Michelle, Kayce (UTC)

From: repar [[redacted]@saw.net]
Sent: Friday, August 27, 2010 10:06 AM
To: EFSEC (UTC)
Subject: Comments-Whistling Ridge-Repar-2
Attachments: Hearing Examiner Decision (SEP-08-35)_Feb2009.pdf; Comments_DEIS_Chap. 3 _Environment_Impacts_Mitigation_27Aug2010.doc

Importance: High

Dear EFSEC,
Attached please find my comments on Chapter 3 and cumulative impacts, plus a supporting document. Thank you.

Mary J. Repar
[redacted] E. Loop Rd. [redacted]
Stevenson, WA 98648
Tel: 509.427.[redacted]
E-mail: [redacted]@saw.net
"Life is not measured by the number of breaths we take but by the moments that take our breath away."

Mary J. Repar
[redacted] E. Loop Rd., [redacted]
Stevenson, WA 98648
Tel: 509.427.[redacted]

27 August 2010

EFSEC
905 Plum Street SE
Olympia, WA 98504-3172
e-mail: [redacted]@commerce.wa.gov

BPA
Public Affairs Office – DKE -7
P.O. Box [redacted]
Portland, OR 97293-4428
Toll-free comment line: 800.622.[redacted]
FAX: 503.230.[redacted]
503. 230. [redacted]
www.bpa.gov/comment

Re: Comments on the Whistling Ridge DEIS, Chapter 3, Affected Environment, Impacts, and Mitigation; and, lack of cumulative impacts and effects analyses in the DEIS.

Dear EFSEC and BPA,

In this section, I am commenting upon the lack of any real, science-based cumulative impacts analyses done by either BPA or SDS Lumber, in Chapter 3 (p.3-1 to 3-289), Affected Environment, Impacts and Mitigation as presented in the Draft Environmental Impact Statement (DEIS). My ***Comments** are italicized and **bolded** after each section that I commented upon,* for the entirety of Chapter 3. (I saved Chapter 3 in text format so the tables and other pictures are not displayed properly). In order to preserve my sanity during my perambulations through 1500+ pages of the DEIS, I have had to also write a few separate memos, which I will also e-mail, upon certain specific areas that I had to research more thoroughly.

3.0 AFFECTED ENVIRONMENT, IMPACTS AND MITIGATION

This chapter describes the existing environmental resources in the vicinity of the proposed project and the potential impacts that the Proposed Action and the No Action Alterative would have on those resources. The potential impacts described were determined through research and field observation by environmental specialists and information provided by agency and public comments. More specific information on methodology for each resource is provided as appropriate. Each resource lists the mitigation measures that would lessen impacts and the impacts that would be unavoidable.

Toward the end of the chapter, cumulative impacts are described, followed by discussions of intentional destructive acts, relationship between short-term uses of the environment and long-term productivity, and irreversible or irretrievable commitments of resources.

3.1 EARTH

This section discusses the existing setting and potential project impacts related to geology, soils and topography. This analysis includes potential impacts of the Proposed Action on resources, and potential impacts of geologic hazards such as earthquakes or landslides on the project. This section includes information submitted as part of the Application for Site Certification (Appendix A) and the background data to that document (Appendix B Geotechnical Report).

3.1.1 AFFECTED ENVIRONMENT

3.1.1.1 Topography

The 1,152-acre proposed wind project site is situated on a series of north-trending ridges that range in elevation from approximately 2,100 to 2,300 feet above mean sea level (msl). The land west of the proposed project site drops sharply to a narrow river terrace and then to an elevation of less than 800 feet above msl in the Little White Salmon River valley. The topography northeast of the site drops gradually toward the White Salmon River or climbs gently up the northeast flank of Underwood Mountain at 2,728 feet above msl. To the south, the topography drops to a terrace of largely agricultural use and then toward the Columbia River. Figure 3.1-1 shows the site topography.

3.1.1.2 Regional Geology

The White Salmon, Washington area is located within the Cascade Range and the Columbia Intermontane Physiographic Province. The project area is located just within the western boundary of the Columbia Plateau, which is located at the western edge of the Columbia Intermontane Physiographic Province. This lowland province is surrounded on all sides by mountain ranges and highlands, and covers a vast area of eastern Washington and parts of northeastern Oregon and western Idaho.

3-1

33758687_115.cdr

Figure 3.1-1

Source: GeoDataScape. Site Topography

The Columbia Plateau is underlain by a series of layered basalt flows extruded from vents (located mainly in southeastern Washington and northeastern Oregon) during the Miocene epoch (between 5.3 and 23.8 million years before present [BP]). Individual basalt flows ranged in thickness from a few millimeters to as much as 300 feet. Where significant time elapsed between successive flows, interflow zones developed. The interflow zones are characterized by the presence of highly weathered basalt and paleosols. These interflow zones are generally significantly weaker than the surrounding basalt and sometimes form basal failure surfaces for large landslide complexes.

Above the basalts are a variety of younger volcanic rocks and sedimentary materials that range from Pliocene (1.8 to 5.3 million years BP) to Holocene (less than 10,000 years BP). Sedimentary rocks are generally thought to underlie the basalts.

Individual geologic units in the general area are primarily Underwood Mountain Basalt., as described in Section 3.1 of the Application for Site Certification (Appendix A). Near-surface rock consists of yellow-gray volcanoclastic rocks, medium to dark gray, fine-grained to medium-grained basalt and andesite, which is fractured into angular gravels, cobbles, and boulders.

Regional geologic maps indicate the presence of Quaternary-age mass wasting landslide deposits located north of Underwood Mountain (Figure 3.1-2). These deposits are mapped as a large landslide, estimated to be approximately 1/3 square mile in area and almost a mile long. However, based on field work conducted in 2007, there is no obvious evidence to suggest the presence of a landslide as mapped on the 1:100,000 scale geologic map. If landslide deposits are present, they have been exposed long enough that most or all of the geomorphic evidence has been removed by erosion.

Comment: Just because there is "no obvious evidence to suggest the presence of landslides" does not mean that the landslide does not exist or that mass wasting is not a definite possibility. What is mass wasting? A Wisconsin geology class syllabus defines mass wasting as follows: "Mass-wasting processes: Mass-wasting processes such as creep, landslides, and debris flows are distinguished from each other in part by whether they occur rapidly or slowly. Landslides are capable of transporting massive amounts of rock and soil downslope for miles in very short periods (e.g. minutes). Creep can also transport much material, but at rates of only millimeters per year. Both are important erosional processes. Rapid mass wasting events such as massive landslides or debris flows are typically triggered by events that destabilize material that resides on steep slopes. Such events include earthquakes, volcanic eruptions, rain or melting snow, and poorly planned landscape alterations by humans (e.g. road cuts or developments that require the removal of material at the bases of slopes)." [Source:http://www.geology.wisc.edu/courses/g112/mass_wasting.html] Hmm, "landscape alterations"? I'm thinking that putting hundreds of tons of whirling propellers on top of impermeable surfaces in a steep-sloped area subject to wind and water erosion is probably not a well-thought out proposal.

3.1.1.3 Local Geology and Soils
Geology

The proposed project site is located within the northern boundary of the Hood River Valley, which extends a few miles into southern Washington. In general, the geology of the area consists of basalt flows extruded from local vents, layered with conglomerate, tuff, tuff breccias, and other volcanoclastic deposits (Figure 3.1-2).

The bedrock underlying the proposed project site consists of Grande Ronde Basalt of the

Columbia River Basalt Group and Quaternary basalt of Underwood Mountain—a shield volcano that lies approximately midway between the lower reaches of the Little White Salmon and White Salmon Rivers. Its southern slopes drain to the Columbia River.

In the project area, these basalt formations are typically overlain by silt and clay soil of varying thickness. Unconsolidated deposits are thin to absent with surface materials consisting primarily of a veneer of brown, silty topsoil that is likely derived from forest duff and wind-blown deposits. The thickness of this material varies across the site from a few inches to three feet. In several areas, bedrock and talus can be observed at the ground surface.

3-3

33758687_116.cdr

Site Geology Source: Korosec, 1987.
Figure 3.1-2

Soils

Soil Types. Figure 3.1-3 shows soils in the project area. The Natural Resources Conservation Service (NRCS) describes the soils in the project vicinity as follows (USDA NRCS 2003):

• McElroy Series. The McElroy series consists of very deep soils (up to 5 feet) formed in colluvium and residuum from basalt with a mantle of volcanic ash that influences soils in the top 9 to 13 inches. The soils exist on the footslopes and backslopes of mountains on slopes from 5 to 90 percent at elevations from 400 to 2,600 feet in eastern Skamania County and western Klickitat County. McElroy Soils are well drained with medium to rapid runoff and moderate permeability. The series was established in 1981 following the introduction of volcanic ash from the eruption of Mt. St. Helens.

• Timberhead Series. The Timberhead series consists of very deep soils (up to 5 feet) formed in residuum and colluvium from basalt mixed with volcanic ash. The soils exist on mountain ridges between 5 and 30 percent at elevations from 2,000 to 3,600 feet in Skamania County and western Klickitat County. Timberhead Series soils are well drained with medium to rapid runoff and moderately high to high permeability.

• Underwood Series. The Underwood series consists of very deep soils (5 feet or more) formed in residuum and colluvium from basalt and andesite with a thin mantle of volcanic ash. The soils exist on benches, backslopes, and footslopes of mountains with slopes between 2 and 50 percent at elevations between 500 and 2,700 feet in southeast Skamania County and west Klickitat County. Underwood Series soils are well drained with slow to medium runoff and moderately high permeability.

• Undusk Series. The Undusk series consists of very deep soils (5 feet or more) formed in residuum and colluvium from basalt and andesite with a thin mantle of volcanic ash. The soils exist on benches, backslopes, and footslopes of mountains with slopes between 5 and 65 percent

at elevations between 2,000 and 2,800 feet in southeast Skamania County and west Klickitat County. Undusk Series soils are well drained with slow to medium runoff and moderately high permeability. Based on the current test pits and field observations, the site soil is best represented as Soil Site Class D (stiff soils). Rock with varying strength and weathering characteristics was encountered at depths ranging from 3 to 12 feet bgs.

Soil Erosion Potential. Erosion is the breakdown and transport of soils and bedrock by natural processes, including water, wind, and glaciation. The susceptibility of any material to erosion depends on chemical and physical characteristics; topography; the amount and intensity of precipitation and surface water; the intensity of wind; and the type and density of vegetative ground cover, if present.

Erosion potential was assessed for the Application for Site Certification, principally based on the erosion potential specified for surficial soils by the NRCS. These erosion factors indicate that the Underwood loam has a high potential for erosion by water and the McElroy, Timberhead, and Undusk units have a medium potential, with the remaining soil types having a low potential. Most soils found in the site vicinity are classified as having a low susceptibility to wind erosion.

3-5

33758687_108.cdr 33758687_108.cdr
Figure 3.1-3

Data Source: USDA NRCS, Skamania County Area, Washington, Soil Survey - Wa659. Soil Classifications

3.1.1.4 Geologic Hazards
Earthquakes

Earthquakes are the result of sudden releases of built-up stress within the tectonic plates that make up the earth's surface. Stress accumulates where movement between plates or on faults produces friction. No faults are mapped within the footprint of the proposed project area. However, faults are mapped approximately 1.5 miles to the southwest and northeast. (Pezzopane 1993 and Geomatrix 1995) Many of these faults are inferred, and shown as dotted lines buried by younger surficial deposits. While the activity of the area faults is unknown, a review of aerial photography showed no indication of recent movement along the trace of the inferred faults.

Comment: "A review of aerial photography is NOT doing geology!! This is a totally inadequate geologic analysis. "Inferred" faults shown as dotted lines (!!) does not mean that there are NOT buried, sub-surface, wide-ranging faults. Ridges have fault lines. I will comment further on the soils issue in a separate memo.

There have been no surface-rupture earthquakes on any fault within northwestern Oregon or southwestern Washington in historic times, and investigations of the regional faults have been limited.

According to the updated National Seismic Hazard Maps published by the US Geological Survey (USGS) in 2008 (Petersen et al. 2008 and USGS 2009), the peak ground acceleration estimated for the area of the Whistling Ridge site is 0.18g for a 475-year return period earthquake (i.e., ground motion with a 10 percent chance of being exceeded in 50 years) and 0.40g for a 2,475year return period earthquake (i.e., ground motion with a 2 percent chance of being exceeded in 50 years).

Large earthquakes at more distant faults could cause prolonged ground movement at the project site. Information on historic large earthquakes can be found in the Application for Site Certification Section 3.1 (Appendix A).

Comment: What does "large earthquakes at more distant faults could cause prolonged ground movement at the project site" actually mean? Does that mean that there will be earth movement downhill? Mass wasting? Does this mean that people and wildlife will be affected? How will they be affected? Does this mean that people would have to leave their homes? Are there evacuation routes? Would there be loss of life and property involved in "prolonged ground movement"? These questions are not answered in the DEIS.

Landslides

As part of the Application for Site Certification, a preliminary landslide hazard evaluation of the project site was conducted by a licensed geologist pursuant to Skamania County Code (SCC) Title 21A, Chapter 21A.06 - Landslide Hazard Areas (LHAs), which are shown on Figure 3.1-4. Skamania County recognizes three classes of LHAs.

• Class I (Severe) LHAs are considered to present a severe landslide hazard and are distinguished as areas of known mappable landslide deposits that have been designated by the local legislative body.

• Class II (High) LHAs are areas with slopes between 20 and 30 percent that are underlain by soils that consist largely of silt, clay or bedrock, and all areas with slopes greater than 30 percent.

• Class III (Moderate) LHAs are areas with slopes between 20 percent and 30 percent not included in Class II.
3-7

33758687_110.cdr

Approximate Turbine
Locations
Figure 3.1-4
Job No. 33758687 Landslide Hazard Areas

The preliminary landslide hazard evaluation concluded that there do not appear to be any areas in the site that meet Skamania County's criteria for a Class I LHA. Figure 3.1-4 shows Class II LHAs in green. The Class II LHAs at the site are predominantly associated with the steep slopes

west of proposed Tower Lines A and B. There are also steep slopes to the east of the seven southernmost Tower Lines A towers, and on both sides of Tower Line C. The Class II areas are generally bordered by smaller areas of Class III.

Volcanic Eruption

The Cascade Mountains of the Pacific Northwest region contain sixteen major volcanoes, which extend from Mount Garibaldi in British Columbia to Lassen Peak in California (Harris 1988). Four of the volcanoes within Washington and Oregon have experienced activity within historic time: Mount Baker, Mount Rainier, Mount Hood, and Mount St. Helens. Mount Adams is the closest volcano to the project site, situated approximately 30 miles due north, but is not historically active. Mount St. Helens is the closest historically active volcano to the project site, situated approximately 42 miles to the northwest.

3.1.2 IMPACTS

3.1.2.1 Proposed Action
Construction

Construction would involve approximately 108 acres of earth-disturbing activities (56 acres of permanent disturbance and 52 acres of temporary disturbance). Activities that would involve earth disturbance include tree harvesting in areas not already cleared; constructing roads and turbine crane pads; constructing foundations for turbine and meteorological towers; trenching for underground utilities; clearing and grading for the substation placement; and clearing and excavating for the foundation for the Operations and Maintenance facility at either of the two alternative locations. Approximately 50 percent of excavated soils are anticipated to be too large for re-use as backfill at foundations. Based on preliminary calculations and depending on the type of foundation design used, approximately 20 cubic yards of excavated soil would remain from each turbine foundation excavation.

Comment: How many truckloads of haul material does all this excavation involve? What will be the impacts on our roads and byways? Will public money have to be used to re-pave or re-construct these roads after all this heavy traffic? Where will all the haul material go?

Roadway improvements would be necessary to accommodate the heavy and long loads associated with the turbine towers. Improvements would be made to approximately 7.9 miles of existing roads, and 2.4 miles of new road would be built. Most of these improvements would be made on the project site, with the exception of off-site improvements to West Pit Road. For areas with steep slopes, it may be necessary to flatten and rebuild the slopes to allow access for the long loads required. Some steep sections of existing or new roads may be graded to create shallower grades, and some tight-radius turns may require localized rerouting of existing roads. West Pit Road would require permanent widening to accommodate long loads. Widening could include removal of trees and other vegetation, along with engineered cut and fill sections (cut and fill volumes will be calculated during final design). The road would not require paving, but would require an all-weather driving surface.

The primary impacts during construction would be potential for erosion, landslides, soil compaction and changes to topography.

Comment: "The primary impacts during construction would be potential for erosion, landslides, soil compaction and changes to topography." IS THAT ALL?!? As the WA State Department of Transportation learned during its rock removal along Highway 14 during the summer of 2010, in Skamania County, when they started an unintended landslide, there is always the very high potential that once you start moving earth, earth does what it wants to and moves where it wills!

3-9

Soils

Because some surface soils on the project site are moderately susceptible to erosion, there is some potential for adverse impacts on the site soil in areas of steep topography during grading and foundation construction, as shown on Figure 2.15-1, Landslide Hazard Classifications, in Section 2.15 of the Application for Site Certification (Appendix A).

Topography

Changes to the topography would include grading turbine foundations and access roads. The changes to topography would be minor to moderate depending on location.

Erosion

The potential for erosion or aggradation would be greatest during the construction process. The NRCS classifies surficial soils at the site as generally having medium erosion potential. During the dry season, soils that are disturbed and stripped of vegetative cover may be susceptible to wind erosion. The potential for erosion by wind and water would be minimized through the use of best management practices (BMPs).

Comment: As far as I could find, the DEIS does not list what these Best Management Practices (BMPS) are. They should be listed, so we could evaluate if they are adequate for this project which proposes to move a lot of earth and has a high potential for erosion and land movement.

Operation

Once the project is constructed, the primary risks would be associated with earthquakes, volcanic activity, and landslides.

Earthquakes

Liquefaction. Liquefaction is a phenomenon whereby soils undergo significant loss of strength and stiffness when they are subjected to vibration or large cyclic ground motions produced by

earthquakes. Saturated soils without cohesive fines (i.e., gravels, sands, and silts) are most susceptible to liquefaction. Other factors affecting the potential for liquefaction in soils are density, amplitude of loading, confining pressure, past stress history, age of soil deposit, the size, shape and gradation of particles, and the soil fabric structure. In earthquakes, liquefaction-induced ground settlement and lateral spreading have been the primary cause for extensive damage to aboveground structures, foundations, and pipelines.

Field investigation concluded that the potential for liquefaction is very low at this site. Test pits excavated at the project site encountered shallow bedrock covered with a combination of cohesive and cohesionless soil. No groundwater was observed in any of the test pits.

Structure failure could occur with enough ground shaking even without liquefaction. However, this hazard would be mitigated by adhering to seismic building codes.

Settlement. Field investigation concluded that settlement and lateral spread induced by a seismic event would be minimal, due to the low liquefaction potential.

Surface Rupture. Surface rupture occurs when a fault breaks to the land surface during an earthquake. Surface rupture is usually associated with moderate to large earthquakes (Mw 6.5 or greater) or rarely during smaller, very shallow events. There are no mapped faults crossing the site. Therefore, the potential for primary surface rupture at the proposed project site is small.

