46 bats per MW per year. Based on these results, and considering the similarities in the characteristics of the project areas and other regional projects, a conservative estimate of total bat mortality would be between 2,550 and 9,990 bats per year, assuming 4060 MW of wind power is constructed.

Fatalities to only four species (silver-haired bat, hoary bat, little brown bat, and big brown bat) have been documented for six wind projects monitored in the Columbia Plateau Ecoregion. The annual period when most bat fatalities occur is in August and September. The species at highest risk appear to be foliage-dwelling (trees) fall migratory species.

Unlike with birds, there is little information available about populations of bat species. Bat mortality in the Columbia Plateau Ecoregion would involve primarily silver-haired and hoary bats, and no impacts to threatened or endangered bat species are anticipated. Hoary and silver-haired bats are wide spread across North America and breed into the boreal forests regions of

Canada and migrate south to winter in the southern U.S., Mexico, and potentially further south in Central America. In general, mortality levels on the order of 1-2 bats per turbine or per MW are thought to be on individuals and not significant to populations, however, cumulative effects may have greater consequences for long-lived low-fecundity species such as bats. Unlike many avian species that may have multiple clutches of multiple young per year, hoary bats and silver-haired bats likely only raise one or two young per year and only breed once per year. Bats tend to live longer than birds, however, and may have a long breeding lifespan. The impact of the loss of breeding individuals to populations such as these is generally unknown but may have greater consequences.

Historic and Cultural Resources

Cumulative effects on cultural resources are associated with construction activities and permanent land use change through development of new wind generation projects. Because the developments are likely to be dispersed, impacts are unlikely to be concentrated, so loss of cultural artifacts from an entire cultural source is unlikely. Most wind facilities conduct cultural resource surveys prior to final siting to avoid impacting cultural resources. Wind projects can be located to avoid these resources if any are found.

Visual Resources

Additional turbine installation would increase the number of areas from which turbines would be visible. Because future wind energy development would likely occur in rural areas, visual impacts would be experienced by the relatively few residents of the rural areas. Turbines would also be visible to other residents and people traveling through on public roads near the wind project areas. The significance of the visual changes would vary according to the location of the wind project and the perceptions of the viewers. Some viewers find that wind energy projects add a positive element to the visual environment, while others disagree. Over time, the cumulative effect of the addition of multiple wind farms throughout the region will change the visual landscape from primarily agricultural to more industrialized, although the basic visual elements that currently exist will be retained.

Noise

Wind generation projects create noise during the construction periods for the projects. If multiple wind projects were constructed in the same area at the same time, a minor increase in construction noise would occur. No operational noise impacts are anticipated, other than the sound of the blades when the turbines are operating and the intermittent noise associated with substation operations. Noise easements, moving or eliminating turbines, or other mitigation measures are typically required during the permitting processes if noise increases are above state standards.

Public Health and Safety

Any potential risks to the health and safety of workers or the general public associated with the construction of the wind projects would be incidental and comparable to other construction projects. The long-term risk to the health and safety of residents and passersby from operation

and maintenance of wind turbines and associated infrastructure is low, due to the small number of people living and working in the predominantly rural areas, and the large area over which the various wind farms will be scattered.

Socioeconomics and Public Services

Wind lease payments to farmers would provide a supplementary source of income that could help farmers retain their farms when farm prices or weather reduce other sources of farm income. Additional development would provide tax revenue to local governments. New wind generation projects would create temporary effects on housing. Because these effects would be temporary and may occur during separate time periods, accumulation of impacts related to project construction would be minor.

Cumulative impacts on public services and utilities would be largely dependent on facility siting. Emergency services could have a higher demand if there are additional facilities to cover in the same service area. However, this additional demand could be offset by additional tax revenue. Impacts to utilities from additional wind energy integration are addressed during system planning studies, and minimized or eliminated with appropriate equipment within the system.

Air Quality

Air quality issues associated with wind energy are limited to construction emissions, which could be minimized by the use of reasonable controls on all projects. These impacts are temporary and generally not significant. In the long term, cumulative development of wind projects may help to reduce the production of air pollutants by replacing a small percentage of energy that otherwise would have to be generated, presumably, by more traditional energy sources such as a gas or coal-fired turbines. This cumulative wind development also could serve to reduce greenhouse gasses in the atmosphere because of this displacement.

MITIGATION

Specific resource mitigation conditions to avoid or minimize environmental harm from the Wind Project were identified through the EFSC site certificate process and are incorporated here by reference.

PUBLIC AVAILABILITY

This ROD will be available to all interested parties and affected persons and agencies. It is being sent to all stakeholders who requested a copy. Copies of the Business Plan EIS, Business Plan ROD, and additional copies of this Golden Hills Wind Project ROD are available from BPA's Public Information Center, P.O. Box 3621, Portland, Oregon, 97208-3621. Copies of these documents may also be obtained by using BPA's nationwide toll-free document request line: 1-800-622-4520, or by accessing BPA's Web site: www.efw.bpa.gov.

CONCLUSION

BPA has decided to offer contract terms through a LGIA for interconnection of up to 200 MW of power from the Golden Hills Wind Project into the FCRTS at Biglow Canyon Substation in Sherman County, Oregon. The LGIA provides for interconnection of 200 MW from the Wind Project with the FCRTS, the operation of this amount of power from the Wind Project in the BPA Control Area (including control area services such as generation imbalance service), and the maintenance of reliability of the FCRTS and interconnected systems. As described above, BPA has considered both the economic and environmental consequences of taking action to integrate power from the Wind Project into the FCRTS. This decision is:

- within the scope of environmental consequences examined in the Business Plan EIS;
- in accordance with BPA's Open Access Transmission Tariff and associated LGIP; and
- in accordance with BPA's statutory authority to make available to all utilities any capacity in this system determined in excess to that required by the United States (16 U.S.C. 838d).

BPA will take measures to ensure the continuing safe, reliable operation of the FCRTS. This ROD identifies all practicable means to avoid or minimize environmental harm that might be caused by the integration of the Wind Project into the FCRTS.

BPA contracts providing for integration of power from the Wind Project into the FCRTS at Biglow Canyon Substation will include terms requiring that all pending permits be approved before the contract is implemented. BPA contracts will also include appropriate provisions for remediation of oil or other hazardous substances associated with construction and operation of related electrical facilities in a manner consistent with applicable federal, state, and local laws.

Issued in Portland, Oregon.

/s/Stephen J. Wright — *August 13, 2009*

Stephen J. Wright — Date
Administrator and
Chief Executive Officer