Record of Decision for the Electrical Interconnection of the Shepherds Flat Wind Energy Project July 2008

INTRODUCTION

The Bonneville Power Administration (BPA) has decided to offer contract terms for interconnection of up to 846 megawatts (MW) of power to be generated by the proposed Shepherds Flat Wind Energy Project (Wind Project) into the Federal Columbia River Transmission System (FCRTS). Caithness Shepherds Flat, LLC (CSF) proposes to construct and operate the proposed Wind Project and has requested interconnection to the FCRTS. The Wind Project will be interconnected at BPA's existing Slatt Substation in Gilliam County, Oregon. To provide the interconnection, BPA will expand BPA's existing Slatt Substation to accommodate a 230-kilovolt (kV) yard and will provide transmission access for up to 846 MW from the Wind Project to BPA's 500-kV transmission system.

BPA's decision to offer terms to interconnect the Wind Project is consistent with BPA's Business Plan Final Environmental Impact Statement (BP EIS) (DOE/EIS-0183, June 1995), and the Business Plan Record of Decision (BP ROD, August 15, 1995). This decision thus is tiered to the BP 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).

For all requests for interconnection of generating facilities that exceed 20 MW, BPA chooses to act consistently with FERC's Order 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 2003 established the

[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.

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 2004, CSF submitted a generator interconnection request to BPA to interconnect its proposed Wind Project to the FCRTS. 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 BP EIS. The six alternatives were: Status Quo (No Action), BPA Influence, Market-Driven, Maximize Financial Returns, Minimal BPA, and Short-Term Marketing. The BP 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 (BP EIS, Section 1.7).

In the BP 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.

The BP EIS was intended to support a number of decisions (BP EIS, Section 1.4.2), including contract terms BPA will offer for transmission interconnection services. The BP EIS and BP ROD documented a strategy for making these subsequent decisions (BP EIS, Figure 1.4-1 and BP 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 BP 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 BP ROD. This ROD for the Wind Project, which summarizes and incorporates information from the BP EIS, demonstrates this decision is within the scope of the BP EIS and BP 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 BP EIS and BP ROD. This ROD references information that was incorporated by reference into the BP 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 from the following sources:

- Application for a Site Certificate for the Shepherds Flat Wind Farm, Prepared for the Oregon Energy Facility Siting Council. Amended February 2007. Caithness Shepherds Flat, LLC.
- Draft Proposed Order Before the Energy Facility Siting Council (EFSC) of the State of Oregon in the Matter of the Application for a Site Certificate for the Shepherds Flat Wind Farm. Oregon Department of Energy. April 7, 2008.
- Proposed Order Before the Energy Facility Siting Council (EFSC) of the State of Oregon in the Matter of the Application for a Site Certificate for the Shepherds Flat Wind Farm. Oregon Department of Energy. June 11, 2008.

PROJECT DESCRIPTION

BPA Interconnection Facilities

To provide interconnection services for the Wind Project, BPA will expand BPA's existing Slatt Substation by approximately 4 acres on the eastern side of the substation. The expansion will consist of a 230-kV yard located immediately adjacent to the existing substation. The area will be cleared and graded. A layer of gravel will be placed on the area. A transformer and other electrical equipment will be placed in the yard. Some of the equipment will be on concrete pads. A set of transmission line terminal structures will be built within the yard to bring conductors from the Wind Project transmission line (constructed by Shepherds Flat) into the 230-kV yard. The interconnection also will require new electrical equipment in the existing Slatt Substation area. An existing access road will be used for construction. The new yard will be fenced to provide security and safety.

Shepherds Flat Wind Farm Project

CSF is proposing to construct and operate a wind power facility that will generate up to 909 MW.[2] The Wind Project will be constructed in north-central Oregon in Gilliam and

[2] Although CSF has applied for certification of a 909-MW facility from Oregon EFSC, CSF has requested interconnection of only 846 MW from BPA under Open Access Same-time Information System (OASIS) Generation Interconnection (GI) request numbers 118 (750 MW) and 291 (96 MW). If CSF should seek interconnection of additional megawatts, 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.

Morrow counties south of the Columbia River and Interstate 84 (Figure 1). The proposed project area is divided into northern and southern sections. Each section has different topography, land use and habitats. The northern area is about 15,580 acres of private property used for grazing. The southern area is about 16,520 acres of private property mostly cultivated and planted in dryland wheat. About 1,718 acres are enrolled in the Conservation Reserve Program.

The facility will contain up to 303 wind turbine generators, with a nameplate generating capacity of from 454.5 to 909 MW, depending on the type of turbine selected. Four turbine types are being considered. The wind turbines will range from 397 to 492 feet tall, depending on the type chosen. EFSC's Proposed Order indicates that CSF will be allowed to modify its project layout as the project is implemented due to micrositing for environmental concerns and other factors, so long as CSF conforms to the binding conditions imposed through the EFSC Order.

In addition to the wind turbines, facility components include the following:

- Six meteorological towers
- An interconnected electrical system
- Two project substations
- A communications system
- Fifty-seven miles of new project access roads
- Two field workshops.

Turbine Foundations

Turbine foundations will be excavated to a depth of approximately 32 feet (as conditions and turbine type warrant). Excavation for the foundation will be required at each turbine site, and blasting may be required in some locations. The turbine foundation (or "pad") will total approximately 1,187 square feet, with an additional 495 square feet of access road parking area. A portion of the excavated material may be used as fill for road and site grading, and the remaining material will either be stockpiled at the turbine site for backfill while the concrete foundations are poured and cured or hauled off-site for disposal. The stockpiled material will be covered, and the surrounding area will be protected with fences, hay bales, and other barriers to contain sediment flow. Once the foundation has cured, the excavated material will be used as backfill around the foundation, leaving the exposed foundation at the surface only slightly larger than the diameter of the tower base. A 10-foot "skirt" surrounding each turbine will be formed by clearing any debris and vegetation, compacting and sterilizing the soil, and applying a layer of washed crushed rock to reduce step and touch hazard. Some turbine models will require a small step-up transformer at the base of the tower on a separate foundation.

Towers

The tower of the wind turbine supports the nacelle and the rotor. The total height of each tower, to the hub of the rotor blades, is from 262 to 344 feet. Towers are made of heavy rolled steel and are fabricated off-site. The towers are conical with their diameter increasing towards the bottom

for strength. Each of three to four tower sections includes flanges on both ends, which are bolted together on-site. The towers feature a locked entry door just above ground level, and house internal control and communication electronics. An internal maintenance access ladder with safety platforms provides entry to the nacelle. The towers are smooth, with no avian perch opportunities, are white in color, and have a non-reflective finish.