3-10

Volcanic Activity

Effects of volcanic activity may include lava flows, mudflows, pyroclastic flows, and ash-fall. Volcanic flows are typically limited to the flanks of the volcano and major drainage channels extending from the volcano, which for all known volcanoes in the area are located outside the project area. The largest potential impact to the site from volcanic activity would be ash carried aloft that subsequently falls to the land surface. Based on prevailing wind patterns, the USGS (Wolfe and Pierson 1995) estimates that there is between a 0.02 and 0.1 percent annual probability that there would be 4 inches (10 cm) or more of ash deposited at the site from eruptions throughout the Cascade Range (Figure 2.15-2 in the Application for Site Certification).

Landslides

The landslide evaluation conducted for the Application for Site Certification concluded that the project could be constructed and operated without danger to human life or the surrounding environment due to landslide hazards.

Although none of the proposed turbines are located within Class II LHAs, several of the towers along the western side of the project site (Tower Lines A and B) are located along ridgelines with descending slopes that are locally greater than 35 degrees (70 percent). Based on studies conducted for the Application for Site Certification, it appears that the primary concern for towers located adjacent to the Class II LHAs is the potential for headward erosion of the steep

drainages by debris or earth flow processes. Erosion rates of these drainages are unknown, but no obvious recent mass wasting features were observed in the aerial photos or during the site reconnaissance. Further subsurface investigation in support of final tower foundation design would help determine if there are weak rock or soil layers that could contribute to more deep-seated failure of the ridges and provide information on the quality of the rock underlying the ridgelines.

Comment: So, we are to gather from the above statement that "further subsurface investigation" has NOT been done, there is NOT a "final tower foundation design that would help determine if there are weak rock or soil layers that could contribute to deep-seated failure of the ridges"?!? And, that this LACK of a final tower foundation design could "provide information on the quality of rock underlying the ridgelines"? Well, I'm confused. Isn't this DEIS supposed to provide all this information so that a thoughtful, science-based decision can be made by EFSEC and the involved public as to whether this project should even go on? This LACK of information is critical and should be provided in the DEIS.

Class III LHAs were delineated adjacent to proposed wind turbines along the southern Tower Line A and along Tower Line C. Class III LHAs are not anticipated to have any impact on the proposed facilities due to the robust nature of the proposed foundation designs.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant will provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan will address site restoration that would occur at the conclusion of the project's operating life (estimated to be 30 years), and restoration in the event the project is suspended or terminated during construction or before it has completed its useful operating life. The plan will include or parallel a decommissioning plan for the project.

Comment: The initial site restoration plan and the decommissioning plan SHOULD be part of the DEIS and SHOULD also be included in the FEIS. We should all be able to evaluate all of SDS's and the BPA's plans for this proposal, NOW not later, especially if "the initial site restoration plan will…identify, evaluate, and resolve all major environmental and public health and safety issues…including potential changes to soils, topography, or erosion…impacts to earth…mitigation measure…". All of these issues should be addressed in the DEIS and these plans should be available for public comment and input NOW.

The initial site restoration plan will be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential changes to soils, topography, or erosion. If impacts to earth are anticipated to occur as a result of site restoration and project decommissioning, mitigation measures will be proposed as part of the plan.

3-11

3.1.2.2 No Action Alternative

Under the No Action Alternative, no structures would be built and there would be no road construction or improvement. Potential impacts to the site from geologic hazards would continue as under present conditions. Some potential for erosion could continue from ongoing logging activity, as mitigated by Washington State requirements and BMPs.

3.1.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential impacts of the proposed project related to geology, soils, topography, and geologic hazards.

• Prior to project construction, confirm subsurface soil and rock types and strength properties through a detailed geotechnical investigation of the specific locations of all wind project elements, including wind turbines, access roads, underground trenching corridors, electrical grounding systems, and the substation and Operations and Maintenance facility locations.

• If detailed geotechnical investigations indicate potential for slope instability at project facilities, ensure that design of these facilities included proper engineering to account for this risk or relocate the facilities on-site to avoid this risk.

• Prepare and implement a Stormwater Pollution Prevention Plan (SWPPP), Erosion and Sedimentation Control Plan, and Environmental Protection Control Plan to lessen soil erosion and improve water quality of stormwater run-off through stabilization practices, structural practices, and stormwater management. These Plans would be developed and approved by EFSEC prior to construction or modification of any roads or facilities.

• Build all structures on the site in accordance with the seismic design provisions of the 2006 version of the International Building Code, and the American Society of Civil Engineers 07-05 standard. Foundations and buildings would be designed for Seismic Zone 2, and the values listed in Table 3.1-1 would be used for seismic design of the project in accordance with Section 1613.5.3 of the 2006 International Building Code. The occupancy category of the proposed structure is assumed III as per Section 1613.5.6 of the 2006 International Building Code.

Comment: All of the above should be part of the DEIS now, not later. These are all valid questions that should be answered PRIOR to the start of any construction or earth movement. Once a proposal is approved, then the proponent can almost do anything to make sure that it gets done. We should use the PRECAUTIONARY PRINCIPLE and know all the details and facts that it is possible to know PRIOR to any construction and excavation. The detailed geotechnical investigation; ensuring that design of these facilities includes proper engineering; [possible] relocation of the facilities; the Stormwater Pollution Prevention Plan (SWPPP), Erosion and Sedimentation Control Plan, and Environmental Protection Control Plan; and, the seismic design provisions should all be part and parcel of the DEIS, not done after the fact when the public has no recourse for further input and comment.

3-12

Table 3.1-1
2006 International Building Code Seismic Design Values

Parameter Value 2006 IBC/ASCE 7-05 Reference
Soil Profile Site Class C Table 1613.5.2
0.2 Second Spectral Acceleration Ss 0.60 g Figure 1613.5 (1)
1.0 Second Spectral Acceleration Sl 0.20 g Figure 1613.5 (2)
Peak Ground Acceleration (0.4SDs) 0.186 g ASCE 7-05 equation 11.4-5
Site Coefficient Fa 1.16 Table 1613.5.3 (1)
Site Coefficient Fv 1.6 Table 1613.5.3 (2)
Seismic Design Category a D Tables 1613.5.6 (1) & (2)

ASCE – American Society of Civil Engineers
IBC – International Building Code

a. Assumes Seismic Use Group III

• Conduct a visual inspection of project facilities following any abnormal seismic activity. These inspections would look for signs of incipient mass movement in areas identified as potentially susceptible to such failures.

• Implement all stormwater pollution prevention activities prior to any clearing and site preparation. Measures would include installation of a stabilized construction entrance, wheel wash, silt fences, hay bales, temporary and/or permanent water conveyance systems, and installation of temporary and/or permanent retention ponds. Dust would be controlled as needed by spraying water on dry, exposed soil.

• Limit clearing, excavation and grading to those areas of the project site absolutely necessary for construction of the project. Areas outside the construction limits would be marked in the field and equipment would not be allowed to enter these areas or to disturb existing vegetation.

• Inspect any installed run-off and erosion control structures at a frequency sufficient to provide adequate environmental protection. Such inspections would increase in frequency during rainfall periods.

• Store additional erosion control supplies, including sandbags and channel-lining materials, on site for emergency use.

• Divert surface runoff around and away from cut and fill slopes using pipes and/or protected channels. If the runoff is from disturbed areas, it would be directed to a sediment trap prior to discharge.

• Construct all project roads to be gravel surfaced with a low profile. Road construction would be performed in multiple passes starting with the rough grading and leveling of the roadway areas,

if necessary. Once rough grade is achieved, a fabric layer would be installed, base rock would be trucked in, spread and compacted to create a road base. A capping rock would then be spread over the road base and roll-compacted to finished grade.

3-13

• Spread soil and rock that is excavated through grading across the site to the natural grade and reseed with native grasses or seeds to control erosion by water and wind.

• Crush larger cobbles into smaller rock for use as backfill or road material or dispose of off site. Those materials that cannot be reused on site would be disposed of in accordance with Skamania County and Ecology regulations for clean fill materials.

3.1.4 UNAVOIDABLE ADVERSE IMPACTS

The primary unavoidable impacts are the potential for landslide and erosion. Both can be mitigated through appropriate design and the application of mitigation measures, but some erosion would nonetheless occur.

3.1.5 REFERENCES

Geomatrix Consultants (Geomatrix). 1995. Seismic design mapping for the State of Oregon. Unpublished final report prepared for the Oregon Department of Transportation.

Harris, S.L. 1988 Fire and Ice: The Cascade Volcanoes. The Mountaineers and Pacific Search Press. Seattle, Washington.

Petersen, M.D., A.D. Frankel, S.C. Harmsen, C.S. Mueller, K.M. Haller, R.L. Wheeler, R.L.

Wesson, Y. Zeng, O.S. Boyd, D.M. Perkins, N. Luco, E.H. Field, C.J. Wills, and K.S.

Rukstales. 2008. Documentation for the 2008 Update of the United States National

Seismic Hazard Maps. USGS Open-File Report 2008-1128.

Pezzopane, S.K. 1993. Active faults and earthquake ground motions in Oregon. Ph.D. Thesis,University of Oregon, 208 p.

United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS). 2003. Skamania County Area, Washington, Soil Survey - WA659.

US Geological Survey (USGS). 2009. Siesmic Hazard Maps and Data. Accessed at: http://earthquake.usgs.gov/research/hazmaps/.

Wolfe, E.W. and T.C. Pierson. 1995. Volcanic-Hazard Zonation for Mount St. Helens, Washington. USGS I 95-497.

3.2 AIR QUALITY

This section describes the existing air quality conditions in the project area, the potential for impacts to air quality from the proposed project, and mitigation measures designed to avoid or minimize those impacts.

3-14

3.2.1 AFFECTED ENVIRONMENT

Regulatory Overview

The Clean Air Act (CAA) is the primary federal statue governing air quality. The CAA establishes National Ambient Air Quality Standards for six "criteria pollutants," and local agencies may establish Ambient Air Quality Standards themselves, provided that these are at least as strict as federal standards. Local air quality is measured against these national and state standards, and areas that do not meet the standards are designated as "non-attainment" areas. Skamania County does not have any non-attainment areas for air quality1.

Comment: Just because the DEIS states that "Skamania County does not have any non-attainment areas for air quality" does not mean that the air quality in the Columbia River Gorge is good. The OR Department of Environmental Quality and the SW Clean Air Agency have been working for many years on the issue of increasing haze and air quality in the Gorge; they have written very large documents about this issue. Neither agency has had the political will or incentive to actually do anything about the issue. There are air pollution issues in the Gorge and the surrounding environments. Most people who reside in the area or swim in the Columbia River will tell you that they have noticed a degradation of the air and water quality. These issues have not been adequately addressed by any government agency, to date. Which does not mean that air [or water] quality of the Gorge is good or bad, from a science viewpoint. It means that it needs to be thoroughly investigated and analyzed. The DEIS fails to do any adequate air [or water] cumulative impacts analyses.

New stationary sources of air emissions in nonattainment areas must undergo more rigorous permitting than equivalently sized sources in attainment areas, in an effort to bring the nonattainment area back into compliance with the air quality standards. The state of Washington has established rules through Ecology for permitting new sources in both attainment and nonattainment areas of the state, and additional requirements may be imposed by local air authorities. EFSEC issues authorizations for air emissions for sources under its jurisdiction. In general, if potential emissions from stationary sources exceed certain thresholds, approval from the appropriate permitting authority is required before beginning construction.

Under the CAA, new industrial sources of air pollution must receive an air quality permit prior to operation. The two most common permits associated with industrial activity emitting regulated air pollutants are Notice of Construction (NOC)/New Source Review approvals and Prevention of Significant Deterioration (PSD) permits. WAC Chapters 463-39 and 173-400 establish the requirements for review and issuance of NOC approvals for new sources of air emissions under

EFSEC jurisdiction. PSD regulations apply to proposed new or modified "major" sources located in an attainment area that have the potential to emit criteria pollutants in excess of predetermined de minimus values (40 Code of Federal Regulations [CFR] Part 51). For new generation facilities, these values are 100 tons per year of criteria pollutants for 28 specific source categories, or 250 tons per year for sources not included in the 28 categories.

The Project is not required to go through these permitting processes. A NOC is not required for the proposed project because there would be no permanent sources of regulated air emissions, and no backup generation or spinning reserves would be required as part of the proposed project. A PSD permit would not be required; the generation of electricity with wind turbines does not produce air emissions because no fuel is being burned to produce energy.

Comment: Although this proposed wind farm project itself does not, allegedly, have any "permanent sources of regulated air emission, and no backup generation," it does not mean that there are no cumulative impacts on air emissions, because this project is included in BPA's energy production grid and BPA's energy production DOES have CUMULATIVE IMPACTS on REGIONAL AIR QUALITY. It is widely known that X amount of wind energy production requires Y amount of gas plant back-up capability because wind energy is notoriously unreliable and BPA cannot have unreliable sources of energy in the grid. It creates havoc among users and I'm pretty sure it negatively affects BPA's machinery. The effects of wind power on the grid and on the actual BPA hard infrastructure is not addressed in the DEIS and it should be. The public should be aware if there are any dangers associated with the influx of large amounts of energy from wind farms into the energy grid and if the grid can reliably balance this energy influx without hardware meltdowns. BPA should have addressed these issues in the DEIS and their failure to do so is just another fatal flaw in this fatally flawed DEIS.

Although construction emissions are not included in permitting of stationary sources, mobile sources (such as construction equipment and maintenance pickups) are regulated separately under the federal CAA. In addition, Washington State also regulates emissions generated by various construction activities. According to WAC 173-400-300, fugitive air emissions are emissions that "do not and which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening." These emissions include fugitive dust from unpaved roads, construction sites, and tilled land. Fugitive emissions are considered in determining the level of air permitting required only for a certain subset of sources, not including wind power

1 See: http://www.ecy.wa.gov/programs/air/other/namaps/web_map_intro.htm.

3-15

projects. However, pursuant to WAC 173-400-040(8)(a), "The owner or operator of a source of fugitive dust shall take reasonable precautions to prevent fugitive dust from becoming airborne and shall maintain and operate the source to minimize emissions."

Other Washington state regulations that apply to nuisance emissions, including fugitive dust, and various equipment used during construction include the following:

• WAC 173-400-040(2) Fallout states that no person shall cause or allow the emission of particulate matter from any source to be deposited beyond the property under direct control of the owner or operator of the source in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material is deposited.

• WAC 173-400-040(3–3a) Fugitive emissions states that the owner or operator of any emissions unit engaging in materials handling, construction, demolition, or other operation which is a source of fugitive emissions, if located in an attainment area and not impacting any non-attainment area, shall take reasonable precautions to prevent the release of air contaminants from the operation.

• WAC 173-400-040(4) Odors states that any person who shall cause or allow the generation of any odor from any source that may unreasonably interfere with any other property owner's use and enjoyment of his property must use recognized good practice and procedures to reduce these odors to a reasonable minimum.

• WAC 173-400-040(8a) Fugitive dust states that the owner or operator of a source of fugitive dust shall take reasonable precautions to prevent fugitive dust from becoming airborne and shall maintain and operate the source to minimize emissions.

• WAC 173-400-035 Portable and Temporary Sources states that for portable sources that locate temporarily at particular sites, such as rock crushers and batch plants, the owner(s) or operator(s) shall be allowed to operate at the temporary location providing that the owner(s) or operator(s) notifies Ecology or the local air quality authority of the intent to operate at the new location at least 30 days prior to starting the operation, and supplies sufficient information to enable Ecology or the local air quality authority to determine that the operation will comply with the emissions standards for a new source, and will not cause a violation of applicable Ambient Air Quality Standards and, if in a non-attainment area, will not interfere with scheduled attainment of ambient standards. The permission to operate shall be for a limited period of time (one year or less) and Ecology or the local air quality authority may set specific conditions for operation during that period. A temporary source shall be required to comply with all applicable emission standards.

Greenhouse Gases

Greenhouse gases are gases that trap heat in the atmosphere, and are implicated in potential global climate change. Some greenhouse gases such as carbon dioxide occur through both natural processes and human activities. Other greenhouse gases (e.g., fluorinated gases) are created and emitted solely through human activities. The most abundant greenhouse gasses are

3-16

water vapor, carbon dioxide, methane, nitrous oxide, ozone and chlorofluorocarbons2. However, because different gasses have different heat-trapping effects, the most abundant greenhouse gasses are not necessarily the largest contributors to potential climate change.

Greenhouse gases are discussed in this section because in the United States, energy-related activities account for 75 percent of human-generated greenhouse gas emissions, mostly in the form of carbon dioxide emissions from burning fossil fuels. Half of all emissions from energy-related activities come from large stationary sources such as power plants (USEPA 2009).

Largely because of the contribution of hydropower, energy generation in the Pacific Northwest, including the Federal Columbia River Power System, produces less carbon dioxide per MW-hour than any other region in the United States. The Federal Columbia River Power System alone produces about 7,000 average MW of hydro-electricity even in a dry water year, enabling the region to sustain its relatively small carbon footprint.

Comment: "Half of all emissions from energy-related activities come from large stationary sources such as power plants" is not a reassuring statement. Half means 50 per cent, that is 50%. This is not a small amount. The DEIS does not state, as far as I was able to ascertain, how much BPA contributes to greenhouse gases through its entire energy production process. How many power plants back up BPA's hydro-energy production when there is not enough water, or fish protections prohibit BPA from dumping water over the dam? What is BPA's calculated carbon footprint? Why didn't BPA calculate its total carbon footprint for the DEIS? This is another fatal flaw in this document. The statement that hydropower "produces less carbon dioxide per MW-hour than any other region in the United States" is NOT a conclusive statement about BPA's or the wind farms' total cumulative contribution to greenhouse gases! LESS does not mean that BPA and Whistling Ridge and all the other energy production facilities in the region do not contribute CO2 to the total footprint. BPA needs to calculate its cumulative carbon footprint from ALL its energy production facilities and processes. Then we can start to talk about carbon footprints.

Like hydropower, production of electricity from wind produces no direct emissions of greenhouse gasses or other air pollutants. The generation of wind energy also displaces generation from individual fossil-fuel-fired power plants or units, thereby reducing fuel consumption and the resulting air emissions that would have otherwise occurred.

Comment: The statement "production of electricity from wind produces no direct emissions of greenhouse gasses or other air pollutant" is specious. The DEIS does not provide any details on what huge propeller-like blades do to the air and what, if any, gasses are produced by the machinery that is used to run the wind towers. The DEIS does not provide any details on how many gas plants are used by BPA to manage the flexibility and balance of the influx of unreliable wind power generated by all the wind farms producing energy and trying to get it onto our energy grid. If the capability of the hydro system to incorporate wind power will be fully utilized in a couple of years, as the NW Energy Council has stated, then the option to use existing gas-fired power plants, unidentified in the DEIS, would be used to integrate wind more fully into the energy grid. Where are these plants located? How much CO2 do they produce? What is their carbon footprint? What if global climate change negatively affects the winds that are now powering some of these wind farms, will more and more gas-fired plants have to be brought online, thus eliminating any benefits that may accrue to wind power? Where is BPA's Wind Integration documentation? If, as the NW Energy Council states, we

can achieve 85% of load growth can be met, through the use of technologically proven efficiencies in our homes, commercial spaces, lighting, etc., then why do we need so many wind farms and gas plants that degrade our environment and our quality of life? These questions need to be answered in the DEIS. The NW Energy Council sees conservation and "improved efficiency of electric use" as the best choice for the region. See the Sixth NW Electric Power and Conservation Plan Overview, below, put out by the NW Energy Council:

Sixth Northwest Conservation and Electric Power Plan

Sixth Power Plan Overview

Summary.....1
Future Regional Electricity Needs.....2
Resource strategy.....3
Efficiency.....4
Generation Alternatives.....5
Climate Change Policy.....6
Capacity, Flexibility, and Wind Integration.....7
Fish and Wildlife Program and the Power Plan.....8

SUMMARY

The Pacific Northwest power system is faced with significant uncertainties about the direction and form of climate change policy, future fuel prices, salmon recovery actions, economic growth, and integrating rapidly growing amounts of variable wind generation. And yet the focus of the Council's power plan is clear, especially with regard to the important near-term actions.

The Council's power plan addresses the risks these uncertainties pose for the region's electricity future and seeks an electrical resource strategy that minimizes the expected cost of, and risks to, the regional power system over the next 20 years. Across multiple scenarios considered in the development of the plan, one conclusion was constant: the most cost-effective and least risky resource for the region is improved efficiency of electricity use.

In each of its power plans, the Council has found substantial amounts of conservation to be cheaper and more sustainable than most other types of generation. In this Sixth Power Plan, because of the higher costs of alternative generation sources, rapidly developing technology, and heightened concerns about global climate change, conservation holds an even larger potential for the region.

The plan finds enough conservation to be available and cost-effective to meet 85 percent of the region's load growth for the next 20 years. If developed aggressively, this conservation, combined with the region's past successful development of energy efficiency could constitute a resource comparable in size to the Northwest federal hydroelectric system. This efficiency resource will complement and protect the Northwest's heritage of clean and affordable power.

Aggressive pursuit of this conservation is the primary focus of the power plan's actions for the next five years. Combined with investments in renewable generation as required by state renewable portfolio standards, improved efficiency will help delay investments in more expensive and less clean forms of electricity until the direction and form of future climate change legislation becomes clearer, and alternative low-carbon energy technologies become cost-effective.

At the same time, the region cannot stand still in maintaining and improving the reliability of its power system. Investments to add transmission capability and improve operational agreements are important for the region, both to access growing site-based renewable energy and to better integrate it into the power system. The Council also expects that there are small-scale resources available at the local level in the form of cogeneration or renewable energy opportunities. The plan encourages investment in these resources when cost-effective.

The power plan recognizes that meeting capacity needs and providing the flexibility reserves necessary to successfully integrate growing variable generation sources may require near-term investments in generation resources to provide reliable electricity supplies in specific utility balancing areas. In addition, individual utilities have varying degrees of access to electricity markets and varying resource needs. The Council's regional power plan is not necessarily a plan for every individual utility in the region, but is intended to provide guidance to the region on the types of resources that should be considered and their priority of development.

The near-term actions recommended in the Council's Sixth Power Plan are important, but the region cannot neglect longer-term needs. The plan encourages research in advanced technologies for the long-term development of the power system. For example, emerging smart-grid technologies could make it possible for consumers to help balance supply and demand. By providing information and tools to consumers to adjust electricity use in response to available supplies and costs, the capacity and flexibility of the power system would be enhanced. Smart-grid development also may facilitate the deployment of plug-in hybrid electric vehicles that work in concert with the power system to improve the use of available generating capacity and help reduce carbon emissions in the transportation sector. In general, these technologies offer the potential to fundamentally change the power system while improving its efficiency and reliability. Developing these technologies is a long-term process that will require many years to reach full potential, but the region can facilitate progress through research, development, and demonstration of the technologies.

Along with the smart grid, other technologies may be able to provide power when it is needed with low cost, low risk, and low emissions. In the future, the region may find greater value in power generated by geothermal resources, ocean waves, tides, gasified coal with carbon sequestration, advanced nuclear, or currently unknown technologies. New methods to store electric power, such as pumped storage or advanced battery technologies may enhance the value of existing variable generation like wind. Given the uncertainties of the future, the region should not concentrate on any one potential future solution to its power supply, but should explore a diversity of potential sources of future energy generation and conservation.

FUTURE REGIONAL ELECTRICITY NEEDS

The Pacific Northwest is expected to develop and expand over the next 20 years. Regional population is likely to increase from 12.7 million in 2007 to 16.7 million by 2030. This four million increase compares to a 3.8 million increase between 1985 and 2007. The population growth will be focused on older age categories as the baby boom generation reaches retirement age. While the total regional population is projected to increase by over 28 percent, the population over age 65 is expected to nearly double. Such a large shift in the age distribution of the population will change consumption patterns and electricity uses. Some possible effects could include increased health care, more retirement and elder care facilities, more leisure activities and travel, and smaller-sized homes.

The cost of energy (natural gas, oil, electricity) is expected to be significantly higher than during the 1980s and 1990s. Although these prices have decreased significantly since the summer of

P. 2

2008, a significant portion of the reductions are likely due to the effects of the current economic recession. Natural gas prices have also been affected by the recent growth of production from nonconventional natural gas supplies. The technology to retrieve these supplies cost-effectively has only developed recently and has improved expectations of adequate future supplies. Nevertheless, the cost of finding and producing these supplies is higher than for conventional supplies, which increases the estimated future price trend for natural gas.

If carbon emissions taxes or cap-and-trade policies are implemented, energy costs are likely to increase. Some of the planning scenarios used to develop this plan include a wide range of possible carbon mitigation costs from zero to $100 per ton. The expected average prices in this range start at zero and increase over time to $47 per ton of CO2 emissions by 2030. Carbon costs can have a significant impact on electricity costs and prices to consumers. While higher prices reduce demand, they also stimulate new sources of supply and efficiency and make more efficiency measures cost-effective.

Electricity load (before accounting for new conservation) is expected to grow by about 7,000 average megawatts between 2009 and 2030, growing at about 335 average megawatts, or 1.4 percent, per year. Residential and commercial sector electricity use account for much of the growth in demand. Contributing to the growth in the residential sector is an anticipated increase in air conditioning and consumer electronics. Also, summer peak electricity use is expected to grow more rapidly than annual energy. All of this growth in energy demand must be met by a combination of existing resources, more efficient use of electricity, and new generation. An important change for the Sixth Power Plan is that electricity needs in the future can no longer be adequately addressed by evaluating only average annual energy requirements. In the future, resource needs must also consider capacity to meet peak load and the flexibility to provide within-hour, load-following, and regulation services. The requirements for within-hour flexibility reserves have increased because of the growing amount of variable wind generation located in the region.

RESOURCE STRATEGY

The Council's resource strategy for the Sixth Power Plan provides guidance for the Bonneville Power Administration and the region's utilities on choices that will help meet the region's growing electricity needs while also reducing the risk associated with uncertain future conditions. The strategy minimizes the cost of, and risks to, the future power system. The timing of specific resource acquisitions is not the essence of the strategy because the timing of resource needs will vary for every utility. Rather, the important message of the resource strategy lies in the nature of the resources and their priorities.

The resource strategy can be summarized in five specific recommendations:

1. Improved efficiency of electricity use is by far the lowest-cost and lowest-risk resource available to the region. Cost-effective efficiency should be developed aggressively and on a consistent basis for the foreseeable future. The Council's plan demonstrates that cost-effective efficiency improvements could on average meet 85 percent of the region's growth in energy needs over the next 20 years.

P. 3

2. Renewable resource development is required by resource portfolio standards in three of the four Northwest states. The most readily available and cost-effective renewable resource is wind power and it is being developed rapidly. Wind requires additional strategies to integrate its variable output into the power system and, in addition, it provides little capacity value for the region. The region needs to devote significant effort to expanding the supply of cost-effective renewable resources, many of which may be small scale and local in nature.

3. Remaining needs for new energy and capacity should be based on natural gas-fired generation until more attractive technologies become available. The resource strategy does not include any additional coal-fired generation to serve the region's needs. Further, the Council's plan demonstrates that meeting the Northwest power system's share of carbon reductions called for in some state, regional, and federal carbon-reduction goals will require reduced reliance on the region's existing coal plants.

4. The challenges of wind integration and the need for additional within-hour reserves initially should be addressed through improvements in system operating procedures and business practices. Changes in wind forecasting, reserve sharing among control areas, scheduling the system on a shorter time scale, and advancing dynamic scheduling can all help address wind integration and contribute to a more efficient use of existing system flexibility. The region is already making significant progress in these areas.

5. Finally, the Council's resource strategy calls for efforts to expand long-term resource alternatives. The region should demonstrate the potential of smart-grid applications to improve the operation and reliability of the regional power system and to access the

potential of consumers to provide demand response for the capacity and flexibility of the power system. The region should continue to assess new efficiency opportunities, expand the availability of cost-effective renewable energy technologies, and monitor development of carbon capture and sequestration, advanced nuclear technologies, and other low-carbon or no-carbon resources.

Efficiency

The Council's power plan includes a detailed analysis of efficiency potential in hundreds of applications. The achievable technical potential of efficiency improvements increased from the Fifth Power Plan levels due to advancing technology, reduced cost, and estimates in new areas such as efficiency in electricity distribution systems, consumer electronics, and street, parking, and exterior building lighting. In addition, the cost-effectiveness of these technologies has increased significantly because avoided costs have doubled and carbon-cost risk is several times higher than in the Fifth Power Plan. The estimated achievable potential conservation is nearly 6,000 average megawatts for measures costing under $100 per megawatt-hour. Over 4,000 average megawatts are available at a cost of less than $40 per megawatt-hour. These increased opportunities exclude future savings from efficiencies that have already been secured through building codes and appliance efficiency standards.

The plan shows that a substantial amount of the growth in electricity demand could be met by conservation. Portfolio model analysis shows that over 5,900 average megawatts of conservation are cost-effective, double the amount in the Council's Fifth Power Plan. The amount that can be

P. 4

achieved is constrained by the commercial availability of technologies, limits on the annual development rate, and an ultimate penetration rate limit of 85 percent. The amount of conservation found to be cost-effective changed very little in response to changing assumptions about carbon costs and policies. Conservation in the plan is projected to be responsible for reducing carbon emissions by 17 million tons per year by 2030, a 30 percent reduction in 2030 emissions. Failure to achieve the conservation included in the plan will increase both the cost of, and risks to, the power system and likely prevent Washington and Oregon from meeting legislated carbon-reduction goals.

Generation Alternatives

The Council analyzed a large number of alternative generating technologies. Each of these technologies is compared in terms of risk characteristics and cost with other generating technologies, efficiency improvements, and demand response. In addition, resource contributions need to be considered in terms of their energy, capacity, and flexibility characteristics.

Generating technologies that are technologically mature, meet restrictions on new plant

emissions, and are cost-effective are limited in the short to intermediate term. Wind remains the primary large-scale, cost-effective renewable generation source in the near term. However, the Council believes there likely are small-scale dispersed renewable generation alternatives that are local and site-specific. Cost-effective development of these is encouraged, even though the Council currently lacks enough information to include them explicitly in the plan. Natural gas-fired generation is also feasible and cost-effective. New coal-fired generation is difficult to site and permit, and prohibited in many states by new plant emissions standards. During the next 20 years, alternatives may develop such as carbon separation and sequestration, maturing renewable technologies, advanced nuclear generation, demand response, smart-grid technologies, and storage strategies to help provide flexibility reserves. When CO2 costs are added to the direct cost of generating alternatives, the cost of most generating resource alternatives range between $70 and $105 per megawatt-hour or higher (levelized 2006$).

New renewable generation (primarily wind) is required to meet renewable portfolio standards in Washington, Oregon, and Montana. Analysis shows that meeting RPS requirements uses most of the 5,300 megawatts of readily accessible wind potential in the region. In addition to the wind, some geothermal resources were found to be attractive. However, the amount of geothermal potential is considered quite limited. Given the risk that a carbon-pricing policy might be enacted in the future, some renewable generation is cost-effective even without renewable portfolio standards.

Natural gas-fired generation is anticipated toward the middle of the planning period. Natural gas is attractive for energy and capacity needs and provides an ability to displace coal plants in the event of high carbon costs or coal plant closures. Both combined-cycle turbines and simple-cycle turbines are included in most scenarios. Although these natural gas plants are sited and licensed in the plan, this does not occur until after the five-year action plan period. Preparing to add natural gas-fired generation helps protect against the risk of uncertain future conditions, but the generating plants are not actually completed in many of the simulated futures during the 20year planning period. The Council recognizes that individual utilities' needs and access to market resources vary. Some utilities will need additional resources in the near-term even if they

P. 5

Plan Overview Sixth Power Plan

meet their renewable portfolio standards and acquire all conservation available to their service territories.

During the last 10 years of the power plan the generating resource priorities become less clear. Given current climate change policies and concerns, new coal without carbon sequestration is unlikely. Further, any significant reduction in carbon will require reduced operations of existing coal plants. Alternatives beyond greater reliance on natural gas are typically unproven commercial technologies or alternatives that require significant new transmission investments. Long-term generating resources considered include wind developed outside the region and imported on new transmission lines, advanced nuclear, gasified coal with carbon

sequestration, and development of relatively unproven renewable resources, or ones that are currently too expensive. Natural gas is used in the plan to meet long-term needs, but the Council recognizes that other alternatives are likely to become available over time. In particular, the evolution of smart-grid technologies could significantly change the nature of future power system needs and the kinds of resource alternatives required and available.

CLIMATE CHANGE POLICY

Addressing the topic of uncertain climate policies was identified as one of the most important issues for the Sixth Power Plan. The focus of climate policy, especially for the power generation sector, will be on carbon dioxide emissions. Nationwide, carbon dioxide accounts for 85 percent of greenhouse gas emissions. Nationally, about 38 percent of carbon dioxide emissions are emitted from electricity generation, but for the Pacific Northwest the power generation share is only 23 percent because of the hydroelectric system. Analysis by others has shown that substantial and inexpensive reductions in carbon emissions can come from more efficient buildings and vehicles. More expensive reductions can come from substituting non- or reduced-carbon electricity generation such as renewable resources, natural gas, and nuclear generation, or from sequestering carbon.

Reductions in carbon emissions can be encouraged through various policy approaches, including regulatory mandates (RPS or emission standards), emissions cap-and-trade systems, emissions taxation, and efficiency improvement programs. State policy responses within the region to climate change concerns have focused on renewable energy standards and new generation emission limits. In addition, Oregon and Washington have carbon reduction targets adopted by statute. National and regional proposals have focused on cap-and-trade systems intended to reduce carbon and other greenhouse gases, although none have been implemented successfully in the region. Although carbon taxes are easier to implement than cap-and-trade systems, policy discussions have focused mainly on cap-and-trade systems.

The question for the power plan is what strategies are prudent given a future where carbon pricing policies are unclear. The Council does not take a position on any particular regional carbon reduction goal or carbon price in this power plan. The plan does recognize the uncertainty about future carbon prices and that possible carbon emission reductions are important risk issues for the regional power system. Multiple carbon reduction scenarios, including a carbon risk scenario that considers a range of future carbon prices between zero and $100 per ton provide relevant information for policy makers in the region. In general, the resource strategy in the plan will allow Washington and Oregon to meet their carbon reduction targets and constructively address the risk of uncertain future carbon policy. According to Council analysis,

P. 6

states and/or the federal government will need to take additional actions in order to achieve these targets. Potential carbon pricing plays an important role in the Council's resource strategy, with the exception of the conservation resource, which remains a key component regardless of climate change policy assumptions.

The key findings from the Council's analysis of climate change policies include the following:

• Without any carbon control policies, including existing ones, carbon emissions from the Northwest power system would continue to grow to 6 percent over 2005 levels by 2030. However, without the significant amount of conservation (which is cost-effective even without carbon policies) the growth in emissions would be far greater.
• Without additional carbon pricing policies, current policies would stabilize carbon emissions from the Northwest power system at 2005 levels, but not meet current carbon reduction goals.
• Assuming a risk of higher carbon prices, the Sixth Power Plan resource strategy has the potential to reduce average regional power system carbon emissions to 9 percent below 1990 levels, or 30 percent below 2005 levels, adjusted for normal hydro conditions.
• Significant reductions of carbon emissions from the Northwest's power system require reduced reliance on coal, which currently emits more than 85 percent of the carbon dioxide from the regional power system. A carefully coordinated retirement and replacement of half the existing coal-fired generation serving the region with conservation, renewable generation, and lower carbon-emission resources could reduce average carbon emissions to 18 percent below 1990 levels.
• To the extent that public policy raises the cost of carbon, we can expect an increase in a typical consumer's electric bill and a decrease in carbon emissions, especially when the carbon price begins to exceed $40 per ton. A fixed carbon price of $45 dollars per ton has a similar effect on carbon emissions as retiring half of the existing coal-fired generation. Both would meet current carbon reduction targets for 2020 on average, but coal retirement would provide more certainty in meeting the targets.
• Preserving the capability of existing regional hydroelectric generation will help keep power system costs and carbon emissions down. In scenarios where the capability of existing resources are reduced, whether hydroelectric or coal, the energy and capacity are largely replaced with gas-fired generation to maintain the adequacy and reliability of the power system.

CAPACITY, FLEXIBILITY, AND WIND INTEGRATION

Reliable operation of a power system requires minute-to-minute matching of electricity generation to varying electricity demand. In the Pacific Northwest, resource planners have been able to focus mostly on annual average energy requirements, leaving the minute-to-minute balancing problem to system operators. This was because, historically, the hydroelectric system had sufficient peaking capacity and flexibility to provide the needed operations as long as there was sufficient energy capability. This is changing for several reasons: growing regional

P. 7

electricity needs are reducing the share of hydroelectricity in total demand, peak load has grown faster than annual energy, the capacity and flexibility of the hydro system has been

reduced over time for fish operations, and growing amounts of variable wind generation have added to the balancing requirements of the system.

As a result, planners must now consider potential resources in terms of their energy, capacity, and flexibility contributions. The rapid growth of wind generation (which has little capacity value and increases the need for flexibility reserves) means that meeting growing peak load and flexibility reserves will require adding these capabilities to the power system. Changes can be made to the operation of the power and transmission system that will reduce flexibility reserve needs. These operational changes are expected to cost less than adding peaking generation, demand response, or flexibility storage, and they can be implemented more quickly.

FISH AND WILDLIFE PROGRAM AND THE POWER PLAN

The Columbia River Basin Fish and Wildlife Program is by statute incorporated into the Council's power plan. The fish and wildlife program guides Bonneville's efforts to mitigate the adverse effects of the Columbia River hydroelectric system on fish and wildlife. One of the roles of the power plan is to help assure reliable implementation of fish and wildlife hydrosystem operations. The Columbia River power system operators have reliably provided hydrosystem actions specified to benefit fish and wildlife (and Bonneville ratepayers have absorbed the cost of those actions) while maintaining an adequate, efficient, economic, and reliable energy supply. This is so even though the hydroelectric operations for fish and wildlife have a sizeable impact on power generation. On average, hydroelectric generation is reduced by about 1,200 average megawatts, relative to operation without any constraints for fish and wildlife. Since 1980, the power plan and the Bonneville Power Administration have addressed this impact through changes in secondary power sales and purchases, by acquiring conservation and some generating resources, by developing resource adequacy standards, and by implementing other strategies to minimize power system emergencies and events that might compromise fish operations.

In addition to operational changes, most of the direct cost and capital costs of fish and wildlife programs have been recovered through Bonneville revenues and Bonneville has absorbed the financial effects of lost generation, resulting in higher electricity prices. Bonneville estimates that the total financial effect of replacing lost hydropower capability and funding direct fish and wildlife program expenditures totals from $750 million to $900 million per year (a range affected by, among other things, water conditions and electric prices). The power system is less economical as a result of fish and wildlife program costs, but still economical in a broad affordability sense when compared to the costs of other reliable and available power supplies.