Nacelles and Generators

The nacelle, located at the top of the tower, houses the key operating components of the wind turbine, including the gearbox and the electrical generator that transforms motion into electricity. Each turbine is equipped with a yaw system, which uses electrical motors to turn the nacelles and rotors into the wind. The yaw mechanism is operated by an electrical controller, which receives the wind direction from an anemometer mounted atop the nacelle. The anemometer constantly checks the wind speed and direction, and sends signals to a pitch actuator to adjust the angle of the blades to capture the energy from the wind in the most efficient manner. Some turbine types may also have the step-up transformer in the nacelle. Service personnel enter the nacelles from the tower.

Rotors

Each wind turbine has three rotor blades, each constructed of one piece of fiberglass or fiberglass composite. Blades are from 135 to 157 feet long. Ground clearance of the blades, when the tips are closest to the ground, is from 82 to 196 feet. Blades are finished with a smooth white outer surface. At the peak of energy production, the blades will turn at about 17 – 22 rotations per minute (rpm). Blades and nacelles are fabricated off-site and shipped to the project location. Blades will be attached to the nacelle on the ground and raised, with the nacelle, into position with a crane. Should adjustments be required, blades can be temporarily removed from the turbine and rotated or replaced.

Meteorological Towers

There will be six permanent, un-guyed, 236 to 263 foot meteorological towers (weather stations) located within the facility site. Anemometers located at different heights on the towers will relay information back to control centers via the communication system. Meteorological towers have a concrete foundation: a 30-foot by 30-foot by 2-foot concrete pad is poured at a depth of approximately 5.5 feet; three 30 inch diameter concrete pedestals are affixed to the pad and rise to approximately 6 inches above ground level. The meteorological tower is then affixed to the three point pedestal.

Electrical System

Wind turbines generate low voltage electricity (from 575 to 4,160 volts depending on the technology selected). Low-voltage underground conductors carry the power from the base of the wind turbine tower to its associated step-up transformer. The step-up transformer raises the voltage to 34.5 kV. A medium-voltage (34.5-kV) collector system connects the step-up transformers and then carries the electricity to one of two facility substations where transformers will raise the voltage once more (to 230 kV) for transmission to the interconnect point. Some types of wind turbines have the step-up transformer in the nacelle. Other types have the step-up transformer mounted on a concrete pad measuring 8 feet by 8 feet by 8 inches thick installed

7 feet from the base of the turbine. The top of the finished pad will be at ground level, and a washed crushed rock skirt three feet wide will be installed around the pad.

Collector System

Approximately 158 miles of collector system runs will be required to connect the step-up transformers to the facility substations. Each collector system run is made up of 3 individual conductors plus a grounding or bonding cable. Approximately 65 miles of collector system runs will be installed underground in a trench of a depth of three to four feet. The trench will generally run along the edge of project roads. About 38 miles of collector system runs will be installed overhead. Approximately 10 miles of these overhead runs will be "understrung" on the 230-kV high-voltage lines discussed below. The remaining 28 miles of collector cable overhead runs will be installed on power poles.

Project Substations

Two project substations, one each in the north and south sections of the Wind Project, will receive the collector cables. The substations support transformers that will raise the 34.5-kV electricity to 230-kV. The finished size of each project substation will be 500 feet by 200 feet (2.3 acres), and each will be fenced and locked. The area within the substations will be cleared of all vegetation, and the soil will be compacted, sterilized, and covered with washed crushed rock to reduce step and touch hazards.

High-Voltage 230-kV Transmission

The 230-kV electricity at the south substation will be transmitted to the north substation via 13 miles of high-voltage H-type power poles. The 230-kV electricity at the north substation will be transmitted to the interconnection point at BPA's expanded Slatt Substation via 4 miles of high-voltage H-type power poles. All transmission corridors are located within lands zoned for exclusive farm use.

Communication System

Each wind turbine contains computerized monitors connected to one of two central host computers — one located in each of the field workshops. The supervisory control and data acquisition (SCADA) programs operating on the central computer systems monitor energy production, internal and external temperatures, wind speed and direction, and equipment condition for each wind turbine. Automatic wind turbine shutdown in the event of a mechanical fault is also controlled by the SCADA system. The SCADA system will be connected to the wind turbines and meteorological towers with fiber optic communications lines. Approximately 120 miles of these communications lines will run either underground or overhead, parallel to the low- and medium-voltage power collection conductors. Where underground, communications lines are placed in the same trench as collection conductors; where overhead, communications lines run on the same power poles as the transmission system; communications lines are run to the meteorological towers in separate trenches. These trenches will be similar in size and configuration to the trenches used for the collector system.

Project Roads

Approximately 57 miles of new road will be required to serve each turbine string, connect the turbine strings, and connect to existing roads. Thirty miles of existing ranch and farm roads will also be incorporated into the road network. Existing 10-foot wide roads will be expanded to 18 feet; new roads will be finished at 18 feet wide. During construction, 10-foot wide temporary roads will parallel project roads. Collector conductors and communications cables will be trenched in these temporary roads and the surface will be compacted to provide for crane movement. Permanent roads will have a compacted base of native soil, and gravel 4 to 6 inches deep.

Field Workshops

Two field workshops are proposed on-site—one each in the north and south. The northern building is planned to be 125 feet by 50 feet, and the southern building is planned to be 84 feet by 50 feet. Both buildings will be metal clad, insulated structures with a 75-foot skirt of crushed stone. Both workshops will have an adjacent fenced lay-down area of 200 feet by 75 feet, and a 20,000 gallon water tank for fire fighting and back-up water. CSF proposes wells and septic tanks for both sites. The workshop footprint will be used for lay-down and secure storage during facility construction.

Construction Employment and Schedule

During construction, about 250 workers will be employed. CSF will construct the Wind Project over the next three years. CSF expects that Wind Project construction will be completed and the Wind Project will be fully operational in 2011.

Termination of Plant

The wind facility is expected to have a useful life of at least 25 to 30 years, and its lifespan could be further extended through facility replacement. Upon eventual termination the wind facility will be decommissioned and the site restored to a non-hazardous condition suitable for agricultural use.

PUBLIC PROCESS AND CONSIDERATION OF COMMENTS

Consistent with BPA's strategy for tiering appropriate subsequent decisions to the BP ROD, a public process was conducted for the Wind Project and BPA's proposed interconnection of the Wind Project into BPA's transmission system. Oregon EFSC reviews of the Wind Project also provided opportunities for public comment. These opportunities included the following:

In November 2007, EFSC declared the site certificate application for the Shepherds Flat Wind Farm to be complete. EFSC issued public notice and notice to reviewing agencies and requested comment on the completed application by January 10, 2008. EFSC received comments from seven agencies and 10 individuals[3]. Comments were made concerning a number of issues,

[3] Oregon EFSC. Shepherds Flat Wind Farm Draft Proposed Order, Attachment D.

including state and local government permitting requirements, the need for dust and noxious weed control, potential visual, cultural resources, noise, shadow flicker, and water quality impacts, and potential impacts to plants and wildlife (particularly avian) species.