The future presents a host of uncertain changes that are sure to pose challenges for the successful integration of power system and fish and wildlife needs. These include possible new fish and wildlife requirements, increasing wind generation and other variable renewable integration needs that could require more flexibility in power system operations, conflicts between climate change policies and fish and wildlife operations, possible changes to the water supply from climate change that might make it more difficult to deliver flows for fish and meet

power needs, and possible revisions to Columbia River Treaty operations to match 21st century power, flood control, and fish needs.

P. 8

To address current operations and prepare for these additional challenges, the Council has adopted a regional adequacy standard to help ensure that events like the 2000-01 energy crisis, in which fish operations and power costs were affected, do not happen again. In addition, the Wind Integration Forum is addressing issues with integration of wind into the power system. Large swings in wind output have sometimes adversely affected hydropower and fish operations. Addressing adequacy and flexibility issues in the Sixth Power Plan will improve electricity reliability and help ensure reliable fish operations.

P. 9 /End

Comment continued: The DEIS should have addressed the issue of Wind Integration into the power system and the aforementioned Wind Integration Forum. The statement "Large swings in wind output have sometimes adversely affected hydropower and fish operations" should be further explained in the DEIS. How large are these swings in output? Just how big is the issue of wind integration into the power grid? How much wind is too much wind? Does wind inconsistency mean more gas plant back-ups (or other types of back-ups) being used by BPA? Frankly, just because there are now some state and federal requirements to meet some made up greenhouse gas emissions number does not mean that new technologies or other methods (energy efficiencies and conservation, for example) might not change these requirements. In the rush to go "green" perhaps common sense has fallen by the wayside. Wind energy production is subsidized by taxpayer monies. It is not cheap green energy. The full cost of wind energy production should be added up and should be included in the DEIS.

State Regulation of Greenhouse Gasses

In Washington State, greenhouse gasses are regulated by RCW Chapter 80.80, which establishes goals for statewide reduction of greenhouse gas emissions. The statute aims to reduce overall greenhouse gas emissions to 1990 levels by 2020, and to 25 percent below 1990 levels by 2035. By 2050, the state intends to reduce overall emissions to fifty percent below 1990 levels. Goals also include fostering a clean energy economy by increasing the number of jobs in the clean energy sector to 25,000 by 2020, from just over 8,000 jobs in 2004. Ecology has proposed regulation (Chapter 173-441 WAC)3, which would establish an inventory of greenhouse gas emission through a mandatory greenhouse reporting rule for owners or operators of:

• A fleet of on-road motor vehicles that as a fleet emit at least 2,500 metric tons of greenhouse gases annually in the state

• A source or combination of sources that emit at least 10,000 metric tons of greenhouse gases annually in the state

Comment: The state initiative to lower greenhouse gases by 2020 through the use of renewable energy sources, while admirable, is perhaps not the only and best way to achieve reduction of greenhouse gases. Going green is not a concept carved in cement. Our ideas can evolve and we can change our minds if a better and safer ideas and technology comes along. See previous comment.

Since wind power projects would not emit greenhouse gasses during operations, these regulations are unlikely to apply to the Project.

Bonneville Power Administration Greenhouse Gas Initiatives

In 2008, BPA adopted new initiatives related to climate change, and included the issue in their strategic objectives and key agency performance targets. One of BPA's first steps was to prepare an initial climate change roadmap (BPA 2008) intended as a step toward subsequent, more

2 See: http://en.wikipedia.org/wiki/Greenhouse_gas#cite_note-kiehl197-6; accessed December 2009.

3 See: http://www.ecy.wa.gov/laws-rules/activity/wac173441.html; accessed December 2009.

3-17

robust plans for managing greenhouse gas emissions. This document identifies near-term and long-term potential actions to meet agency targets and contribute to national and regional greenhouse gas reduction goals. As a first step in managing greenhouse gas emissions, BPA will collect data in 2009 to inventory BPA's greenhouse gas footprint, which will be reported in 2010.

Comment: Where is this document in the DEIS? I was not able to find it. This should be part of the DEIS and if it isn't then the DEIS is not adequate and should not have been rushed out for public comment. This is a crucial report on BPA's carbon footprint. One rationale for all of these regional wind farms is that they produce less CO2 than other types of energy production facilities and therefore have less of a carbon footprint. Well, we don't really know that, do we? There is nothing in the DEIS that would lead to this conclusion, at least nothing based on facts and figures. All of BPA's greenhouse gas-causing activities SHOULD be in the DEIS, so that a comparison can be made based on facts and figures.

Background Air Quality

The Dalles, Oregon is the closest city with an air monitoring station. The Oregon Department of Environmental Quality (ODEQ) reports air quality data using an air quality index based on particulate matter 2.5 micrometers diameter and smaller (PM2.5). ODEQ's 2008 report for The Dalles shows 339 days with good air quality, 25 days with moderate air quality, and no days with unhealthy air quality (ODEQ 2009).

While air quality in the project area is generally good, haze is a well-documented problem in the

Columbia Gorge and the causes are being studied by the Southwest Clean Air Agency. In a 2008 Report, the agency found that haze was largely caused by winter stagnations that trap pollutants and fog (SWCAA 2008). In the summer, winds flow predominantly from the west, transporting emissions from the Portland metropolitan area into the Gorge. Wildfires also contribute to the haze when smoke is blown into the Gorge. There is no single source that is primarily responsible for haze; however, man-made sources are important contributors (ODEQ 2008). The most significant man-made sources contributing to haze in the Gorge include:

- Power plant emissions
- Woodstoves
- Motor vehicles
- Non-road emissions (e.g. ships, trains, trucks)
- Agricultural sources of ammonia

The Skamania Fish Hatchery, located west of the project site, collected climatological data in the project site area for 1965–2005. Average temperatures ranged from a minimum of 38.2 degrees Fahrenheit to a maximum of 61.8 degrees Fahrenheit. Average precipitation was 84.06 inches, and there was an average of 9 inches of snow per year.4

3.2.2 IMPACTS

3.2.2.1 Proposed Action
The potential environmental consequences of the proposed project include those from construction and operation. Impacts to air quality would not differ between the two alternative

4 Columbia Gorge Economic Development Association, http://www.cgeda.com/environment/quclimat.shtml.

3-18

locations for the Operations and Maintenance Facility. Potential impacts include emissions, odors and dust.

Construction

Emissions

Construction of the project would result in temporary air emissions from the following sources:

- Exhaust from the diesel construction equipment used for project site preparation (including logging), grading, excavation, and construction of on-site structures
- Exhaust from water trucks used to control construction dust emissions
- Exhaust from diesel trucks used to deliver equipment, concrete, fuel, and construction supplies to the construction site
- Exhaust from pickup trucks and diesel trucks used to transport workers and materials around the construction site and from vehicles used by workers to commute to the construction site

• Exhaust from diesel-powered welding machines, electric generators, air compressors, etc.
• Emissions from one or more portable rock crushers and one or more portable concrete batch plants, which will be used as necessary to supply the large amounts of gravel and concrete needed for the project

The primary air pollutants from diesel-powered equipment would be nitrogen oxides, hydrocarbons, carbon dioxide, particulate matter (PM) and sulfur dioxide. In addition to these, the rock crusher and batch plant(s) would produce additional PM. These emissions would be similar in nature to those produced by any construction project that involves heavy equipment and transportation of materials to the project site. These construction emissions would be temporary and would be limited to the areas adjacent to the construction site. They would not affect a substantial number of persons or persist for an extended period of time and would not result in exceedance of any air quality standards.

Comment: So, nitrogen oxides, hydrocarbons, carbon dioxide, particulate matter, and sulfur dioxide would be the primary air pollutants, plus more particulate matter produced by the rock crusher and batch plants! What quantity of each of these would be produced? How much particulate matter would go into our air and affect air quality? Where is the data and some hard numbers so that we can see what quantity of these "primary air pollutants" will be produced! Where are the cumulative impacts analyses on our regional air and water quality to see how much air and water pollution this project would contribute to our region? There is nothing here to compare, assess, and analyze. This is a DEIS deficiency.

Odors

Project construction would produce limited odors associated with exhaust from diesel equipment and vehicles, and painting the Operations and Maintenance facility, turbine towers, and other structures. The effect of odors would be temporary, and would be limited to the areas adjacent to the construction site and along haul routes to the batch plant(s) and rock crusher. Odors would not affect a substantial number of persons or persist for an extended period of time. An occasional small amount of diesel exhaust may be noted from trucks entering or leaving the site from public roadways.

Dust

Project construction would create fugitive dust from construction and re-construction of gravel roads, including from rock crushing and/or a concrete batch plant. Small amounts of dust would

3-19

be created by construction-related traffic and additional wind-blown dust as a result of ground disturbance. The presence and impact of dust would be temporary, and would be limited to areas adjacent to the construction site and along haul routes. Dust would not affect a substantial number of persons or persist for an extended period of time. A small amount of dust may be noted from trucks entering or leaving the site from public roadways.

Operation

Emissions

Since the fuel source for the proposed project would be wind, there would no emissions from the operation of the turbines. Project operation would not produce visible plumes, fogging, misting, icing, or impairment of visibility, or changes in ambient levels of pollutants. Emissions would occur from Operations and Maintenance vehicles. Travel on the project access roads would produce minor exhaust emissions.

Avoided Emissions

Project operation would avoid the use of fossil fuel to meet the energy needs of the region. The project's annual electricity production is estimated at 197,000 megawatt hours (MWh). This energy is equivalent to 114,000 barrels of crude oil or 654 million cubic feet of natural gas. Total electricity production can be used to estimate the emission displaced by a fossil-fuel alternative. Table 3.2-1 shows emission rates for carbon dioxide and sulfur dioxide for fossilfuel-based power plants in the Northwest Power Pool, along with estimated emissions avoided from the operation of the wind power plant. This table also shows the displaced emissions from the project as a percentage of Washington State emissions for 2004.

Table 3.2-1
Air Pollutant Emissions Displaced by the Project

Air Pollutant	Emission Rates a (lb/MWh)	Tons Displaced by Projectb	Washington State Emissions 2005	Project as % of Washington Emissions
Carbon dioxide	1334c	131,466	16,882,540c	0.7
Sulfur dioxide	1.573	155	4,525	3.4

a. Non-baseload output emission rates for Northwest Power Pool Western Electric Coordinating Council Northwest Region. A non-baseload emission factor was used to calculate the avoided emissions from the project, based on guidance from the US Environmental Protection Agency that "Annual non-baseload output emission rates … can be used to estimate GHG emissions reductions from reductions in electricity use. These output emission rates, called annual nonbaseload emission rates, are the annual output emission rates for plants that combust fuel and have capacity factors less than 0.8. These new data values are derived from plant level data and supplement, rather than replace, the fossil fuel output emissions rates, which are sometimes used

as a rough estimate to determine how much emissions could be avoided if energy efficiency and/or renewable energy displaces fossil fuel generation. These non-baseload output emission rates would somewhat improve this rough estimate by factoring out baseload generation, which is generally unaffected by measures that affect marginal generation" (USEPA 2007).

b. Estimated annual electricity production multiplied by emission rate, for example, for carbon dioxide (1,334) x [(75 MW) x (0.30 capacity factor) x 24 x 365]/2000 = 131,465.7 tons

c. 2005 value; values for 2005 were not available for the other pollutants listed. By avoiding the need for fossil-fuel-powered plants, the project would contribute to air quality by avoiding emissions associated with burning fossil fuels, including greenhouse gasses. Using wind power also likely would have a beneficial effect on visibility, since the same pollutants that affect visibility also affect air quality (ODEQ 2008).

Comment: Cumulative Impact Analyses are NOT done on a project by project basis. They are done on a regional, inclusive basis. Therefore, any and all fossil fuel-powered plants and other types of backup energy production that is used to back up BPA's hydro power generation have to be accounted for in the DEIS. They are not. Just because Whistling Ridge doesn't have a gas power plant onsite does not mean that a gas power plant will not be used to balance its wind energy production on the grid. The statement "Using wind power also likely would have a beneficial effect on visibility" is patently inaccurate. If visibility in the Gorge and along the Columbia River has been deteriorating for 20 or more years when there wasn't any wind power to speak of, then it is pretty specious to make the correlation that using wind power today would have "beneficial" effects on visibility! The two things are not mutually inclusive.

3-20

Greenhouse Gas Emissions from the Project

Greenhouse gasses would be emitted during construction of the project, as a result of burning fossil fuels in the construction equipment and vehicles. The amount of these emissions has not been quantified, but would be directly proportional to the number of workers and vehicles on the site. Some emissions of greenhouse gases will take place during the design, manufacture, transport of the wind turbines. During operation, greenhouse gas emissions would be the result of vehicles used for regular maintenance activities and would be much lower than during construction. Production of electricity itself would not release greenhouse gasses or other pollutants. The American Wind Energy Association estimates that including generation from all sources, wind energy's carbon dioxide emissions are on the order of 1 percent of coal or 2 percent of natural gas per unit of electricity generated (AWEA 2009).

Comment: So what does "wind energy's carbon dioxide emissions are on the order of 1 percent of coal or 2 percent of natural gas per unit of electricity generated" actually mean? This statement doesn't mean anything without data to compare. Where are the comparison charts for wind, gas, and coal CO2 emissions? I could not find them in the DEIS.

While greenhouse gas emissions from the project will be low, several of the mitigation measures mentioned in Section 3.2.3 will reduce such emissions. These include limiting idling times of equipment and encouraging carpooling among construction workers.

Odor

Operation of the turbines would create no odors, as no combustion is involved and no odor-producing materials would be used in project operations. Travel on the project access roads would produce insignificant amounts of odor from exhaust. Maintenance of the substation and Operations and Maintenance building would produce occasional minor odors from painting.

Dust

Operation of the project would result in minor increases in dust during regular maintenance of gravel access roads. Project-related increases to traffic on these gravel roads would generate small amounts of additional fugitive dust. This increased traffic would consist largely of weekly or less frequent trips to turbines in service vehicles for maintenance and repair activities.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant will provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the project's operating life (estimated to be 30 years), and restoration in the event the project is suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential emissions or impacts to air quality. If impacts to air quality are anticipated to occur as a result of site restoration and project decommissioning, mitigation measures would be proposed as part of the plan.

3.2.2.2 No Action Alternative
Under the No Action Alternative, the project would not be built. The project site would continue to be used primarily for timber harvests. If the No Action Alternative is selected, the growing

3-21

electricity needs of the region would continue to be met through a combination of other renewable development and combustion of additional fossil fuels. In recent years, several of the new power plants proposed and constructed in the Pacific Northwest have been fossil fuel powered plants, primarily using natural gas as fuel.

Comments: If Whistling Ridge is NOT built, this does not necessarily mean that gas plants will take its place. Conservation and energy efficiencies in our homes, businesses, and

infrastructure could fill the energy gap. Whistling Ridge and other wind farms are not necessarily the best way to meet our energy needs. What must be addressed, and it is NOT addressed in the DEIS, is that most of the energy produced in the NW is sucked down to California and parts South and they will continue to demand more and more energy and we will never be able to satisfy their energy thirst.because they will want more and more. With global climate change upon us and temperatures rising, people will want more energy for air conditioning. Why should our environment and ecosystems be degraded just to satisfy this insatiable energy thirst? If California wants more energy let them put wind turbines on their beaches. Like that's going to happen any time soon!!

Fossil fuel power plants, in contrast to wind power projects, emit significant quantities of carbon dioxide, an important greenhouse gas linked to potential climate change. Natural-gas-powered plants also emit sulfur oxides and nitrogen oxides, which contribute to both ground-level air quality problems and acid rain. According to the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006 (USEPA 2008), air emissions from fossil fuel combustion for electricity production are a leading source of air pollution nationally, accounting for:

- 67 percent of sulfur dioxide emissions
- 28 percent of nitrogen oxide emissions
- 36 percent of carbon dioxide
- 3 percent of mercury

3.2.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential construction-related air emissions and dust impacts:

- Ensure that all vehicles used during construction comply with applicable Federal and state air quality regulations.

- Implement operational measures, such as limiting engine idling time and shutting down equipment when not in use, to reduce air emissions.

- Implement active dust suppression on unpaved construction access roads, parking areas and staging areas, using water-based dust suppression materials in compliance with state and local regulations.

- Implement a dust control program to minimize any potential disturbance from construction-related dust. Dust suppression would be accomplished through application of either water or a water-based, environmentally safe dust palliative such as lignin. The use of a dust palliative such as lignin (a non-toxic, non-hazardous compound derived from trees) would result in the use of substantially less water for dust suppression and therefore less traffic from water trucks to the construction site. The final decision regarding dust suppression techniques would be made by the Construction Contractor in consultation with local authorities.

- Limit traffic speeds on unpaved project roads to 25 mph to minimize dust.

• Encourage carpooling among construction workers to minimize construction-related traffic and associated emissions.

3-22

• Replant or gravel disturbed areas to reduce wind-blown dust.

• Implement erosion control measures to limit deposition of silt to roadways.

3.2.4 UNAVOIDABLE ADVERSE IMPACTS
The proposed project would produce minor and temporary impacts to air quality during construction activities, similar to existing logging operations.

3.2.5 REFERENCES
American Wind Energy Association (AWEA). 2009. Wind Energy and the Environment. Accessed December 2009 at: http://www.awea.org/faq/wwt_environment.html.

Bonneville Power Administration (BPA). 2008. Climate Change, BPA's Initial Roadmap. December. Accessed December 2009 at: http://www.bpa.gov/corporate/pubs/Climate_Change_2008_Initial_Roadmap_final.pdf.

Oregon Department of Environmental Quality (ODEQ). 2008. Columbia River Gorge Air Study and Strategy, Oregon DEQ and Southwest Clean Air Agency, Draft, February 29. Accessed October 2009 at: http://www.deq.state.or.us/aq/gorgeair/docs/GorgeStrategyDRAFT.pdf.

———. 2009. 2008 Oregon Air Quality Data Summaries. June. http://www.deq.state.or.us/aq/forms/2008AQreport.pdf.

Southwest Clean Air Agency (SWCAA). 2008. Columbia River Gorge Air Quality Study, Science Summary Report, Columbia River Gorge National Scenic Area. Final Report. February 8. Accessed October 2009 at http://www.swcleanair.org/gorgedata/FinalScienceSummaryReportFeb8-08.pdf.

United States Environmental Protection Agency (USEPA). 2009. Climate Change. Accessed December 2009 at http://www.epa.gov/climatechange/basicinfo.html.

———. 2007. The Emissions & Generation Resource Integrated Database for 2006 (eGRID2006) Technical Support Document. April.

———. 2008. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006. April.

3.3 WATER RESOURCES

This section describes the existing water resources in the project area, the potential for impacts to water resources from the proposed project, and mitigation measures designed to minimize or avoid those impacts. Information in this section is taken primarily from the Application for Site Certification and the visual assessment completed for that document.

Comment: In 2007, Underwood had a really dangerous water situation, as reported in The Columbian newspaper: "Underwood water deemed safe to drink"

The Columbian

State health officials Wednesday lifted a boil-water advisory issued Friday for the Underwood area after tests showed the water is now safe to drink.