EFSC issued its Draft Proposed Order for the Shepherds Flat Wind Farm on April 7, 2008 for public review. EFSC held a public hearing on May 8, 2008, in Arlington, Oregon. EFSC received comments from four agencies and five individuals[4]. Comments were made concerning issues such as potential soil, visual, wildlife, and wildlife habitat impacts, the need for noxious weed control, and potential impacts to residents and military training routes in the area.

BPA also provided opportunity for public comment. On October 5, 2006, BPA sent written notice to adjacent property owners and interested parties describing the proposed interconnection of the Wind Project into the FCRTS at Slatt Substation. The notice requested comments on the proposal by November 10, 2006. BPA posted information about the interconnection request at http://www.efw.bpa.gov/environmental_services/Document_Library/ShepherdsFlatWindFarm/ and in BPA's monthly information periodical, the "BPA Journal." Five comment letters were received during the open comment period about the following issues:

- Impacts to the Washington ground squirrel at the substation site
- Need for noxious weeds surveys
- Visual impacts to local residents
- Impacts to the Oregon Trail
- Impacts to the natural environment and bunchgrass sage
- Impacts to birds and bird flight patterns
- Impacts to curlew nesting on Rhea Lane/Road by Arlington; long-billed curlew birds' safety
- Impacts of large-scale wind energy development on wildlife and wildlife habitat in the Columbia Plateau region including cumulative impacts to birds and bats
- A suggestion that BPA fund research to address cumulative effects of wind energy development on the region.

On October 25, 2006, BPA held a public meeting in Arlington, Oregon to receive comments and address questions. No comments were made at the meeting.

ENVIRONMENTAL ANALYSIS

Consistent with the BP ROD, the BP EIS was reviewed to determine whether offering terms to interconnect the Wind Project is adequately covered within its scope. The BP EIS alternatives analyzed a range of marketing actions and response strategies to maintain a market-driven approach. The BP 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

[4] Oregon EFSC. Shepherds Flat Wind Farm Proposed Order, Attachment E.

resource development, resource operation, transmission development and operation, and consumer behavior.

BPA's BP 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 BP 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 BP EIS (Table 4.3-1). The BP 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 BP 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 BP 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 BP EIS and RP EIS, interconnection of the Wind Project falls within the scope of the BP EIS. Site-specific impacts that would result from the Wind Project are of the type and magnitude reported in the BP EIS and the RP EIS. The following discussion describes the environmental impacts that would result from the substation expansion and the Wind Project, and provides additional information on potential cumulative impacts.

BPA Interconnection Facilities Impacts

Land Use and Recreation

The Slatt Substation expansion site is entirely within an area owned by BPA. The site is relatively level to gently rolling, and sparsely vegetated with grass and rabbitbrush. The site appears to have been heavily grazed in the recent past. There is no recreational use. This type of land is abundant in the region. Current land use will be changed on the 4 acres for the expanded substation yard from open space to transmission facility, and the expanded area, like the existing substation, will be fenced.

Geology and Soils

Gilliam County is mainly within the Columbia Plateau physiographic province. Most of the county is a plain that was covered by molten basalt and then uplifted. The basalt in the floor of the plain is overlain by wind-deposited silt. The surface layer of soil in the substation expansion area is dark brown or very dark grayish brown silt loam. The subsoil is dark brown or brown gravelly silt loam. The upper part of the substratum is dark brown or brown very gravelly silt loam, and the lower part of the substratum to a depth of 60 inches or more is brown, calcareous

extremely gravelly silt loam. The soils are used mainly for range. They are also used as wildlife habitat.

The expansion area will be graded and leveled, and crushed rock fill materials will be added to form the substation pad. No water is present on or near the site, but BPA will require site-specific erosion and sediment controls (Best Management Practices [BMP]) be used for soil stabilization, and to prevent hazardous material and petroleum product releases. Spill notification procedures will be in place. 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 substation expansion site is in an arid to semi-arid region with low precipitation, hot, dry summers and cold winters. The area has been grazed by sheep in the recent past. The area is sparsely vegetated with native and non-native grasses and rabbitbrush. No trees or large shrubs are present.

Construction of the substation expansion will permanently remove about 4 acres of vegetation. No vegetation will be allowed to grow on the substation's permanent rock surface. BPA will manage any vegetation on the substation site in accordance with BPA's Transmission System Vegetation Management Program Environmental Impact Statement (DOE/EIS-0285, 2000).

Wetlands and Water Resources

The substation expansion site's windswept ridge top location is at a high elevation and has no water present. No wetlands or waterways are located in or near the project area.

Fish and Wildlife

No aquatic or riparian habitats occur at the site and no fish are present. Some wildlife uses the area. During a field survey, a number of small animal burrows were found, but no terrestrial wildlife was observed. Several raptors were observed flying over the project area. Small numbers of upland animals that may now occupy or pass through the site, such as mice, rabbits, ground squirrels, fox, coyote, mule and blacktailed deer, will be displaced temporarily during construction. Nearby populations will also be temporarily disturbed during construction. Any animals or birds that range through the area during construction may also be disturbed and will likely avoid the area. Wildlife that may have occupied the area will be displaced.

Threatened and Endangered Species

BPA completed a site assessment to determine the potential impacts to listed species from the expansion project. No fish species will be impacted because the project will not involve work in or around water. BPA obtained an updated species list from the U.S. Fish and Wildlife Service prior to a site visit. No federal, endangered, threatened or proposed species are known to occupy

the habitat at the expansion site. The only potential habitat listed was for the Washington ground squirrel (*Spermophilus washingtonii*), a candidate for listing under the federal Endangered Species Act. A survey of the project site[5] found that no Washington ground squirrels were present on or near the site and that follow-up surveys were unnecessary. Based on this information, BPA has made a determination of no effect to federally-listed species.

Historic/Archeological Resources

Under Section 106 of the National Historic Preservation Act, BPA consulted with the Oregon State Historic Preservation Office (SHPO), and the Yakama Nation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes of the Umatilla Reservation, the Burns Paiute Tribe, the Nez Perce Tribe, and the Confederated Tribes of the Colville Reservation on potential effects to cultural resources and historic properties.

A pedestrian survey of a portion of the site was conducted in January 2006. No cultural resources were identified during the survey. Given the degree of disturbance caused by the initial substation development, it is unlikely that any intact cultural resources are located within the Area of Potential Effect (APE). On June 15, 2006, the Oregon SHPO concurred with the delineated APE. No concerns or comments were received from consulted tribes. In May 2008, BPA submitted a letter to the aforementioned tribes and SHPO describing how the project would have no effect upon cultural resources in a small substation expansion area not originally considered during the initial consultation. BPA received concurrence from the SHPO on May 27, 2008. No comments were received from the tribes.