Major firefighting efforts in the Columbia River Gorge last week drained local water supplies, causing Underwood's water system to lose pressure in some areas. The pressure loss could have allowed contaminants to enter the water, so the state Department of Health and the Skamania County Public Utility District issued the boil- water advisory as a precaution. The Underwood system serves 876 residents.

Water supplies have returned to normal, officials said, and excess air has been flushed from the system. Water samples sent for bacterial analysis came back indicating the water is safe.

Originally published by KATHIE DURBIN Columbian staff writer, 9/27/2007.

(c) 2007 Columbian. Provided by ProQuest Information and Learning. All rights Reserved.

Source: Columbian

The DEIS has no data on the watershed in this area and from which or what type of source, in actuality, the residents get their water. This is a fatal flaw in data gathering and analysis. What would be the cumulative effects, on the water resources that these 876 Underwood residents use, of all the impermeable surfaces—wind turbine pads, substation, maintenance roads, etc.-- that would result from the construction of this proposed wind farm? This is a critical question for fire fighters and the residents. We all know that there will be future fires. What if one of the turbines causes a fire in the woods? Where is the water going to come from to combat this type of fire? Would the Underwood reservoir be depleted thus affecting the residents and their health and safety?

3-23

3.3.1 AFFECTED ENVIRONMENT

3.3.1.1 Surface Water

The Columbia River flows south of the project site and receives runoff via the White Salmon

Basin from the east portion of the project site and via the Little White Salmon Basin from the west portion of the project site. Surface water resources in and near the project site are shown on Figure 3.3-1 and include the following:

One wetland labeled "Cedar Swamp" on Figure 3.3-1 and described in Section 3.4.

• Several drainages located within the project site boundaries, which are typed as seasonal, non-fish habitat streams or perennial, non-fish habitat streams (Figure 3.3-1). Some drainages extend upstream from these typed reaches, but lack defined channel features. Most of the drainages within the project site boundary would be classified as Class V streams under Skamania County's critical areas ordinance. Class V streams are small perennials streams or seasonal streams with short periods of spring or storm runoff (SCC 21A Appendix C). The tributary to Little Buck Creek may be classified as a Class IV stream as it nears the eastern project site boundary. The stream information has been updated from the information contained in the Application for Site Certification with additional data from field visits.

Comment: LIDAR reconnaissance would be useful to determine drainages and streambeds. It could also be used for the geologic survey. Why isn't LIDAR a requirement for this DEIS?

• One unnamed perennial stream crossed by West Pit Road, the proposed access road. This stream occurs in the Little White Salmon watershed. Flow was observed through the existing culvert under West Pit Road at the time of the July 2009 field visit. However, the surface flow and the channel disappear downstream of the culvert. There is no surface water connection to any other stream or waterbody.

3.3.1.2 Stormwater Runoff Water runoff from the northeast portion of the project site drains southeast via Cedar Swamp and its tributaries to Little Buck Creek before flowing south to the White Salmon River, and ultimately to the Columbia River. Water runoff from the southwest area of the project drains west and southwest to a flat area east of the project, ultimately draining to the Little White Salmon River and then the Columbia River.

Project site soils are classified as well-drained, with slow to moderate runoff, and slight to moderate hazard of water erosion. The presence of scour, sedimentation, steep slopes, ephemeral and perennial streams, and the soil classifications suggest that surface water runoff and infiltration within the project are moderate (Haagen 1990).

3-24

33758687_154.cdr

Figure 3.3-1
Job No. 33758687 Waterways in the Project Vicinity

3.3.1.3 Groundwater

A subsurface investigation was conducted in September 2007 to assess near-surface soil and rock characteristics (Appendix B). The investigation included twelve test pits excavated from seven to 16 feet in depth. Groundwater was not encountered in any of the test pits. However, these observations reflect groundwater levels at the time of the field investigation and actual groundwater levels may fluctuate significantly in response to seasonal effects, regional rainfall, and other factors not observed during this investigation. Regional or perched water tables may be present at a greater depth.

Comment: Why weren't the field investigations done during the rainy season? How does one find perched water tables and if they "may be present at greater depth" shouldn't they be found since SDS and BPA are proposing to put structures that weigh quite a few tons unto unstable ground that is subject to mass wasting? The groundwater issue needs to be addressed with further field studies and deeper coring. Where is the watershed map for this area? What is the extent of the watershed for this area? The 50+ turbine pads are 50 X 50 feet and this would introduce a large quantity of impermeable surface area to unstable ridges. How would these impermeable surfaces affect water saturation and water flow in the watershed? Is this area included in the Water Resource Inventory Area (WRIA) 29?

3.3.1.4 Floodplains

The project site is located on a series of north-trending ridges that range in elevation from approximately 2,100 to 2,300 feet, outside the 100-year floodplain for the White Salmon, Little White Salmon, and Columbia Rivers (FEMA 1986).

3.3.1.5 Public and Private Water Supplies

There are no public water supplies within the project site. Private water supplies are limited to water supply wells serving adjacent residences and agricultural operations.

Comment: Well, where do these "private water supplies" come from? From perched water tables? Other types of groundwater? Are these wells interconnected? Could the construction and excavation from Whistling Ridge affect these wells?

3.3.2 IMPACTS
3.3.2.1 Proposed Action
Construction

Surface Water

On site, project construction would involve roadway improvements on approximately 7.9 miles of existing private, gravel logging roads, construction of approximately 2.4 miles of new gravel access roads, the project substation, an Operations and Maintenance building at one of two alternative sites, the collector system pad, a pad for each turbine tower, and underground electric cables buried in trenches along the access roads. Temporary roadways would be built to provide additional access for heavy machinery during construction. Of these improvements, only the planned improvement to West Pit Road may directly affect water resources.

The planned improvements to West Pit Road would cross one unnamed drainage that currently flows under West Pit Road through a culvert. This drainage would be classified by Skamania County as a Class V stream. The Skamania County Code establishes buffers for Class V streams; however, expansion of existing uses is allowed within these buffers. The culvert under West Pit Road was upsized during road improvements in summer 2009. Depending on the amount of additional roadway widening that may be required, this new culvert may need to be lengthened to extend beyond the width of the improved access road. This would be determined in during final design.

Comment: "Additional roadway widening"? What does this mean? Doesn't SDS know now how much roads would have to be widened? And which roads would actually have to be widened? Determining this during "final design" does not work for me. I want to know now, before this project is approved or not whether and which roads would have to be widened or reinforced since hauling those heavy turbines up narrow roads would require widening and perhaps repaving. SDS should provide information on roads now, not later.

Small portions of stream and stream buffer are located with the 650-foot turbine corridors used for permitting this project. However, all streams and stream buffers would be avoided during the micrositing process.

3-26

No wetlands or other surface water bodies would be filled or otherwise affected as a result of the project. Wetlands are discussed in further detail in Section 3.4.

Stormwater Runoff

Construction would result in approximately 108 acres of disturbed surface, of which approximately 52 acres will be restored. Use of standard construction BMPs would mitigate surface runoff and erosion from these surfaces to a minor level.

Comment: What are these "standard construction BMPs" and where are they located in the DEIS?

Groundwater

No impacts to groundwater are anticipated from construction. Construction water would be obtained from a supplier with valid water rights and no construction water would be withdrawn on site. Potential spills to groundwater during construction would be controlled through standard construction BMPs. A Spill Prevention, Control and Countermeasure (SPCC) Plan will be prepared.

Floodplains

The project site is located outside of floodplain areas. No construction impacts to floodplains would occur.

Public and Private Water Supplies

During construction, approximately 1.7 million gallons of water would be used for road construction, wetting of concrete, dust control, and other activities. Water consumed during construction would be purchased by the contractor from an off-site vendor with a valid water right and transported to the project site in tanker trucks. No water would be withdrawn from the project site during construction. There would be no water treatment requirements or methods on site. Environmentally benign dust palliatives such as lignin may be added to water used for dust suppression to improve efficiency and reduce water use.

Operation

Surface Water

No impacts to surface water are anticipated from project operation.

Stormwater Runoff

The total project site area is approximately 1,152 acres; however, permanently improved areas would cover approximately 56 acres, less than 5 percent of the total project site. Stormwater impacts from disturbed areas would be generated from this permanently improved area. .

The increase in surface water runoff from this additional impervious surface is expected to be minimal. Stormwater would continue to be routed off-site via culverts and some stormwater would continue to infiltrate in the way it does currently. Based on site conditions and assuming implementation of appropriate BMPs, the net impact to absorption on the project site is considered negligible and there would be negligible impacts to surface water.

3-27

Approximately 22 acres would be converted from forested to non-forested habitat in the areas surrounding the turbines where re-growth of trees would be prevented. This conversion would result in minimal impacts to precipitation interception and runoff.

Groundwater

Operation of the project would have minimal or no impacts to groundwater. The well serving the Operations and Maintenance building would use less than 5,000 gallons of water per day, and would thus be exempt from permit requirements of RCW 90.44.040. The size of the aquifer is not known; however, this would be the only well on the project site, which is approximately 1,152 acres in size. The well would be installed by a well contractor licensed pursuant to Chapter 173-162 WAC, and in compliance with the requirements and standards of Chapter 173160 WAC. The well would be installed consistent with Skamania County Community Development Department and Ecology requirements for new wells.

Although the amount of impervious surface would increase by approximately 52 acres with the construction of the project, impacts to groundwater recharge during operation would be negligible.

Floodplains

The project site is located outside of floodplain areas. No impacts to floodplains would occur from operation of the project.

Public and Private Water Supplies

Project operation would require water use primarily for the bathrooms, showers, and kitchen in the Operations and Maintenance building. When the project is operational, there would be eight to nine permanent full-time and/or part-time employees on the Operations and Maintenance staff. The average total water supply needs would be less than 5,000 gallons per day.

Water supply for the Operations and Maintenance staff would be provided through a well drilled on the project site. All water would be discharged to a septic tank installed on site, and thus most of the water used would be returned to the aquifer. There would be no process water generated on site, and no water associated with plant operations would be discharged to surface waters.

Comment: So there is an aquifer. If there is an aquifer then there is groundwater. What is this aquifer, what is its extent? Do the other wells in the area use this aquifer for their water?

The project would not require the use of any water for cooling or any other industrial use, and there would be no industrial wastewater stream from the project. The project would require and obtain approval for the new well from EFSEC, in consultation with Skamania County Environmental Health Department and Ecology.

The project would not require any new water rights or authorizations beyond the well for the Operations and Maintenance building.

Due to the low volume of water that would be required for operational use, no alternatives to reclaim water or other water reuse projects would be required.

3-28

Project water use is not expected to affect water levels in private wells in the vicinity of the project. There are no public water supplies within the project site; therefore, no impacts are anticipated to public water supplies.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant will provide EFSEC with an initial site restoration plan at least 90 days prior to the beginning of site preparation. The plan will address site restoration that would occur at the conclusion of the

project's operating life (estimated to be 30 years), and restoration in the event the project is suspended or terminated during construction or before it has completed its useful operating life. The plan will include or parallel a decommissioning plan for the project.

Comment: These plans should not be left for later. They should be in the DEIS now so that we can all comment on them. I think it is very important to know HOW a project will be decommissioned and who will be responsible for removal and costs. Is there some type of bond that the project proponents have to put up so that we the taxpayers don't get stuck with having to decommission wind farms??

The initial site restoration plan will be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential changes to surface water flow, water quality, stormwater runoff, groundwater quality, or water supply. If impacts to water resources are anticipated to occur as a result of site restoration and project decommissioning, mitigation measures will be proposed as part of the plan.

Comment: What are these "mitigation measures" that will be proposed if there are water impacts? What kind of impacts to water resources is SDS anticipating? Why not list these mitigation measures now so that we can all see if they would be adequate? The DEIS should include information on impacts to water resources.

3.3.2.2 No Action Alternative

Under the No Action Alternative the project would not be built, and there would be no well drilled to support the Operations and Maintenance building. No impacts to surface or ground water would occur.

3.3.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential impacts of the proposed project related to water resources during pre-construction, construction, and operation.

• Prepare and implement a Stormwater Pollution Prevention Plan (SWPP) prior to construction of the proposed project to lessen soil erosion and improve water quality of stormwater run-off. The SWPP will be developed to prevent movement of sediment off-site to adjacent water bodies during short term or temporary soil disturbance at construction sites. The plan addresses stabilization practices, structural practices and stormwater management (as outlined by Section 402(p) of the Federal Clean Water Act and Chapter 90.48 RCW of the State of Washington's Water Pollution Control Act).

• Identify all areas of potential chemical storage during construction, including any herbicides, and provide appropriate control measures within the SWPP.

Comment: Is Whistling Ridge proposing to use herbicides over the life of the proposed wind farm to control vegetation? What kind of herbicides and/or pesticides is SDS proposing to use? What is the chemical makeup of any proposed chemicals that might be used on this project? Are there any potential health hazards to human beings and wildlife?

• Control the sequence and methods of construction activities to limit erosion. Clearing, excavation, and grading would be limited to the minimum areas necessary for construction of the project, and would not be performed far in advance of facility construction.
3-29

• Design slopes to be graded no steeper than 3 feet horizontal (H) to 1 foot vertical (V).

• Protect slopes less than 3H:1V with silt fencing as appropriate. Silt fences would be installed in locations where they would trap silt eroded from slopes during construction and prior to reestablishing vegetation. The maximum flow path to each silt fence would be approximately 100 feet. No concentrated flows greater than 1 cubic foot per second would be directed toward any fence for the 25-year storm. Silt fences would be maintained throughout the construction period and beyond, until disturbed surfaces had been stabilized with vegetation. Silt fence construction would be determined by local construction conditions during final design of the facilities.

• Design sediment control measures used during construction based on 10-year design storm specifications. Water quality measures (other than sediment removal) would be based on the 6-month, 24-hour design storm.

• Utilize sediment traps to intercept stormwater runoff and allow sediment to settle, thereby minimizing the amount of sediment flowing off site. Sediment traps would be sized for the specific disturbed area, for bare soil conditions, and typically for 75 percent sediment removal efficiency.

• Implement and emphasize erosion controls over sediment controls through non-quantitative construction activities such as:
- Straw mulching and vegetating disturbed surfaces

- Retaining original vegetation wherever possible

- Timing grading operations to dry seasons

- Directing surface runoff away from denuded areas

- Keeping runoff velocities low through minimization of slope steepness and length

- Providing and maintaining stabilized construction entrances

• Grade control structures such as rock check dams, hay bale check dams, dikes, and swales would be used where appropriate to reduce runoff velocity, as well as to direct surface runoff around and away from cut-and-fill slopes. Swales and dikes also would be used to direct surface water on top of the filled pad toward sediment traps and away from flowing over the bank.

• Utilize the appropriate erosion control blankets designed for various weather conditions during the construction period, such as straw or jute matting or other suitable erosion control blankets, on any disturbed slopes to prevent erosion and control sediment migration.

• Use quarry spall construction entrances to reduce migration of construction dirt to public roads. Placing the construction entrances is one of the first activities required at the site, but the rock bed also must be periodically replenished as it becomes dirty or migrates into the subgrade. All construction traffic would be directed to use the construction entrances.

3-30

• Restore ground surfaces within fourteen days of the area's final disturbance. Interim surface protection measures, such as erosion control blankets or straw matting, also may be required prior to final disturbance and restoration if warranted by the potential for erosion.

• Reduce potential for chemical pollution of surface waters during construction. Since source control is the most effective method of preventing chemical water pollution, careful control must be exercised over potentially polluting chemicals used on site during construction. Under the SPCC Plan, the general contractor would be responsible for planning, implementing, and maintaining BMPs for:
-Neat and orderly storage of construction chemicals and spent containers in lined, bermed areas

- Prompt cleanup of construction phase spills

- Regular disposal of construction garbage and debris

• Train employees to utilize methods outlined by the SWPP.

• Dispose and contain garbage generated during construction properly.

• Design and incorporate BMPs into final construction plans and specifications so that operational impacts to water resources will be minor.

• Construct appropriate stormwater hydraulic and treatment facilities making sure that routine maintenance and chemical pollution prevention through source control are utilized for permanent stormwater management.

• Utilize the following constructed permanent stormwater BMPs:
- Vegetated drainage ditches

- Culverts with stabilized inlets and outlets

-Permanent erosion and sedimentation control through site landscaping, grass, and other vegetative cover

-Runoff treatment BMPs facilities would be designed to conform to the applicable Stormwater Management Manual

• Adopt operational BMPs to implement good housekeeping, preventive and corrective maintenance procedures, steps for spill prevention and emergency cleanup, employee training programs, and inspection and record keeping practices as necessary to prevent stormwater pollution. Examples include:
-Neat and orderly storage of chemicals under cover in the Operations and Maintenance facilities

Comment: What are these chemicals that are in storage? What is their chemical makeup? Are they hazardous? Are they dangerous to humans and wildlife?

3-31

- Prompt cleanup and removal of spillage

- Regular pickup and disposal of garbage and rubbish

- Prevention of accumulations of liquid or solid chemicals on the ground or the floor

• Train facility operators annually to in spill response and in the applicable pollution control laws and regulations.

• Train additional staff to recognize areas that may be affected by a spill and potential drainage routes.

• Train additional staff to report spills to appropriate individuals.

• Train additional staff on the appropriate material handling and storage procedures.

• Train additional staff to implement spill response procedures.

• Summarize in-house compliance inspections to be kept with the SWPP, along with any notifications of non-compliance and reports on incidents such as spills. If the SWPP has been followed but still proves inadequate to prevent stormwater pollution, project staff would amend the SWPP and seek EFSEC concurrence with the improvements.

• Utilize BMPs to include vegetated ditches or swales which will increase infiltration to protect groundwater.

• Utilize a site development plan to protect groundwater from the on-site storage of chemicals (if any).

3.3.4 UNAVOIDABLE ADVERSE IMPACTS

Construction and operation of the project would only result in negligible to minor impacts to water resources because the impacts are localized and the disturbance is short-term.

Comment: Now see, this is why this DEIS is so frustrating. Since there is no watershed map and the proponents don't know whether there is an aquifer or perched water tables or other sources of groundwater, they cannot make such a blatantly inaccurate statement. There is no data in this DEIS that could be used to conclude "negligible to minor impacts to water resources." The proponents don't have any way of knowing whether "impacts are localized and the disturbance short term" because they have NOT done a CUMULATIVE IMPACTS ANALYSIS for impacts and effects of this project and all other such projects in the region.

3.3.5 REFERENCES

Federal Emergency Management Agency (FEMA). 1986. Flood Insurance Rate Map, Skamania County, Washington; Community Panel Number 530160 075 B.

Haagen, Edward. 1990. Soil Survey of Skamania County Area, Washington. US Department of Agriculture, Natural Resources Conservation Service, Washington Soil Survey Program.