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

Visual Resources

The substation expansion will be constructed next to the existing Slatt Substation. Traffic numbers on local roads are low. No residences are within sight distance of the site. The substation expansion will not greatly alter existing visual resources in the area because it will be an extension of the existing substation and will sit under existing 500-kV lines.

Noise

Intermittent noise will be generated at the site during construction. Construction will be limited to daytime hours. This noise will be temporary and will cease once construction is complete. The substation expansion will generate noise (akin to a low frequency electrical hum) from the operation of the transformer, but this continuing noise level will not be any greater than the noise already generated by the existing substation. Brief, loud bursts of noise, similar to a gunshot, sometimes occur when circuit breakers operate. These occurrences are infrequent. The

[5] Site surveyed with Russ Morgan of the Oregon Department of Fish and Wildlife. March 16, 2006.

substation will comply with federal and Oregon state noise standards. No residences or other sensitive noise receptors are located near the substation site.

Public Health and Safety

During construction, BPA will use standard construction safety procedures to reduce the risk of fire. BPA requires that the construction contractor develop an emergency response plan that includes 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 absorbent 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 & Abatement (PPA) Program will create an environmental requirements document that will guide construction personnel. A member of the PPA staff is assigned to the project, and will be notified immediately in the event of any hazardous material spill. The substation will be surrounded by a fence to provide security and prevent the public from entering a dangerous area.

Socioeconomics and Public Services

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

Air Quality

Temporary amounts of dust will be created by earth moving activities during construction. BPA requires that the construction contractor develop and implement a suitable dust abatement plan to control and minimize dust. BMPs will be used to control dust, 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. No water will be withdrawn from any stream, ditch or water body in the project area unless approved. Construction and maintenance vehicles and equipment will be in good running condition, minimizing emissions.

Wind Project Impacts

The following summary of environmental impacts is based on information in the Application for a Site Certificate for the Shepherds Flats Wind Farm and EFSC's Proposed Order for the project.

Land Use and Recreation

The proposed Wind Project is in north-central Oregon, immediately south of the Columbia River on private land in Gilliam and Morrow counties. The project area has a northern and a southern section. The northern area is grazed; none is tilled. Most of the southern area is cultivated and planted in dryland wheat. All existing land uses will continue to occur in and around the turbines and other facilities during construction and operations.

About 135.9 acres in Gilliam County and about 43.5 acres in Morrow County will be removed from production for the wind turbines and associated facilities. There are no designated recreational facilities or activities on the project site. The land is posted to prevent trespass and hunting. There will be no impacts to recreation from the project.

Transportation

Construction of project roads, facilities and collection and communication lines will occur at about the same time, using individual vehicles for multiple tasks. During construction, construction, delivery and personal vehicles will make about 25 to 50 round trips daily. Most heavy equipment will be delivered via Interstate 84, and most vehicles will exit I-84 at Arlington. About 30 miles of existing public and private roads will be used for the project. About 57 miles of new private roads will be constructed.

Traffic in Arlington will be disrupted, particularly during the delivery of towers and rotors. During facility operation, two to four daily round trips to and from the project site are expected. On an as-needed basis, maintenance vehicles will travel to and from the turbines on the project site; most of this vehicle traffic will be on private roads.

Geology and Soils

The facility site contains two areas with very different characteristics and use, primarily a consequence of soil depth. The northern area of the site is situated south of the Columbia River, and some sections within the site boundary contain portions of the bluffs along the river. The upland area is characterized by shallow soils used primarily for sheep grazing. Areas of bare sand, exposed rock, and soil left bare due to wildfires are also frequently encountered. Within or near the site boundary in the northern area also lie portions of Willow Creek Valley and Eightmile Canyon.

Land in the southern area of the proposed facility has deeper soils and is largely devoted to the cultivation of dryland wheat. Fourmile Canyon passes through the southern area, and Willow Creek Valley lies to the east. Fourmile Canyon (an offshoot of Eightmile Canyon) also has an ephemeral stream.

During construction, the temporary disturbance width of project access roads may be up to 100 feet. Standard construction practices include water application as necessary to reduce wind-blown soil loss. The disturbance area outside the finished width is not graveled, but rather formed from a compacted base of native soil. When the construction phase is complete, these areas will be plowed and planted by the landowner as appropriate. Project access roads interconnect with each other and are available for use by both project staff and the landowner, limiting soil damage caused by cross-field driving.

The proposed project will have no impacts that will result in loss of soil, excessive erosion, or alteration of local geology.

Vegetation

The project area contains grazed and ungrazed shrub-steppe and native plant communities. There are also isolated juniper trees, riparian areas, and crop and rangeland. Cheatgrass,

bluegrass species, fescue species, crested wheatgrass, and intermediate wheatgrass are common grass species. Other dominant plants include yarrow, lupine and arrowleaf balsamroot. No federal- or state-listed plant species were found during field surveys of the project area.

Construction activities will temporarily impact up to 180 acres and permanently impact up to 184 acres. After construction all disturbed areas, except the areas needed for permanent facilities, will be restored with native grasses and shrubs or will be managed as cropland or rangeland.

A 435-acre parcel of land just outside the project areas has been identified that will have approximately 166 acres of habitat restored to mitigate for the Wind Project's impacts to plant and wildlife habitats. Restoration activities on those 166 acres of habitat mitigation area will include the elimination of livestock grazing, weed control, fire control, erosion control, and habitat protection.

Wetlands and Water Resources

Fourmile Canyon contains an intermittent creek. Willow Creek, a perennial stream that sits just outside the project boundary to the east, will not be affected by construction of the Wind Project or the interconnection facilities. Some small springs have been developed into stock-watering ponds or altered to flow into stock-water troughs. A number of ephemeral drainages are located within the project area. Only ephemeral drainages will be affected by the proposed project, as some of the new and existing roads will cross them. The project is not within a 100-year floodplain. Wetland surveys were conducted for the project and no wetlands were identified that will be impacted by the project. Groundwater is found in porous zones in underlying basalt. Water from existing wells will be used for dust suppression during construction.

Construction could locally increase storm runoff and expose some soils to erosion, but since most of the project is located in an upland area far away from wetlands or streams, wetlands and water resources are not likely to be affected. The Wind Project will follow a Stormwater Pollution Prevention Plan to reduce any potential impacts to wetlands and water resources.

Fish and Wildlife

Fish

There are no perennial streams in the areas planned for wind turbines. Willow Creek is to the east of the wind turbine strings. According to anecdotal evidence, Willow Creek supported Summer steelhead, and is designated as Essential Fish Habitat (EFH) for Chinook salmon. However, steelhead are not currently present due to downstream passage obstructions and low flow problems. Resident redband trout are known to occur in the more suitable reaches and headwater tributaries of Willow Creek. Riparian vegetation in the Willow Creek drainage is estimated at less than 25 percent of historic levels. Willow shrubs and cottonwood trees are limited.

No work is planned within Willow Creek. Runoff from roads and wind farm facilities will be controlled with BMPs and are not expected to contribute to sediment or pollutant loading of

Willow Creek. Any fish present in Willow Creek are not expected to be affected by the proposed project.

Terrestrial Wildlife

Terrestrial wildlife species that may be found in the area include mule deer, antelope, white- and black-tailed jackrabbits, badgers, coyotes, porcupines, marmots, pocket gophers, ground squirrels, rabbits, voles, mice and other small animals.

Impacts to wildlife will be mostly local and temporary due to construction disturbance. Construction activities will tend to displace those wildlife species in and around the construction sites, but will not result in permanent displacement over time in those areas where temporary disturbance will take place. Temporary disturbance to wildlife habitat will total a maximum of 180 acres.

The Oregon Department of Fish and Wildlife's Willow Creek Wildlife Area and the BLM's Horn Butte Tract (designated as an Area of Critical Environmental Concern) are within 2 miles of the proposed facility site. However, no construction is proposed in or near these areas, so no wildlife or habitat in these areas will be affected.

Permanent impacts to wildlife habitat will total approximately 184 acres. The majority of the disturbed area (both temporary and permanent) includes grasslands and agricultural areas, with minor amounts of shrub-steppe. Thus, the majority of impacts will be to grassland species such as squirrels, mice and other small mammals.

Impacts to wildlife and wildlife habitat will be mitigated by the restoration of an adjacent 435-acre parcel of land containing shrub-steppe and other habitat that is currently degraded.

Avian Species

Avian use studies identified over 60 species of birds within the wind project boundaries during site surveys. Common birds found in the project area include horned lark, Western meadowlark, blackbirds, ravens, crows, red - tailed hawk, Swainson 's hawk and other birds.

Using a regional (Northwest) fatality estimate range of 0.9 to 2.9 (average of 1.9) avian deaths/MW/year, the range of potential fatalities for the 909 MW Wind Project could be between 818 and 2,636 birds per year, likely averaging approximately 1,727 birds per year. Using deaths/MW may overestimate expected fatality numbers for the Wind Project depending on which turbines are used. Most of the mortality data collected to date is from wind farms that use 1.5 MW turbines. If the Wind Project uses 3.0 MW turbines, each turbine, although producing double the power output of the 1.5 MW units, is not likely to cause double the number of bird fatalities because the rotor-swept area is not twice as big.

Raptors

The area surveyed within 2 miles of the project boundaries contained six active red-tailed hawks nests, one Swainson's hawk nest, one golden eagle nest, and two great horned owl nests.

Raptor mortality at the Wind Project is expected to be low to moderate given relative moderate raptor use of the site, and the documented low raptor mortality observed at other new wind projects using similar turbines in the U.S., outside of California. The regional raptor mortality ranges from of 0 to 0.14 fatalities/MW/year (average of 0.05). Based on monitoring results of other regional projects and raptor use documented at the project site in 2005, estimates of raptor mortality for the Wind Project may range between 0 and 127 raptors per year, likely averaging about 45. Most fatalities of diurnal raptors will likely consist of red-tailed hawks and American kestrels.

Mitigation measures to reduce impacts to raptors will be taken if fatality monitoring (which is reported to ODFW) exceeds a threshold of concern (0.09 fatalities/MW, 0.06 for raptor species of special concern), and will be determined based on the species affected, the location where they are affected, and other variables agreed to by ODFW and the wind farm owner.

Passerines

Based on results of other regional projects, and estimates of passerine fatalities observed at other newer generation wind power projects in the western United States, an approximate range of 563 to 1,818 songbird fatalities per year (average of 1,190) or 0.62 to 2.0 fatalities/MW/year is predicted for the Wind Project. The largest number of fatalities will likely be horned larks, a common grassland songbird frequently detected during the surveys. Western meadowlarks may also collide with turbines. Impacts to individual western meadowlarks will likely be related to vehicular activity on-site. These ground-nesting species spend a considerable amount of time on the ground and could be struck by vehicles on occasion. Various swallow species may occasionally interact with turbines and night-migrating golden-crowned kinglets may collide with turbines. No other species (day or night-time migrant or resident nester) is anticipated to make up a large proportion of the fatalities, based on the patterns of results of other regional studies for projects that are operating in a native habitat/agricultural environment.

Waterfowl

The project area is sometimes used by Canada geese, especially during the winter period as they forage in grain fields. Some waterfowl mortality may occur from the project, but based on available data from other projects, the numbers are expected to be very low.

The only shorebird observed in the turbine development area of the Wind Project was long-billed curlew, a State Sensitive species. No long-billed curlew collision fatalities have been found at any existing wind projects, though some wind projects have been constructed at sites where long-billed curlews were recorded during baseline avian-use studies. Use by curlews at the Wind Project site is higher in the northern portion of the site, so some collisions could occur in that area. While long-billed curlews may be at risk for collision with turbines whenever they occur in the project area, they may be at increased risk during pair formation, when they are performing their aerial displays.

Curlews are also known to be susceptible to human disturbance during the breeding season, which can result in nest abandonment or disruption of important parental behaviors such as brooding chicks. Loss of suitable habitat may reduce social behaviors or reduce nesting

opportunities. Construction activity will be avoided within 0.5 miles of long-billed curlew nesting habitat during the nesting season, including areas within the Horn Butte Wildlife Area.

Operational noise generated by the turbines is not expected to be a significant source of disturbance to nesting long-billed curlews or to other nesting avian species. With mitigation, impacts to long-billed curlews is expected to be low.

Other Birds

Some upland gamebird mortality has been documented at wind projects. It is not clear if these mortalities were caused by turbine towers or blades. Also, there are likely some collisions with project vehicles traveling through the project. Based on habitat present, results from other regional wind projects, and the presence of a few gamebirds (primarily pheasants) during the project baseline surveys, there is potential for mortality of some upland gamebirds to occur. The occurrence, however, is expected to be infrequent.

The presence of wind turbines may alter the landscape so that wildlife habitat use patterns are altered, thereby displacing wildlife away from project facilities. Recent grassland bird study results suggest there are relatively small-scale impacts of the wind facility on grassland passerines. Grassland species as a whole appear not be have been impacted through loss of habitat in the studied areas, and habitat mitigation is providing suitable habitat over time to compensate for the project footprint habitat impacts.