3-32

3.4 BIOLOGICAL RESOURCES

This section describes the existing biological resources on the project site, including vegetation, habitat, wetlands, special status species, fish and other wildlife. It also considers the potential for impacts to biological resources as a result of construction and operation of the project, and mitigation measures designed to minimize those impacts. Information in this section is taken from the following background studies and reports:

- Vegetation Technical Report: Saddleback Wind Project (CH2MHill, no date) (Appendix C-1)
- Wetland Delineation Report, Saddleback Wind Energy Project (CH2MHill 2007) (Appendix C-2)
- Rare Plant Survey Report: Saddleback Wind Project (CH2MHill 2003) (Appendix C-3)
- Baseline Avian Use Surveys of the Project in Fall 2004, Summer 2006, and winter-spring 2008-2009 (West Inc. 2009a) (Appendix C-4)
- Final Report, Northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project (Turnstone 2004) (Appendix C5)
- 2008 Final Report, Results of northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project. (Turnstone 2008) (Appendix C-6)
- 2009 Report, Results of northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project. (Turnstone 2009) (Appendix C-7)

• Bat Acoustic Studies for the Whistling Ridge Wind Resource Area in 2007 (West Inc. 2008; Appendix C-8), 2008 (West Inc. 2009b; Appendix C-9), and 2009 (West Inc. 2009c; Appendix C-10)
• Washington Natural Heritage Program (WNHP 2003a, 2003b, 2009)
• Discussions with representatives of Washington Department of Fish and Wildlife and USFWS
• Supplemental wetland reconnaissance and special status plant surveys in May and July 2009

Comment: I am not an expert on the spotted owl issue, but wasn't there a lawsuit filed in Washington, D.C., by the American Forest Resource Council, in 2009, challenging the Department of Interior's (DoI) U.S. Fish and Wildlife Service (USFS) 2008 Northern Spotted Owl critical habitat designation? The U.S. DoI had made a court motion asking the court judge to remand and vacate the owl's critical habitat designation and to remand the recovery plan on which the designation was made. The government's action was basically seeking to set aside the 2008 critical habitat designation. It was DoI Secretary of Interior Ken Salazar who announced the withdrawal of the Western Oregon Plan Revisions (WOPR) Records of Decision (RODs) on July 16 2009; at this same time he also announced the government would also seek to have the critical habitat designation vacated. What is the status of this lawsuit as it regards to the spotted own critical habitat in this region? BPA must do cumulative impact analyses on the effects of its regional infrastructure and energy production facilities on the critical habitats of the spotted owl (and other species). The DEIS, as far as I was able to see, does not address BPA's impacts on critical spotted habitat. This needs to be remedied.

3-33

3.4.1 AFFECTED ENVIRONMENT

3.4.1.1 Regional Environment

The project site is located in the Southern Washington Cascades Province, within the grand fir (Abies grandis) and Douglas-fir (Pseudotsuga menziesii) major vegetation zones (Franklin and Dyrness 1988). Topography in the area is characterized by generally accordant ridge crests, separated by steep, deeply dissected valleys. The prevailing climate is cool and wet. The majority of precipitation falls as snow, which may accumulate one to three meters during the winter season. The site is located on Underwood Mountain. Major drainages in the vicinity of the project site include the White Salmon Basin to the east and the Little White Salmon River Basins to the west, both of which drain to the Columbia River, which is located south of the project site.

Comment: In section 3.17, there is this statement about snow: average of 9 inches of snow per year. Footnote 4. Which is the true statement "...snow, which may accumulate one to three meters during the winter season" or "average of 9 inches of snow per year"?? This does not compute. Three to nine feet of snow is a lot different than 9 inches of snow. Meters of snow mean more water erosion. Meters of snow mean more snow removal traffic. Meters of snow could also mean lack of access to the wind turbines when they have to be tied down due

to high winds. What happens if the technicians can't get to the wind turbines and the blades are subjected to high winds? Will they rip off? Will they go flying into neighboring properties? What happens during high winds and snow season? What's the standard operating procedure to be followed? The DEIS should answer these questions and address the issue of snow.

Historically, the project site was dominated by grand fir and Douglas-fir. The relative abundance of each of these coniferous species was driven by elevation, aspect, underlying soil, and previous disturbance history (Franklin and Dyrness 1988). Mixed conifer and deciduous forest stands were present, typically following natural disturbance events. Deciduous forests also were present, composed mainly of alder (Alnus rubra, A. viridis ssp. sinuata), Pacific dogwood (Cornus nuttallii), and big-leaf maple (Acer macrophyllum).

For the last century, the predominant land use in the area located between Underwood Mountain and the Little White Salmon River has been commercial forest production. Lands within the project site are privately owned, and have been actively-managed for timber for the last century. As a result of ongoing timber harvest, forests within the project site are now characterized by a mosaic of stand ages; however, average stand age has declined as a result of relatively short stand rotations.

Changes in stand structure and complexity, patch size, and species distribution also have occurred. Forest management practices have resulted in a shift in species dominance to the commercially valuable Douglas-fir. Changes in stand structure and complexity, patch size, and species distribution also have occurred. Few large, old-growth conifers exist in the project vicinity, and there are no late-successional stands or old forest habitats (using Washington Forest Practices habitat definition) within or adjacent to the site.5 Canopy species within the corridor areas have been removed, and areas are managed to be devoid of shrub and tree species.

Comment: If SDS is such a poor steward of their lands so that there is a mosaic of stand ages, few large, old growth conifers, and no late successional stands or old forest habitats, then I'm not quite sure why we would trust SDS to take care of and protect the 1000+ acres on the proposed wind farm site from further fragmentation and degradation! SDS's purported reason for proposing this wind farm is to help reduce the CO2 footprint of the Pacific NW. Then wouldn't it be better if they were growing more older and bigger trees which have been scientifically proven to store more CO2 then younger trees? Instead they have an area which has been under commercial forest production for the last century and "average stand age has declined as a result of relatively short stand rotations" and probably the practice of clear-cutting, a practice that should be prohibited in active forest management, has not helped the stands, either.

The proposed turbine corridors have been forested recently in general conformance with established timber harvest schedules, and are connected by a network of existing forest roads. Four major BPA high voltage transmission lines, located in two corridors, cross the site. Canopy species within these two corridors have been removed, and areas are managed to be devoid of shrub and tree species. The project site contains a network of roads ranging in width from

approximately 8 to 20 feet. These roads are currently used to support logging activity and to access BPA transmission lines.

5 "Adjacent" refers to defined as non-SDS lands that were within 1.8 mile of the proposed turbine strings and/or the two known northern spotted owl management areas (Mill and Moss Creek) north of the project site.

3-34

A Williams Northwest natural gas pipeline is located on the northern edge, their natural compressor station is located to the west, and cellular towers and communications facilities are located nearby. Resource mining in the area has left rock pits in places. As a result, the project area includes no native habitat and is permanently committed to use by commercial forestry operations and utility infrastructure.

Comment: SO, where are the cumulative impact analyses for this apparently industrialized area? If all of this man-made infrastructure exists in this area, surely there are cumulative impacts and they must be considered in the broader context of cumulative regional impacts and effects of further industrialization—and a wind farm is an industry.

Initial habitat, vegetation, and special status plant surveys were conducted within the Project site in 2003. Environmental assessments included a pre-field information review and field surveys designed to classify habitats and identify special status plants that may occur within the project site. Supplemental habitat, vegetation, and special status plant surveys were conducted in 2009.

3.4.1.2 Habitats

Habitat maps were created using DNR orthophotos from January 2002 and classified using the USFS Classification System (USFS 1985). Habitat maps were field-verified during the 2003 survey season. These data were entered into a GIS database and used to calculate the total acres of each habitat type that would be crossed by the proposed project elements. The results of the habitat survey are provided in the Vegetation Technical Report (Appendix C-1).

Five vegetation communities and wildlife habitats were identified within the project site:

- Grass-forb stand (recent clearcuts)
- Brushfield/shrub stand
- Conifer-hardwood forest
- Conifer forest
- Riparian-deciduous forest

All five of the vegetation communities are part of a mosaic of habitat that comprises a commercial forest operation, as discussed in Section 3.4.1.1. Because of these man-made conditions, which result in frequent and repeated disturbance, the quality and value of the forest is generally considered low. Native tree species are used in timber production; however, they are not allowed to become mature forests prior to harvesting. Stand structure also is considered to be

low quality with limited undergrowth of a few species. Weeds are present, especially in clear cuts, which are eventually cleared for regeneration. Patch size of forests are generally small, and bisected by numerous roads, transmission lines and other facilities for logging. Timber harvest rotations are ongoing; therefore, future quality of the habitat on the project site is also considered low.

Grass-Forb Stand

Grass-forb stands are defined as habitats where shrubs comprise less than 40 percent crown cover and are less than 5 feet tall (USFS 1985). This stand type typically occurs when a natural or anthropogenic disturbance such as a wildfire, wind, or timber harvest results in the removal or death of the majority of large trees, or when brushfields are cleared for planting. These habitats

3-35

may be devoid of vegetation, or covered by herbaceous grasses and forbs. Tree regeneration in grass-forb stands is typically less than 5 feet tall and 40 percent crown cover. Grass-forb stands within the project site are located primarily in recently clearcut harvest areas. Vegetation in these areas is minimal and consists predominantly of weedy herbaceous species, including bull thistle (Cirsium vulgare), Canada thistle (Cirsium arvense), and dandelion (Taraxacum officinale). Coarse woody material, occasional slash piles, and large areas of bare ground are common in these areas.

Brushfield/Shrub Stand

Brushfields are defined as the shrub-dominated habitats (USFS 1985). These habitats typically develop following clearcut harvest, or natural disturbance that may result in removal of vegetation.

The majority of brushfields are young plantations that have been planted with Douglas-fir. The plantations typically have not reached the closed-canopy stage. Vegetation consists of remnant forest understory species, such as vine maple (Acer circinatum), Sitka alder, beaked hazelnut (Corylus cornuta var. californica), serviceberry (Amelanchier alnifolia), oceanspray (Holodiscus discolor), bracken fern (Pteridium aquilinum), sword fern (Polystichum munitum), and early successional species such as Himalayan blackberry (Rubus armeniacus), fireweed (Epilobium angustifolium), common yarrow (Achillea millefolium), pearly everlasting (Anaphalis margaritacea), and grasses. Large amounts of bare soil, slash and other logging debris are common.

Vegetation control has occurred in some areas as part of existing forest management practices. Control methods include herbicide application and/or mechanical control. Areas where vegetation management has occurred are visually and functionally different from areas where control has not been implemented. In areas where vegetation control has not occurred, dense vine maple thickets with occasional alder or Douglas-fir frequently occur. Patches of alder saplings, salmonberry (Rubus spectabilis), vine maple, red elderberry (Sambucus racemosa),

oceanspray, lupine (Lupinus spp.), Oregon oxalis (Oxalis oregana), and grass also may be present in these areas. Small diameter coarse woody material is common.

Conifer-Hardwood Forest

Conifer-hardwood forests within the project site are predominantly characterized by the presence of bigleaf maple and Douglas-fir, with some red alder. The forest stand condition is characterized as a multi-layer, closed sapling-pole forest (USFS 1985). Canopy height ranges from 40 to 60 feet, and canopy closure is between 60 and 80 percent. The majority (~70 percent) of canopy cover results from the presence of Douglas-fir. The shrub layer is characterized by vine maple, salmonberry, thimbleberry (Rubus parviflorus), red elderberry, beaked hazelnut, and Pacific dogwood. Density of the shrub layer is variable. The herbaceous layer is characterized by sword fern, trailing blackberry (Rubus ursinus), oxalis, grasses, and moss. Coarse woody material is generally low to moderate. Deciduous snags are more common than conifer snags; however, short well-decayed conifer snags may be present.

3-36

Conifer Forest

Coniferous forests located within the project site are dominated by grand fir and Douglas-fir. Forest stand condition is primarily closed sapling-pole-sawtimber and large sawtimber. The diameter at breast height of pole-size conifers measures 8–12 inches. The diameter at breast height of sawtimber measures 12 to 23 inches. Closed sapling-pole-sawtimber stands are characterized by closed canopy, relative short live crowns, and exclusion of shrub species and many forb species. Coarse woody material in these stands is typically low, consisting mainly of remnants from historic forests. Snags are rare; however, small diameter snags become more common in the pole and sawtimber stages, as smaller individuals are out-competed.

Large sawtimber is considered to be at least 21 inches diameter at breast height. Large sawtimber stands are characterized by within-stand differentiation of canopy species, the emergence of dominant trees, and a more diverse and multilayer understory composed of shrubs and forbs. Snags and coarse woody material are generally rare; however, this may vary depending on past harvest practices, stand management, and actual stand age. The majority of coniferous forests within the project site is managed for commercial timber production, and is replanted following harvest. Commercial timber lands are widespread throughout the vicinity of the project site.

Riparian Deciduous Forest

Riparian deciduous forests may develop in near-stream areas as a result of natural or anthropogenic disturbance. Riparian deciduous forest habitats are present within the project site in an area known as "Cedar Swamp." Historically this area was dominated by large, old-growth western redcedar (Thuja plicata); however, these trees have since been harvested. Cedar Swamp is now dominated by willow (Salix sp.) and cottonwood (Populus balsamifera), with scattered occurrences of young western redcedar. Cedar Swamp is discussed further in Section 3.4.1.3.

The vegetation communities described above are common throughout the Southern Washington Cascades Province. In the proposed project site, these communities are maintained primarily through forest management. Because the project is located within private commercial timber lands, existing forest management practices are expected to continue for the foreseeable future. The total acreage of each habitat type was calculated during the 2003 surveys; however, because of active forest rotation schedules, some of these areas have been harvested. Aerials photos from 2009 were used to update the habitat maps from 2003 with recent timber harvests (Figure 3.4-1). The updated acreages of each habitat type can be found in Table 3.4-1.

Grass-forb, brushfield/shrub, and conifer forest habitat types are present along West Pit Road. However, the band along the road that is within the project bounds is too narrow to map on Figure 3.4-1.

3-37

33758687_142.cdr

Figure 3.4-1

Source: GeoDataScape. Habitat Types

Table 3.4-1
Habitat Types within the Project Site

Habitat Type	Area (acres)
Grass-Forb Stand	522
Brushfield/Shrub Stand	103
Conifer-Hardwood Forest	310
Conifer Forest	209
Riparian Deciduous Forest	8
Total	1,152

In addition, the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species database was searched for the area in and around the project site. No sensitive habitat features such as snags, talus, or Oregon white oak were identified in or within one mile of the project site. The project site is not located within any known wildlife corridor, flyway, foraging area, or migratory route.

Comment: Just because "the project site is not located within any known wildlife corridor, flyway, foraging area, or migratory route" does not mean that these do not exist on site. The whole Columbia Gorge region is a well known bird migration route so why would this area be exempt. Flying predators love ridges and ridges are where SDS proposes to put whirling death

blades which probably won't do the predators much good. I'm sure the Audobon Society will be glad to provide SDS and BPA with facts and figures on migrating birds.

3.4.1.3 Wetlands

No wetlands or wetland indicators were identified within the project site study area (the turbine corridors and proposed access roadways). One wetland was identified outside the study area perimeter west of turbines C1-C4 (Figure 3.4-2). This wetland is labeled as "Cedar Swamp" on the USGS map and is listed as palustrine unconsolidated bottom, semi-permanently flooded, impounded (PUBFh) on the National Wetland Inventory (NWI) (Appendix C-2).

Cedar Swamp is classified as a Category II wetland according to the Washington State Wetland Rating System for Eastern Washington (Ecology 2004). The standard wetland buffer for Category II wetlands enforced by Skamania County is 100 feet. The Cedar Swamp wetland is over 150 feet from the nearest proposed turbine string or proposed road.

A preliminary review of the NWI was conducted for the area encompassing the construction access. Results indicate that wetlands occur along SR 14 near White Salmon, Washington (Figures 3.4-3a and 3.4-3b). The NWI does not show the presence of wetlands along any of the local secondary and forest roads proposed to be used by the project. As the NWI is based on historic aerial photography interpretations, field investigations were conducted in May and July 2009. These investigations confirmed that wetlands do not occur along the local secondary and forest roads. See Section 3.3 for a discussion of surface water features such as streams.

3-39

33758687_143.cdr

Figure 3.4-2

Source: GeoDataScape. Project Site Wetland
33758687_155.cdr

Figure 3.4-3a
Job No. 33758687 East Access Route NWI Wetlands

Whistling Ridge Energy Project
Conditional Use Permit Application 33758687_156.cdr

Figure 3.4-3b
Job No. 33758687 West Access Route NWI Wetlands

3.4.1.4 Special Status Plant Species

Several sources were used to identify special-status plants that have been documented or have the potential to occur within the vicinity of the proposed project, including:

• Listed and Proposed Endangered and Threatened Species and Critical Habitat; Candidate Species; and Species of Concern in Skamania County (USFWS 2009a)
• A Washington Natural Heritage Program (WNHP) record search of known special status plant locations in the vicinity of the project site (WNHP 2003a and 2009)
• Rare Plant List for Skamania County (WNHP 2003b and 2009)

These data indicated that no federal-listed plant species are known to occur in the vicinity of the project site. However, four WNHP sensitive plants occur within 2 miles of the project site, including branching montia (Montia diffusa), Suksdorf's desert parsley (Lomatium suksdorfii), Siskiyou false hellebore (Veratrum insolitum), and golden chinquapin (Chrysolepis chrysophylla). Two additional special status plant species are reported as historically occurring in the vicinity of the project site, including bolandra (Bolandra oregana) and white-top aster (Sericocarpus rigidus). Three occurrences of the Oregon white oak/Idaho fescue (Quercus garryana/Festuca idahoensis) vegetation community, a WNHP high-quality plant community, are documented within 2 miles of the project site (WNHP 2003a and 2009). These are located along the Columbia and White Salmon Rivers.

Initial surveys were conducted in May and June 2003, and followed methods described in the US Bureau of Land Management Survey Protocols for Survey and Manage Strategy 2 Vascular Plants (Whiteaker et al. 1998). Survey dates were selected to encompass all or a portion of the blooming times of all special status plants potentially occurring in the project site. Surveys were conducted within a 300-foot corridor centered on proposed turbine strings and associated access roads, and a 100-foot corridor centered on existing roadways that were identified as needing improvement (Figure 3-4-4). Special status plant surveys also were conducted in proposed locations for the Operations and Maintenance facility, substation, and staging areas. During the 2003 surveys, no special status plant species or plant communities were detected on the project site. A detailed account of survey methods and results, as well as a list of plant species observed during vegetation surveys, can be found in Appendix C-3.

Because turbine locations were changed from the initial alignment, field surveys conducted prior to the March 2009 Application submittal did not cover 100 percent of the proposed project area. Additional surveys were conducted in May and July 2009 to supplement the previous studies and included West Pit Road and underground cable routes where potential special status plant habitat could exist (Figure 3.4-4). During this survey, two WNHP Watch List species were observed within the project area: phantom orchid (Cephalanthera austiniae) and gnome plant (Hemitomes congestum). Watch List species are afforded no protection by any agency. Most species on the Watch List are no longer actively tracked because they were found to be more abundant than previously thought.

3-43

33758687_157cdr

Figure 3.4-4
Job No. 33758687 2003-2006, 2009 Rare Plant Survey Areas

3.4.1.5 Special Status Wildlife Species

Seven special-status wildlife species are known to occur within the vicinity of the proposed project: bald eagle (Haliaeetus leucocephalus) golden eagle (Aquila chrysaetos), northern goshawk (Accipiter gentilis), pileated woodpecker (Dryocopus pileatus), Vaux's swift (Chaetura vauxi), olive-sided flycatcher (Contopus cooperi) and western gray squirrel (Sciurus griseus). One species, the northern spotted owl (Strix occidentalis caurina), has been surveyed extensively within the project area and never detected and is therefore considered not to occur. Two additional special status species, Keen's myotis (Myotis keenii) and Townsend's big-eared bat (Corynorhinus townsendii), may occur but have not been identified in prior surveys. These species are summarized in Table 3.4-2. This section provides a detailed account of each species, their status within the project area, and a summary of surveys conducted within the project area.

Table 3.4-2
Federal and State Special Status Species
with the Potential to Occur in the Vicinity of the
Whistling Ridge Energy Project Site

Common Name Scientific Name Washington StateStatus
Federal Status Potential to Occur

BIRDS
Bald eagle Haliaeetus leucocephalus Sensitive Species of Concern,
Bald Eagle Protection Act
Known to Occur
Golden eagle Aquila chrysaetos Candidate Bald Eagle Protection Act
Known to Occur
Northern goshawk Accipiter gentilis Candidate Species of Concern Known to Occur
Northern spotted owl Strix occidentalis caurina Endangered Threatened Does not Occur
Olive-sided flycatcher Contopus cooperi -Species of Concern Known to Occur
Pileated woodpecker Dryocopus pileatus Candidate -Known to Occur
Vaux's swift Chaetura vauxi Candidate -Known to Occur

MAMMALS
Western gray squirrel Sciurus griseus Threatened Species of Concern Known to Occur
Keen's myotis Myotis keenii Candidate -May Occur
Townsend's big-eared bat Corynorhinus townsendii Candidate Species of Concern May Occur

Bald Eagle

The bald eagle is a state and federal species of concern, and also protected under the Bald Eagle Protection Act of 1940 (16 United States Code [USC] 668-668d, 54 Stat. 250) which prohibits the taking, possession and commerce of such eagles. In Washington, bald eagles are year-round residents. In addition, many bald eagles from northern areas migrate south to Washington during the winter. In Washington they occur generally in coastal waters or near large inland lakes or

rivers. They are considered "fairly common" during the winter near the project site, but likely occur nearby year round (BirdWeb 2009). The Columbia River is approximately two miles south of the project site, and the White Salmon River is approximately three miles east of the project site. These are the two nearest likely foraging locations for bald eagles. One bald eagle was recorded on the project site in 2009 during surveys for northern goshawk. In addition, three

3-45

bald eagles were observed during the winter of 2008–2009 during baseline avian surveys. Two were observed flying within the rotor-swept area, and one below.

Golden Eagle

The golden eagle is a Candidate under the Endangered Species Act and also protected under the Bald Eagle Protection Act of 1940 (16 USC 668-668d, 54 Stat. 250) which prohibits the taking, possession and commerce of such eagles. In Washington, golden eagles are year-round residents, primarily in the eastern part of the state. The project area is at the westernmost edge of their year-round distribution, where they are considered "uncommon" (BirdWeb 2009). Golden eagles require open areas with large, rocky cliffs or large trees. They are often found in alpine parkland and mid-elevation clear-cuts, as well as shrub-steppe area and open forests. Although they soar at high altitudes, they drop down to the ground to capture prey. They prey on mid-sized mammals such as marmots, rabbits, ground squirrels, and birds.

Two golden eagles were recorded during the fall of 2004. The timing of this observation was consistent with localized or longer distance migration of this species in the fall. One was observed flying at a height within the rotor-swept area, and one was observed flying above the rotor-swept area. None were recorded during the summer of 2006 during baseline avian studies in the project area, which is consistent with the project site being outside of the species breeding distribution.

Comment: So, bald eagles and golden eagles, both under protection from the Federal government, were observed in the project area. They could be subject to lethal harm from the whirling blades of the turbines. Where is the de minimis analysis of any "taking" that would result from this project?
There is a troubling attitude among some of the public and among some officials that it's okay if birds get killed because energy is being produced and we humans need energy. Well, it's not okay if birds get killed. There are cumulative impacts to the entire food chain when predators are killed off. Trophic cascade effect anyone? We humans do not exist on this planet in a vacuum. Everything and all life and life's processes are interconnected.

Northern Goshawk

The northern goshawk is categorized as a "species of concern" by the USFWS, and as a "listing candidate" for sensitive, threatened or endangered species by the State of Washington. Goshawks inhabit a wide variety of forest habitats, including true fir (red fir, white fir, and subalpine fir), mixed conifer, lodgepole pine, ponderosa pine, Jeffrey pine, montane riparian

deciduous forest and Douglas-fir. Goshawk nest sites tend to be associated with patches of relatively large, dense forest; however, home ranges often consist of a wide range of forest age classes and conditions. Nest sites tend to be positively correlated with proximity to water or meadow habitat, forest openings, level terrain or "benches," northerly aspects and patches of larger, denser trees, although variation in habitat associations does occur (USFS 2002). Although they inhabit and hunt dense forest sites, they also hunt in open areas. They hunt on the wing, and by swooping down on ground-dwelling prey.

In Washington State, goshawks occur year-round and in some areas only during the non-breeding seasons. The project site is located in an area where either may occur, and the eastern slope of the Cascades is considered the most common place to find this "uncommon" species (BirdWeb 2009). This species is generally non-migratory. Some birds move to lower elevations in the winter.

Northern goshawks were recorded during avian surveys during the fall of 2004 and the summer of 2006. A total of five individuals were sighted; two during the fall and three during the summer (Figure 3.4-5). They were observed flying both within and above the rotor-swept height during surveys. Results of these surveys are detailed in Appendix C-4.

3-46

In response to the baseline data, and in order to better understand these sightings, the Applicant commenced multi-year, species- and season-specific biological surveys for Northern Goshawk. These surveys were developed based on best available survey protocols described below, and in consultation with WDFW. Northern goshawk surveys were conducted during the spring and summer seasons in 2004, 2008, and 2009, which are the time of year when goshawks would be most expected to occur. Surveys occurred on properties managed by SDS, Broughton Lumber and adjacent private land.

In 2004, protocol-level surveys were conducted in suitable habitat located in four core project sections, including the provincial home range radius of 0.5 mile around the core area (see Map 7, Appendix C-5). Suitable habitat was identified using topographic maps and aerial photography. Survey stations were establish at 0.2-mile intervals on roads and trails located in suitable habitat within 0.5 mile of a proposed wind turbine location. Potential goshawk habitat was surveyed in accordance with "Survey Methodology for Northern Goshawks in the Pacific Southwest Region" (USFS 2002). Two rounds of surveys were completed, including 185 calling stations each time. All raptor species responses detected during surveys also were recorded. No Northern Goshawks were recorded during the 2004 surveys. Detailed methodology and results for northern goshawk surveys can be found in Appendix C-5.

In 2008, the potential survey area for the northern goshawk was determined by protocol parameters outlined in the Northern Goshawk Inventory and Monitoring Technical Guide (USFS 2006), consultation with WDFW biologists, and GIS analysis. The survey area was established by placing a 150-foot buffer around the turbine string layout, and then adding an additional 2,624 foot buffer per protocol (see map in Appendix C-6). Forest stands with greatest potential to contain suitable habitat structure and composition to support northern goshawk were identified

using GIS data and aerial photographs. Criteria for selecting stands included stand age greater than 25 years, and an average tree diameter at breast height of at least 12 inches. Based on these criteria, 1,100 acres was identified for surveys (Figure 3.4-5).

It was determined that the "Broadcast Acoustical Survey" methodology would be used for a two-year survey effort (2008 and 2009). Biologists completed two protocol surveys at 136 calling stations during the 2008 goshawk survey season. The first survey was conducted during the nesting period, and the second during the fledgling period. No northern goshawk responses were documented during either of the two site visits in 2008. In 2009, in addition to the two rounds of Broadcast Acoustical Surveys, two rounds of "Intensive Search" surveys were completed. These surveys were conducted where the turbine alignment extended north from prior project design. No goshawks were recorded during either type of surveys in 2009. Detailed methodology and results for 2008 can be found in Appendix C-6. The full methods and results for the 2009 surveys can be found in Appendix C-7.

3-47

33758687_158cdr

Figure 3.4-5
Job No. 33758687 2008-2009 Northern Goshawk Survey Locations

Northern Spotted Owl

The Applicant conducted surveys and analysis to confirm the absence of northern spotted owls or spotted owl activity centers in the vicinity of the proposed project. Additionally, the Applicant coordinated and met with USFWS regarding its surveys and analysis for the northern spotted owl.

On April 9, 2009, the Applicant met with the USFWS to discuss the proposed project. On May 14, 2009, the USFWS met the Applicant at the site for a site visit. On July 13, 2009 and September 14, 2009, the Applicant met with USFWS to further discuss the studies that have been performed for northern spotted owl. This section documents all the information that Whistling Ridge Energy LLC obtained from its discussions with USFWS and the surveys and analysis conducted by SDS.

As detailed below, extensive surveys indicate that neither northern spotted owls nor northern spotted owl activity centers are present in or around the proposed project area. In addition, the project would not be located within a habitat area designated as critical or identified as essential to owl recovery. Given the extensive survey record confirming the absence of northern spotted owls, the proposed the Project will not pose a risk of taking northern spotted owls under the Endangered Species Act Section 9 and its regulations (50 CFR § 17.3).

Northern Spotted Owl Distribution and Status

The northern spotted owl is one of three spotted owl subspecies, and the only one found in

Washington State. They are distributed from extreme southwestern British Columbia to northern California. In Washington State, they inhabit the Eastern and Western Cascades, Western Lowlands and Olympic Peninsula Provinces. Within these regions, northern spotted owls are associated with a variety of areas containing suitable habitat for nesting, roosting, foraging and dispersal. They prefer forest habitats characterized by multi-layered canopy and a high incidence of large trees that provide suitable structure for nesting and roosting. They have large home ranges and use large tracts of land containing late successional forests. Fragmented forest habitats may be used for dispersal and foraging. They will nest in stick nests of northern goshawks, on clumps of mistletoe, in large tree cavities, on broken tops of large trees, or on large branches or cavities in bands and rock faces.

Northern spotted owls are designated as threatened under the Endangered Species Act (16 USC §§ 1531-1544), as well as under Washington State law (WAC 232-12-297). Because they are listed under the Endangered Species Act, USFWS has designated northern spotted owl critical habitat and issued a northern spotted owl recovery plan (USFWS 2008). In addition, the Endangered Species Act prohibits the "take" of northern spotted owls, which includes modifying habitat in a manner that impairs significant behavioral patterns and results in actually killing or injuring an animal (50 CFR § 17.3).

As described in detail below, the project is not located within habitat designated as critical or identified as essential to northern spotted owl recovery. In addition, the owls prefer forest habitats characterized by multi-layered canopy, and a high incidence of large trees that provide suitable structure for nesting and roosting. No such forests are present within the project site. Most importantly, however, extensive surveys following USFWS protocol indicate that the

3-49

project is not sited in or near northern spotted owls or spotted owl activity centers. Two historical nesting sites on public lands near the property have not been used in over six and eight years, respectively, and are therefore no longer considered occupied site centers pursuant to USFWS protocol and state law. Based on these facts, this analysis concludes that northern spotted owls will not be "taken" by the proposed project.

Survey History and Description

The Applicant contracted with Turnstone Environmental Consultants (Turnstone) to conduct wildlife investigations on the proposed project site. Surveys were conducted in 2003, 2004, 2008 and 2009, and all surveys followed the Protocol for Surveying Proposed Management Activities that May Impact Northern Spotted Owls (USFWS 1992). In addition, the National Council for Air and Stream Improvement (NCASI) surveyed historical activity centers near the project site each year since 1994, the last six years of which were under contract with the DNR. These surveys were conducted in support of an ongoing owl demography monitoring study and, while focused on the same activity centers, placed more emphasis on the nest cores. Table 3.4-3 summarizes the survey results.

Table 3.4-3

Whistling Ridge Energy Project Site Survey Results for
Northern Spotted Owl at the Mill Creek Core Areas

Year Mill Creek Core Survey Results Moss Creek Core Survey Results
Spotted Owl Barred Owl Spotted Owl Barred Owl
2009 no response male observed no response pair observed
2008 no response male & female
observed
no response pair observed
2004 no response present* no response present*
2003 no response present* no response no response

* = Surveyor unable to determine sex of barred owl detected.
Project Area Surveys. Surveys were conducted in suitable habitat located in and adjacent to the proposed project site, and included two historical spotted owl activity centers, discussed in further detail below. Suitable habitat was conservatively defined as stands with 12-inch diameter at breast height and greater with a canopy cover of 60 percent or greater6. Suitable habitat was identified using topographic maps, aerial photography, and stand classification data from Whistling Ridge Energy LLC. Figure 3.4-6 indicates the location of survey calling stations.

6 Features that support nesting and roosting typically include a moderate to high canopy closure (60 to 90
percent); a multilayered, multi-species canopy with large overstory trees (with diameter at breast height greater than 30 inches); a high incidence of large trees with various deformities (large cavities, broken tops, mistletoe infections, and other evidence of decadence); large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for spotted owls to fly (Thomas et al. 1990.)

3-50

33758687_159.cdr

Figure 3.4-6
Job No. 33758687 2008-2009 Spotted Owl Calling Points

During the 2003–2004 survey periods, the project site was surveyed from March–July 2003 using the one-year survey methodology, and from March–August 2004 using the two-year survey methodology. USFWS protocol allows a six-visit survey followed by three-visit survey over two years to rule out northern spotted owls for the following two years (USFWS 1992). No northern spotted owls were detected during the 2003–2004 surveys. See Maps 1 through 5 in Appendix C-5 for 2004 survey locations.

More recent northern spotted owl surveys were conducted from May–July 2008 and May–August 2009 (Appendices C-6 and C-7). Surveys were conducted using the USFWS protocol two-year survey methodology, which requires a minimum of three visits for two consecutive

years in order to determine presence or absence (USFWS 1992). Surveys were implemented in all potentially suitable habitat located within a 1.8-mile radius of the corridor. This area totaled 14,901 acres. The survey area also included the historical activity centers discussed below, which expanded the survey area by 7,222 acres. No northern spotted owls were detected in either the survey area or historical activity centers in the 2008–2009 surveys.

The project's proposed layout was finalized in October 2008 and included additions to proposed turbine strings, removal of previously proposed turbines, and identification of areas requiring improved roadways. Changes to the project layout resulted in lands added to the project area that, in some cases, were not included in wildlife surveys conducted prior to October 2008. The final turbine alignment did expand the area requiring owl surveys; however, because the survey area had included spotted owl activity centers located at the northern reach of the proposed project site, the area was accounted for in the 2008 and 2009 surveys.

Historical Activity Centers. Two historical northern spotted owl activity centers, Mill Creek (master site no. 0991) and Moss Creek (master site no. 1003), are located near the project site (Figure 3.4-6). The nest cores of both activity centers are located on public lands managed by DNR and USFS. The Mill Creek activity center is composed of contiguous but scattered northern spotted owl habitat located on private and DNR lands. This site was designated in 1992, and the last known spotted owls were a non-nesting pair seen in 2000 (Table 3.4-4 and T. Flemming, personal communication.). Since 2000, neither the surveys conducted by Whistling Ridge Energy LLC nor DNR/NCASI have found northern spotted owls.

The Moss Creek activity center is composed of patchily distributed northern spotted owl habitat and a mix of rural residential lands, industrial timberland, and lands administered by DNR and USFS. This activity center was established in 1994 and the last known spotted owl was a male detected in 2002 (Table 3.4-4). Since that time, the Turnstone and DNR surveys have not resulted in any detections.

The longstanding absence of any northern spotted owls at these locations suggests that these historic site centers likely no longer qualify for special protection. As of January 1, 2009, an site center is defined under WAC as the location of status 1, 2 or 3 northern spotted owls, where status 1 means a male and female owl pair (i.e., observed in proximity to each other, a female detected on a nest, or one or both adults observed with young); status 2 means a male and female owl where pair status cannot be determined; and status 3 means either (a) "the presence or response of a single owl within the same general area on three or more occasions within a breeding season" where there is no response by an owl of the opposite sex after a complete

survey, or (b) three or more responses over several years (WAC 222-16-010). Only sites documented in substantial compliance with WDFW protocols and quality control methods will be considered site centers (WAC 222-16-010).

Table 3.4-4
DNR/NCASI Mill Creek and Moss Creek Owl Data

Year Mill Creek (T4N R10E) Moss Creek Campground (T4N R9E)
Spotted Owl Barred Owl Spotted Owl Barred Owl
2008 no response pair no response male
2007 no response no response no response male
2006 no response pair no response male
2005 no response male no response pair
2004 no response pair no response pair + 1 juvenile
2003 no response no response no response no response
2002 no response male male pair + 1 juvenile
2001 no response -no response -
2000 pair -nest -

Source: Washington Department of Natural Resources (T. Flemming, personal communication). 2003-2008 surveys conducted by
NCASI pursuant to DNR contract; 2000-2002 survey data provided to DNR by NCASI.

No surveys—whether in substantial compliance with WDFW protocols or otherwise—have documented status 1, 2 or 3 owls on the Mill Creek or Moss Creek sites since January 1, 2009, when the new rule became effective. Furthermore, the Turnstone and DNR/NCASI surveys affirmatively documented the absence of northern spotted owl site centers at these locations. Therefore, the Mill Creek and Moss Creek locations do not meet the definition of a site center under Washington regulations. Even if they did, they should qualify for decertification under the interim decertification rules passed by the Washington Forest Practices Board7.

Similarly, the USFWS protocol allows a historical activity center to be considered unoccupied if no owl responses are obtained after three years of surveys using protocol guidelines (USFWS 1992). These surveys do not need to be consecutive; the protocol anticipates that surveys will be conducted in one- or two-year increments (not three). In any case, however, the DNR/NCASI surveys of the Moss Creek and Mill Creek centers were conducted annually and obtained no responses over six and eight years, respectively. Based on the collective Turnstone and DNR/NCASI surveys, these centers should therefore be considered unoccupied pursuant to the USFWS protocol.

Barred Owl Concerns. During the 2003–2004 and 2008–2009 project area surveys described above, only barred owls were detected. In addition, Whistling Ridge Energy LLC learned that the USFWS is in the process of revising its protocol for 2010 to include special guidance for conducting surveys where barred owls are detected. After the 2008 surveys, the Applicant consulted with USFWS, and was instructed to follow existing survey protocol (K. Berg, personal communication). The Applicant did so, but also incorporated USFWS's suggestion that

7 See Washington State Register 09-02-202 (amending WAC 222-16-080(6)(b) (re-promulgated in Washington State Register 09-10-012 [April 24, 2009]) (emergency rule effective for 2009 calendar year establishing "spotted owl conservation advisory group" to determine whether

northern spotted owl site center need be maintained based on surveys demonstrating absence of the owls).

3-53

biologists visit core areas during the day to look for northern spotted owls, which might not respond in the presence of barred owls. Biologists conducted three day-time site visits over the seasonal breeding window in 2009 but did not detect any northern spotted owls.

NSO Habitat Designations

Federal and state habitat designations can be useful in characterizing the importance of certain areas to spotted owl life cycles and recovery. In this case, as described in the subsections below, the project would not be located in the areas designated as most critical to northern spotted owls or identified as essential to their recovery. The project would be located within a state-delineated management area, but the absence of a site center means that management restrictions would not be applicable to the project site.