Bats

The primary impact to bats will be collision mortality. Available evidence indicates that this will be confined primarily to migratory species. Bat mortality estimates have been made for existing wind projects in the Pacific Northwest, where they have ranged from 0.63 to 2.46 (average 1.43) bats/MW/year (with the same caveat discussed under the avian impacts section regarding the use of 3.0 MW turbines). Most bat fatalities were hoary bats and silver-haired bats. Most mortality has occurred from mid-summer through early fall, coinciding with the fall migration period.

There is little potential foraging habitat and limited roosting habitat for bats in the vicinity of the Wind Project. No aquatic habitat is present onsite for bats to drink or forage for insects over open water. Only five species of bats are likely to be resident in the area and they are unlikely to be affected by construction of the turbines. The turbine locations are open arid environments that are often windy. Open surface water ponds and pools (bat foraging and drinking sites) will not be impacted during the construction or operation of the project and no deciduous trees or snags (bat roosting habitat) will be impacted. Therefore, construction of the project will not result in the loss or degradation of bat habitat in the project area.

Using the regional per MW per year range, bat mortality during operation of the Wind Project is expected to range from 572 to 2,236 (average 1,299) bat fatalities for the 909-MW project. Species composition will likely be similar to that at other wind projects, with silver-haired and hoary bats comprising most of the fatalities.

Based on knowledge gained from monitoring at other wind projects in the region, it is expected that two bat species (the hoary bat and the silver-haired bat) have the potential to migrate through the area. Although bat inventories and studies are almost non-existent in the general area, based on all available information, no threatened or endangered bats are likely to occur. No state

sensitive status bat species have been documented within and near the Wind Project area; only the silver-haired bat (sensitive-undetermined status) is likely to occur due to its potential migratory movements through the general area. Risk of turbine collision for this species is high based on results available for adjacent wind projects.

State and Federal Threatened and Endangered Species

The following species with federal or state status are listed for Gilliam and Morrow counties:

Species	Federal Status	State Status
Greater Sage Grouse (*Centrocercus urophasianus*)	Candidate	State Sensitive - Vulnerable
Bald Eagle (*Haliaeetus leucocephalus*)	none	Threatened
Washington ground squirrel (*Spermophilus washingtoni*)	Candidate	Endangered
Canada Lynx (*Lynx canadensis*)	Threatened	none
Gray Wolf (*Canis lupus*)	Endangered	Endangered
Grizzly Bear (*Ursus arctos horribilis*)	Threatened	none
Chinook Salmon (*Oncorhynchus tshawytscha*)	Threatened	Threatened
Steelhead (*Oncorhynchus mykiss*)	Threatened	State Sensitive - Vulnerable
Sockeye Salmon (*Oncorhynchus nerka*)	Endangered	none

Sage Grouse

The historic distribution of the greater sage grouse includes Gilliam County, however there are no records of current detections in either Morrow or Gilliam counties and there were no observations of this species recorded during the on-site wildlife surveys. Suitable habitat for the species includes foothills, plains and mountain slopes where sagebrush is present. Little suitable habitat exists within the site boundary. The Wind Project is unlikely to have an effect on sage grouse, because habitat for the species is lacking in the project area, and no sage grouse have been observed in or near the project area.

Bald Eagle

Bald eagles winter along the Columbia River north of the project area. The eagles concentrate their foraging and roosting in areas along or close to the Columbia River, but they scavenge on carrion and small mammals in the upland areas. Only one observation was recorded during the on-site wildlife surveys.

To mitigate any risk to bald eagles from wire strikes and electrocution, most of the facility collector lines will be placed underground. All aboveground transmission line structures will be designed in accordance with the Avian Power Line Interaction Committee (APLIC) guidelines to reduce the risks of wire strikes and electrocution. Meteorological towers will be non-guyed structures to eliminate the risk of avian collision with guy-wires, and turbine towers will be smooth tubular structures rather than lattice towers to avoid creating perching opportunities. For turbine types having pad-mounted step-up transformers, the transformer cabinets at each turbine will be designed to avoid creation of artificial habitat for raptor prey.

Standardized fatality searches of turbine tower areas and ongoing monitoring of all facility structures will take place after construction. CSF will report any bald eagle fatalities attributable to collision with wind turbines or other facility structures to the Oregon EFSC and Department of

Fish and Wildlife. Additional mitigation may be required if the fatality rate for raptor species including bald eagles exceeds a level of concern. Based on the limited use of the facility site by bald eagles and the proposed mitigation measures, the project is unlikely to cause more than isolated bald eagle fatalities.

Washington Ground Squirrel

The Washington ground squirrel (WGS) was abundant in sagebrush and native bunchgrass habitat throughout the Columbia plateau, including Gilliam and Morrow counties, but has declined significantly. The current range of the WGS is unknown, but is generally thought to be greatly reduced from the historic range, largely due to agricultural and grazing activities and other development that have fragmented and disturbed native vegetation. The squirrel occupies burrow systems requiring deep soils with high silt content. In Oregon, these conditions are predominantly found in Warden soils. Suitable deep soil is present in the southern project area. Except in areas too steep to cultivate, the deeper soils in the southern project area are cultivated for dryland wheat, making these areas unavailable for WGS habitat. Soil depth in the northern project area is generally too shallow to provide suitable habitat.

WGS occur within the analysis area. On-site wildlife surveys in 2002-2004 found no signs of WGS activity within the area searched. A biologist observed a WGS colony off-site but near the site boundary. This colony was used as a reference site to help identify WGS burrow characteristics during the rest of the survey. Systematic surveys for WGS were conducted in 2007. The survey included all areas of suitable soil for WGS burrows within the site boundary and a 1,000-foot buffer outside the site boundary (a total area of approximately 26 square miles). The surveyors identified five WGS sites in addition to the reference site. Four of the five sites, as well as the reference site, are outside the Wind Project boundary. All but one of the sites (including the reference site) lie well outside the site boundary and outside the 1,000-foot buffer area. These sites were not within the survey area and were observed incidentally. The surveyors found one WGS colony complex in the survey area, consisting of three areas of burrow entrances. Only one of the burrow entrance areas lies within the site boundary, and the larger portion of the complex lies outside the site boundary. The surveyors observed two individuals and fewer than ten burrow entrances within the site boundary.

In March 2008, the proposed transmission line corridor along Fourmile Canyon Road was moved to land not previously surveyed for WGS. A supplemental survey was conducted within a search area that included the proposed corridor plus a 1,000-foot buffer outside the site boundary. The supplemental survey followed the same protocol as the 2007 survey described above. No WGS or WGS burrows were observed.

All WGS habitat will be avoided during construction and operation of the proposed Wind Project and no construction will take place within 1,000 feet of squirrel habitat when the squirrels are active (generally between early March and the end of May). The status of the WGS colony within the site boundary will be assessed beginning in the first WGS activity period after construction begins and annually thereafter through the second year after the facility becomes commercially operational.

Soil conditions and physical constraints from current land uses make it unlikely that the existing WGS colony will expand farther into the Wind Project site. With the mitigation measures, the proposed Wind Project will have no effect on WGS.

Canada Lynx, Gray Wolf, and Grizzly Bear

Although the historic distribution of these three species includes Gilliam and Morrow counties, they are now extremely rare or non-existent within Oregon. There are no recent recorded detections of these species in either Morrow or Gilliam counties, and these species were not observed during on-site wildlife surveys. Because these species are not present in or near the project area, the Wind Project will have no effect on these species.

Fish

Three listed fish species in the analysis area are anadromous species that travel the Columbia River north of the facility site. The fish may be present in Morrow and Gilliam counties, but there are no perennial streams within the site boundary that can support these species. Facility construction will not consume water from any streams that function as habitat for these species. The project will have no effect on listed salmon and steelhead.

Historic/Archeological Resources

Cultural resources were discovered during a survey of the project area at one location in the northern section. This site consisted of an extensive lithic scatter with artifacts. These resources will be avoided during construction and operation. If impacts cannot be avoided, treatment plans will be developed to minimize and mitigate the adverse effects to these resources. If a cultural resource is discovered during construction, the construction activity will cease in the vicinity of the site and the state and affected tribes will be notified.

Visual Resources

Wind energy facilities have no emissions to affect visibility during facility operation. During construction, dust suppression measures will reduce the potential for visible dust clouds.

Wind turbine towers will be visible from some locations within protected areas. Three of the identified protected areas are associated with the John Day River and are more than 17 miles west of the project site. The John Day Federal Wild and Scenic River and the John Day State Scenic Waterway are managed, in part, for outstanding scenic quality. The visual impact analysis shows that the proposed wind turbines will not be visible from viewpoints on the river. The John Day Wildlife Refuge is not managed for scenic views, but is protected because it provides wildlife habitat. The proposed project will not have a significant adverse visual impact on the John Day Federal Wild and Scenic River, the John Day State Scenic Waterway or the John Day Wildlife Refuge.

The Willow Creek Wildlife Area and the Horn Butte Wildlife Area are within 2 miles of the proposed facility site. Turbines will be visible from these areas. Turbines might be visible from locations within the Umatilla National Wildlife Refuge, but from a distance of more than 17 miles. These three protected areas are protected because they provide wildlife habitat. They

are not protected or managed for scenic views. Although parts of the project might be visible from the Willow Creek Wildlife Area, the Horn Butte Wildlife Area and the Umatilla National Wildlife Refuge, the visual impact of the impact of the facility will not result in a significant adverse impact to these protected areas.

The current project area includes portions of the Oregon Trail, some parts of which have wagon ruts still visible. The initial project proposed would have impacted the Oregon Trail, but the Wind Project now proposed will avoid disturbing the Trail by having no project facilities, access roads or work areas sited on the identified rutted remnants of the Oregon Trail. No project facilities, access roads or work areas will be sited on undeveloped land where the trail alignment is marked by existing Oregon-California Trail Association markers. CSF will provide pre-construction photographic documentation of the presumed Oregon Trail alignments within the site boundary.

Noise

Temporary construction noise will occur from building access roads, wind turbines, substations, and transmission lines.

Permanent noise will occur from operation of the wind turbines themselves; the turbine blades passing through the air and the gear box and generator located in the nacelle. Noise from the blade is reduced with an aerodynamic blade and materials that provide a smooth finish on the blades. To mitigate noise from the gear box and generator, these components are totally enclosed and insulated in the nacelle. Noise will be generated on an intermittent basis depending on wind velocity and duration.

Overall, wind turbines are typically quiet, but the noise generated by wind turbines is likely to be the most noticeable at low wind speeds (8 to 12 miles per hour [mph]). Wind turbine noise tends to be masked by other background sources (i.e., the sound generated by the wind) at higher wind speeds.

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, sources on new sites may not increase the noise levels by more than 10 dBA (decibels on the A-weighted scale) unless the person who owns the noise sensitive property executes a legally effective easement or real covenant that benefits the property on which the wind energy facility is located. This effectively allows for a noise level of no more than 36 dBA (26 dBA background + 10 dBA increase) at noise sensitive properties. Wind turbines and transformers can cause noise that may exceed the noise limit and would require mitigation.

Because of the recommended conditions required by EFSC, the proposed facility will comply with the applicable state noise control regulations.

Public Health and Safety

Fire risk from construction activities include dry vegetation coming in contact with an ignition source, such as catalytic converters on vehicle exhaust systems, smoking by construction

personnel, use of explosives, electrical arcing, and use of welding equipment. There is a small risk of accidental fire or explosion during operation and maintenance as a result of careless smoking practices, catalytic converters coming in contact with dry plant material, or a turbine mechanical failure. The site could also be impacted by range fires that originate off site, or from lightning. Most of the electrical connection system will be buried, minimizing the potential for fire. However, the overhead transmission line could, in unusual circumstances, cause a fire from a broken electrical cable or sagging of the line into vegetation during periods of very hot weather. The appropriate maintenance of vegetation within the transmission line corridor and line voltage regulation will minimize this potential impact.

Fuel and lubricating oils from construction vehicles and equipment are potential sources of hazardous material that could accidentally leak or spill during construction, operation and maintenance. Potential spills or leaks could occur during refueling or equipment maintenance, but could also occur from equipment failure or an accident. Some turbine components also include lubricating oils and coolants that could be released if a component containing these materials was damaged during construction. Mineral oil used in turbine transformers and at the substations could also be accidentally released by damage caused during transport or installation.

Electromagnetic fields (EMF) are produced when electricity flows through a conducting material or is used by an electrical device or appliance. In particular, magnetic fields are the result of electrons moving through a conductor or electrical device and electric fields are a result of the force (voltage) that drives the electrical current. EMF will be associated with the turbines, turbine transformers, the underground collection system, the substations, and the overhead transmission lines. Although there have been numerous studies on the potential health effects from EMF, the studies remain inconclusive showing no or weak associations with effects on health.[6]

Socioeconomics and Public Services

The project will not increase the need for public services. There will be no significant increase in permanent population as a result of construction and operation of the project. During construction most workers will permanently or temporarily reside in the local area (approximately 250 workers over the course of construction). Operation will not require a large number of people (about 35 permanent full-time employees). The project will not result in a significant increased need for public services, including fire and police protection. 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.

The Wind 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

[6] Minnesota Department of Health, [undated]. Electric and Magnetic Fields, Frequently Asked Questions, Web site: http://www.health.state.mn.us/divs/eh/radiation/emf/#risks, accessed December 5, 2005.

National Institute of Health Sciences and the National Institute of Health. June 2002. EMF Electric and Magnetic Fields Associated with the Use of Electric Power. Web site: http://www.doh.wa.gov/ehp/rp/xray/emf202.pdf, assessed December 5, 2005.

will help farmers retain their farms when farm prices reduce other sources of farm income. A substantial increase in the Morrow and Gilliam counties' tax bases 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 would increase slightly. CO emissions will be temporary and limited to the immediate area surrounding the construction site.

Wind farms help off-set the production of air pollutants and greenhouse gasses by replacing a small percentage of energy that otherwise would have to be generated, presumably, by traditional, 'dirtier' energy sources such as a gas or coal fired turbines. 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 source are expected.

Cumulative Impacts

The BP 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 and are reasonably certain to be built in the region. According to the cumulative impacts analysis prepared for the project,[7] approximately 4,060 MW of wind power is proposed in the Columbia Basin within 60 miles of the project area and is reasonably certain to be built. This figure and analysis area is used in the following sections discussing cumulative impacts. Other projects are in the early planning phases and may or may not be constructed, thus there is no reasonable certainty that they will be constructed.

[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.

Land Use and Recreation

Overall, wind projects and associated facilities, including substations, 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, which can occur around most wind project facilities. Wind lease payments provide a supplemental source of income for farmers, helping them weather the uncertainties of agricultural yields and prices.

Local land use regulations in Gilliam and Morrow counties require county land use approval prior to construction of additional facilities. Oregon EFSC requires that projects over a certain size apply for a site certificate. These permitting processes are designed to prevent incompatible uses and the degradation of farmland. The potential for cumulative impacts will be substantially minimized by these regulations.

Wind projects and associated facilities have little direct impact to recreation in agricultural areas. Any private hunting opportunities allowed by landowners could continue after construction and during turbine operation. Some vandalism of facilities may occur. For this project, and other wind projects, mitigation has been required to avoid impacts to established recreation sites.

Geology and Soils and Flood Hazards

Construction of energy projects close together could increase the flooding and erosion potential in flood-prone areas as a result of the decrease in soil storage area. Additional wind projects and associated facilities needed in the future could increase the potential for erosion, but standard control and containment measures would limit permanent impact.

Vegetation and Wildlife

Terrestrial Wildlife

The current and proposed wind projects near the analysis area will 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.

Birds

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. All constructed, planned, and under construction wind projects within 60 miles and including CSF's Wind Project would contribute about 4,060 MW of power. 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.

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, and on average about 200 raptor deaths per year.

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 red tail and kestrel 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 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 avian fatality at wind projects studied (approximately 69 percent of all avian fatalities). Both migrant and resident passerine fatalities have been observed, with migrants generally making up 20-30 percent of the avian fatalities. Assuming that 69 percent of all bird mortality would be passerine fatalities between approximately 2,518 and 8,125 and on average 5,323 passerine deaths per year in the region would occur. Some impacts are expected for nocturnal migrating species; however, impacts are not expected to be great 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 4,060 MW of wind power expected to be constructed. Passerine species most common to the project sites will likely be most at risk, including horned lark and western meadowlark. Horned larks represent approximately 35 percent of the avian fatalities in the Columbia Plateau Ecoregion at 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 existing breeding bird surveys, 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 (approximately 679) would be during the breeding season. This 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 considered migrants spread over many species. The most common migrant fatality (9 percent) was golden-crowned kinglet. Golden-crowned kinglets are typically associated with

treed 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 farther 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. Three introduced species, ring-necked pheasant, chukar, and gray (Hungarian) partridge, are the most commonly found non-passerine fatalities. Estimates for upland gamebird 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 gamebird 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).

Bats

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 4,060 MW of wind power is constructed.

Only four species of bat fatalities have been documented for six wind projects monitored in the Columbia Plateau Ecoregion (silver-haired bat, hoary bat, little brown bat, and big brown bat) The species at highest risk appear to be foliage dwelling (forest, trees) fall migratory species. The annual period when most bat fatalities occur is in August and September. Hoary and silver-haired bats are widespread 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 farther south in Central America.

Unlike for 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 bat and silver-haired bats are widely distributed in North 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.

Since it is most likely breeding populations from surrounding mountainous/forested ecoregions or from more northern areas (e.g., Canada) that are affected at the Columbia Plateau wind projects during the fall migration, the dynamics of these populations would need to be known to predict population effects. If these populations are large and stable the level of impact is not expected to be significant. However, if population trends are decreasing, the added impact from wind development may continue to cause population declines. This information is generally unknown and future study is needed before the significance of the impacts can be estimated.

Wetlands and Water Resources

Wetland, water quality, and water use impacts related to new wind generation projects would be temporary and minor, and subject to further regulatory approvals. Wind projects can be located to avoid these resources.

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 throughout many counties, the impacts are not likely to be concentrated, so loss of cultural artifacts from an entire cultural source is unlikely. Wind projects can be located to avoid these resources.

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 of Gilliam and Morrow counties and surrounding counties, visual impacts of wind energy would be experienced by residents of these rural areas. Turbines would also be visible to people traveling through the counties on public roads near the wind project areas. The significance of the visual changes varies according to the location of the wind projects and the perceptions of the viewers (some viewers find that wind energy projects add a positive element to the visual environment, while others disagree).

Noise

Significant noise issues associated with wind generation projects are limited to the construction period of the project. No operational impacts are anticipated other than the sound of the blades when the turbines are operating and intermittent noise associated with substation operations. State and county approvals have required large setbacks for turbines from residences or noise easements, and these measures reduce the impact of operational noise from individual turbines.

Public Health and Safety

Any potential risks to the health and safety of workers or the general public associated with the construction, operation, and maintenance of wind projects would be incidental and comparable to

other construction projects. State and county approvals have required large setbacks from public roads and residences to reduce the potential risks to the public from wind projects.

Socioeconomics and Housing

Wind lease payments to farmers provide a supplementary source of income that helps 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.

Public Services and Utilities

Cumulative impacts on public services and utilities would be largely dependent on facility siting. Emergency services would have a higher demand with the additional facilities to cover. However, this additional demand could be offset by additional tax revenue.

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.

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 them 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.

MITIGATION

Specific resource mitigation conditions to avoid or minimize environmental harm from the Wind Project were identified through the Oregon Department of Energy and EFSC facility siting 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 BP EIS, BP ROD and additional copies of this Shepherds Flat 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 the Shepherds Flat Wind Project into the FCRTS at Slatt Substation in Gilliam County, Oregon. The LGIA provides for interconnection of the Wind Project with the FCRTS, the operation of 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 BP 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 Slatt 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 *July 18, 2008*

Stephen J. Wright
Administrator and
Chief Executive Officer

Date

Filename: Shepherds Flat Tiered ROD.doc
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Title: ADMINISTRATOR'S RECORD OF DECISION
Subject:
Author: Computer Service Center
Keywords:
Comments:
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