Managed Owl Conservation Area and Designated Critical Habitat Area. The USFWS released its Final Recovery Plan for the Northern Spotted Owl in 2008 (USFWS 2008), which recommends a network of habitat blocks, or managed owl conservation areas (MOCAs), on federal lands in the west-side provinces in the northern spotted owl range. MOCAs were designated to correspond to the owl's full geographic distribution. The recovery plan's strategy focuses on managing MOCAs to support self-sustaining populations of 15 to 20 spotted owl pairs, as well as spacing and managing areas between MOCAs to permit owl movement between and among MOCAs (USFWS 2008). The revised critical habitat designation, also issued in 2008, concluded that the MOCA network is "sufficient to achieve the recovery" of northern spotted owls and designated only those lands as critical (73 Federal Register page 47,328). The project site is not located within, adjacent to, or between federally designated MOCAs or, therefore, corresponding designated northern spotted owl critical habitat (Figure 3.4-7).

Conservation Support Area. In the final recovery plan, USFWS delineated Conservation Support Areas (CSAs) to support designated MOCAs. CSAs are areas between or adjacent to MOCAs where habitat contributions made by private, state or federal land managers "are expected to increase the likelihood that [spotted owl] recovery is achieved, shorten the time needed to achieve recovery, and/or reduce management risks…" (USFWS 2008). In Washington State alone, the USFWS delineated 2,163,453 acres as CSA habitat.

The proposed project site is located within the Klickitat CSA, a 425,114-acre mix of private, state and federal lands (Figure 3.4-7). The project site's location within a CSA does not mean that spotted owls are present in the project area, or that modification of the area will compromise owl recovery. As the USFWS explained in excluding CSAs from designated critical habitat, "although recognized as potentially helpful in achieving recovery plan goals, these areas were not considered essential to the conservation of the species" (73 Federal Register page 47,331). Although CSAs are not unimportant, the recovery criteria for northern spotted owl populations "do not require the contributions of [CSAs] as an essential component of recovery" (USFWS

2008). Moreover, to the extent CSA lands provide an important function in supporting the MOCA network, it is worth noting that the project site constitutes just 0.27 percent of Klickitat CSA lands and 0.053 percent of Washington CSA lands.

3-54

33758687_140.cdr

Project Area

Figure 3.4-7

Source: 2008 Final Spotted Owl Recovery Plan (USFWS 2008). Map of Spotted Owl MOCAs and CSAs

Spotted Owl Special Emphasis Area. In 1996, Washington State finalized a rule identifying ten spotted owl special emphasis areas (SOSEAs) to complement protections provided by the Northwest Forest Plan. The proposed project is located in the southernmost portion of the White Salmon SOSEA which, like the Klickitat CSA, was delineated with the goal of providing demographic support (WAC 222-16-086[10]). In such areas, any suitable spotted owl habitat should be maintained (WAC 222-10-041[1]). More specifically, all suitable habitat within 0.7 mile of a site center plus 2,605 acres (approximately 40 percent) of suitable habitat within the median home range circle (a 1.8 mile radius) is assumed necessary to maintain the site center's viability (WAC 222.10.041[4]). This 40 percent suitable habitat level corresponds with USFWS research on the level of habitat necessary to avoid take and support recovery8. According to DNR, both the Mill Creek and Moss Creek site centers exceed 40 percent of the suitable habitat9.

The proposed project will not alter that fact. Therefore, the SOSEA limitations on habitat use or modifications do not restrict use of the project site as a wind turbine energy facility (WAC 222.10.041[4]). Forest practices within a SOSEA are therefore allowed to proceed so long as they do not affect the 40 percent suitable habitat threshold.

Habitat Conservation Plans. A review of USFWS habitat conservation plans issued in the Pacific region indicates that there are no spotted owl-related habitat conservation plans applicable in or near the project area (USFWS 2009b).

The Applicant has sited the proposed project to avoid habitat areas deemed critical to northern spotted owls or essential to their recovery. Surveys conducted pursuant to USFWS protocol indicate that spotted owls are not present in or near the project, and that nearby historical sites are no longer occupied pursuant to USFWS protocol or state law. Because there are no spotted owls or activity centers present in the project area, no project impacts to northern spotted owls are expected. Finally, the project would not affect the White Salmon SOSEA's 40 percent suitable habitat level and therefore is not restricted by Washington's forest practice regulations. Given the extensive record and review, this project does not pose a risk of taking northern spotted owls under The Endangered Species Act Section 9.

Olive-Sided Flycatcher

The olive-sided flycatcher is considered a federal species of concern. This species occurs in forest habitat and adjacent cleared areas such as burned areas or clear cuts. They perch high in treetops and catches insect prey on the wing in cleared areas. They breed in Washington State and also migrate through during August to areas in South America. The olive-sided flycatcher is considered a fairly common breeder in the area encompassed by the project site (BirdWeb 2009). There were 21 birds observed during summer 2006 avian surveys, and six recorded during the spring of 2009. All 21 observed in 2006 were within the rotor-swept area; it is not reported in 2009 how many were in the rotor-swept area. None were recorded during the fall of 2004 or the winter of 2008–2009 (Appendix C-4).

8 See 61 Federal Register 21,426, 21,428 (May 10, 1996) (proposed 4(d) rule for northern spotted owls
setting 40 percent target); USFWS (2008) Appendix C at 77 (targeting 35–40 percent).

9 Data provided by DNR which shows Mill Creek at 48 percent and Moss Creek at 55 percent (J. Herman, personal communication)

3-56

Pileated Woodpecker

The pileated woodpecker is considered a Washington State Candidate for listing. This species occurs in all forest types as long as large trees exist for nesting and foraging. Old-growth and mature forest therefore are a common association. In Washington, pileated woodpeckers occur year round but are uncommon in the vicinity of the project site. They are more common west of the Cascades. During avian surveys in the project area, six pileated woodpeckers were recorded in the fall, two during the winter, seven during the spring, and none in the summer. None occurred within the rotor-swept area (Appendix C-4).

Vaux's Swift

Vaux's swift is considered a Washington State Candidate for listing. It typically occurs in coniferous or mixed forest of mature age where snags are available for roosting and nesting. They forage for insects in flight in open sky, typically above woodlands or bodies of water. In Washington, Vaux's swift breeds widely, and the project site is considered within the range of common occurrence for the species. They migrate south during the fall. During fall 2004 avian surveys, 15 Vaux's swifts were recorded in three groups, 87 percent of which occurred within the rotor-swept area. Four were recorded in two groups during the summer of 2006, all of which occurred within the rotor-swept area. Eleven were recorded during the summer of 2009; the number within the rotor-swept area was not reported in this study (Appendix C-4).

Western Gray Squirrel

The western gray squirrel is listed as a "threatened" species by WDFW. In Washington, western gray squirrel distribution has been reduced to three geographically isolated populations: the "Puget Trough" population, centered in Thurston and Pierce counties, the "South Cascades" population, located in eastern Skamania County, Klickitat and Yakima Counties, and the "North Cascades" population, located in Chelan and Okanogan Counties. Western gray squirrels are arboreal species. Although they forage on the ground, this species rarely strays far from trees. They use tree canopies for cover and nesting. Western gray squirrels prefer areas where contiguous tree canopy allows arboreal travel in a minimum of a 198 feet (60 meters) radius around the nest (Ryan and Carey 1995). Western gray squirrels are diurnal species, with most activity occurring during morning hours. This species is most active during August and September, when this species is collecting and storing food for winter (Ryan and Carey 1995). The principal food source for the gray squirrel is acorns; however, conifer seeds are also eaten (Dalquest 1948). While pine nuts and acorns are considered essential foods for accumulating body fat in preparation for winter, green vegetation, seeds, nuts, fleshy fruits, and mushrooms also are consumed (WDW 1993, Carraway and Verts 1994, Ryan and Carey 1995).

Western gray squirrel surveys were implemented by Whistling Ridge Energy LLC on lands located in and adjacent to the project site in 2004, 2008, and 2009 (Figure 3.4-8). Surveys conducted in 2004 included a general search for western gray squirrels and nests while conducting northern goshawk station placement and surveys. Two adult western gray squirrels were identified during that effort.

3-57

33758687_160.cdr

Figure 3.4-8
Job No. 33758687 Western Gray Squirrel Survey Areas

An additional protocol survey was completed following methods described in Surveys for western gray squirrel nests on sites harvested under approved forest practice guidelines: analysis of nest use and operator compliance (Van der Haegen et al. 2004). No western gray squirrels were detected during protocol surveys. Detailed methodology and results for western gray squirrel surveys in 2004 can be found in Appendix C-5.

Additional western gray squirrel surveys were completed by Whistling Ridge Energy LLC in 2008 and 2009. Prior to implementing field surveys, the Applicant consulted with a WDFW biologist to identify survey criteria and methodology. It was determined that gray squirrels surveys should be performed in areas where project activities would result in the removal of potential western gray squirrel habitat or structural modification (i.e., stand thinning), and these surveys should include unaltered habitat within 400 feet of potential disturbance.

An area consisting of a 1,050-foot buffer around the proposed turbine layout to account for lands that may be affected by the project, and also the 400-foot buffer of undisturbed lands, was identified for potential survey. This area included 1,420 acres; however, only 738 acres were identified as potentially suitable to support western gray squirrel (Figure 3.4-8). Surveys were

conducted following methods described by Van der Haegen, Van Leuven, and Anderson (2004). Surveyors searched for individuals and nests, focusing mainly on gray squirrels, but also noting other species. When possible, historical use by western gray squirrels was determined. No gray squirrels or nests were detected during these surveys in 2008 or 2009. Detailed methodology and results can be found in Appendices C-6 and C-7.

Keen's Myotis

Keen's bat is considered a Washington State Candidate for listing. In Washington, this species is recorded as occurring on the Olympic Peninsula and Cascade Mountains (BCI 2009). The project site is likely on the very edge of the distribution range for Keen's myotis. Although little is known about this species, it is believed to rely on old-growth forests. Keen's myotis likely roosts in tree cavities and forages in dense coniferous forests. Bat surveys conducted during 2007, 2008, and 2009 (Appendices C-8, C-9, and C-10) did not have the ability to detect individual species of bats. Instead, bats are grouped into species with either "high-frequency" calls or "low-frequency" calls. Keen's myotis is considered part of the "high-frequency" group. Based on the lack of detailed information of this species life history and habitat requirements and nature of the bat surveys conducted it is difficult to conclude with certainty what the likelihood of Keen's bats occurring on the project site. However, due to the lack of old-growth or mature forest types within the project area and the predominant commercial forestry use of the property, the likelihood of occurrence on the site is considered to be low.

Townsend's Big-Eared Bat

Townsend's big-eared bat is a federal species of concern and a Washington state candidate for listing. Its distribution spans the western US, and occurs primarily in desert scrub and pine forest regions (BCI 2009). In the spring and summer, females form maternity colonies in mines, caves or buildings. In winter they hibernate in caves and abandoned mines. These maternity and roosting locations are sensitive to disturbance. It forages after dark in upland areas. Bat surveys conducted on the project site during 2007, 2008, and 2009 (Appendices C-8, C-9, and C-10) did not have the ability to detect individual species of bats. Instead, bats are grouped into species

Comment: This is inadequate data and analysis and should be redone using the best available science techniques to gather enough data on this particular species so that a thorough analysis of its habitat and numbers can be made.

3-59

with either "high-frequency" calls or "low-frequency" calls. Townsend's big-eared bat is considered part of the "low-frequency" group. Based on lack of detailed information on this species distribution and the nature of the bat surveys conducted on the site, it is difficult to conclude with certainty the likelihood of Townsend's big-eared bats occurring on the project site. There are no known roosting structures or maternity colonies occurring in the vicinity of the project area. Consequently, the likelihood of occurrence on the site is considered to be low.

3.4.1.6 Other Wildlife Species

In addition to studies of special status species, other studies of birds and bats at the Project site have been ongoing since 2004. Birds were surveyed during all seasons of the year in the fall of 2004, summer of 2006, winter 2008–2009 and spring of 2009. Results are summarized in Appendix C-4.

Bats were surveyed during the fall of 2007, summer–fall of 2008 and summer–fall of 2009. Results of those studies are presented in Appendices C-8, C-9 and C-10. The timing of these surveys is expected to capture the peak of bat use during the breeding season (summer) and migration (fall). Information on the potential for other taxonomic groups to occur on the project site is based on general distribution and habitat requirements for individual species.

Birds

Avian surveys were conducted on the project site across all seasons in multiple years. There were: 53 surveys during the fall migration period (September 11 to November 4, 2004), 45 surveys during the breeding/nesting season (May 15 to July 14, 2006), 47 surveys during winter and 116 surveys during spring (December 4, 2008 to May 29, 2009).10

Study protocol followed methods described by Reynolds et al. (1980). An 800-meter circular plot was centered on each observation point (Figure 3.4-9). All observations, behavior, and flight patterns of birds in and near plots were recorded. Flight patterns, such as direction of travel and flight altitude also were recorded.

Observations of birds beyond the 800-meter radius were recorded; however, these data were analyzed separately from data collected from survey plots. The location of raptors, other large birds, or species of concern observed during counts was recorded on field map. A list of all birds recorded on the project site (including those during special status species surveys) is provided in Table 3.4-5. Appendix C-4 contains full results of fall 2004, summer 2006, winter 2008-09 and summer 2009 surveys.

10 In its 2003 Energy Overlay Environmental Impact Statement, Klickitat County also included two survey locations at or in proximity to the Project site. These included surveys during the spring and summer 2003 seasons. See Appendix B to the Klickitat County Energy Overlay Draft Environmental Impact Statement (Kennedy/Jenks Consultants 2003).

3-60

33758687_161.cdr

Figure 3.4-9
Job No. 33758687 2004, 2006, 2008 and 2009 Bird Survey Locations

Table 3.4-5
Birds Observed in the Project Area Across All Seasons

Species(Common Name)
Winter Fall Summer Spring
American crow X
American goldfinch X X X X
American kestrel X
American robin X X X X
Bald eagle X X
Band-tailed pigeon X X X
Barred owl X
Barn swallow X
Bewick's wren X
Black-capped chickadee X X X X
Black-headed grosbeak X X
Black-throated gray warbler X
Brown-headed cowbird X X
Bullock's oriole X
Canada goose X
Cassin's finch X
Cassin's vireo X
Cedar waxwing X
Chestnut-backed chickadee X X X X
Chipping sparrow X X
Clark's nutcracker X
Common raven X X X X
Cooper's hawk X X X X
Dark-eyed junco X X X
Downy woodpecker X X X
Evening grosbeak X X
Golden-crowned kinglet X X X X
Golden-crowed sparrow X
Golden eagle X
Gray jay X
Hairy woodpecker X X X
Hammond's flycatcher X X
Hermit thrush X X
Hermit warbler X
House wren X X
Lazuli bunting X X
Lincoln's sparrow X
Macgillivray's warbler X X
Mountain chickadee X X
Mourning dove X
Nashville warbler X X
Northern flicker X X X X
Northern harrier X X
Northern goshawk X X

Northern rough-winged swallow X
Northern saw-whet owl
Olive-sided flycatcher X X
Orange-crowned warbler X X
Osprey X

3-62

Species(Common Name)
Winter Fall Summer Spring
Pileated woodpecker X X X
Pine siskin X X
Prairie falcon X
Purple finch X X X
Red crossbill X X X
Red-breasted nuthatch X X X X
Red-breasted sapsucker X
Red-tailed hawk X X X
Red-winged blackbird X
Ruby-crowned kinglet X X X
Rufous hummingbird X X
Ruffed grouse X X
Say's phoebe X
Sharp-shinned hawk X X X
Snowy owl X
Song sparrow X X X
Sooty grouse X
Spotted towhee X X X
Steller's jay X X X X
Swainson's thrush X
Townsend's solitaire X X
Townsend's warbler X
Tree swallow X X
Turkey vulture X X X
Varied thrush X X
Vaux's swift X X X
Violet-green swallow X X
Warbling vireo X X
Western bluebird X X X
Western tanager X X X
Western wood-peewee X X
White-breasted nuthatch X
White-crowned sparrow X X X
Wild turkey X
Willow flycatcher X
Wilson's warbler X X

Yellow-rumped warbler X X X
Yellow warbler X

A total of 87 species were recorded during avian surveys. Passerines (songbirds) were the most abundant avian group overall. American robin, dark-eyed junco and white-crowned sparrow were the three most frequently observed birds across all seasons. Mean overall bird use in the study area was low compared to these other wind resource areas studied; ranking 19th compared to 24 other wind resource areas (Figure 9 in Appendix C-4). Eleven species of raptors were observed: American kestrel, bald eagle, Cooper's hawk, golden eagle, northern harrier, northern goshawk, osprey, prairie falcon, red-tailed hawk, sharp-shinned hawk, and turkey vulture. Red-tailed hawk was by far the most observed raptor, followed by Cooper's hawk and sharp-shinned hawk. Mean annual raptor use was 0.28 raptors per plot per 20-minute survey, which is a standardized way to measure use in order to compare results to avian use at other sites. This

3-63

annual rate is low relative to raptor use at 36 other wind-energy facilities that implemented similar protocols and had three or four season surveys. Mean raptor use in the study area was low compared to these other wind resource areas; ranking 29th compared to 36 other wind energy
facilities (Figure 7 in Appendix C-4).

Fall Migration Surveys (2004)

General avian surveys identified 39 species of bird in the survey area (Figure 3.4-9). Passerines (songbirds) were the most abundant avian group, constituting 87.4 percent of observations. This group was observed with the greatest frequency (94.4 percent of surveys). Raptors were the second most abundant group observed; however, this group represented only 4.9 percent of observations. Raptors were observed during 38.5 percent of the surveys, followed by woodpeckers (22.6 percent of surveys) and doves/pigeons (9.3 percent of surveys).

The most common species at the project site included dark-eyed junco, American goldfinch, Steller's jay, common raven, and white-crowned sparrow. The species of birds most frequently observed during fall surveys were common raven, Steller's jay, dark-eyed junco, red-breasted nuthatch, and golden-crowned kinglet. Eight species of raptor were observed during the survey. Those with the highest use of the site were sharp-shinned hawk, Cooper's hawk, and red-tailed hawk. The highest raptor use observed at the site during 2004 surveys occurred between September 11 and October 12, 2004. These data do not indicate that any areas within the proposed site have substantially higher raptor use than others.

No federal or state listed endangered or threatened avian species were observed during the survey period. Four state candidate species were observed: golden eagle, northern goshawk, pileated woodpecker, and Vaux's swift. Two State Monitor species were observed, including four single turkey vultures and four groups totaling 27 western bluebirds. Detailed results and summary tables can be found in Appendix C-4.

Summer Surveys (2006)

Fifty-five species of birds were observed during summer breeding and nesting surveys in 2006 (Figure 3.4-9). Passerines were the most abundant group (88.5 percent), followed by raptors and woodpeckers (3.3 percent each), and doves/pigeons (3.2 percent). The most frequently observed groups were passerines (100 percent of surveys), woodpeckers (35.6 percent of surveys), and raptors (31.1 percent of surveys). Species with the highest use of the project site included white-crowned sparrow, red crossbill, western tanager, spotted towhee, and MacGillivray's warbler. The most frequently observed species included white-crowned sparrow (77.8 percent of the surveys), western tanager (75.6 percent of surveys), spotted towhee (64.4 percent of surveys), MacGillivray's warbler (48.9 percent), and dark-eyed junco (48.9 percent). Three species of raptors were observed, including red-tailed hawk, northern goshawk, and sharp-shinned hawk. Raptor use in the fall was only slightly higher than during the summer breeding season. The data do not indicate that any portions of the project site have substantially higher raptor use than other areas. For all bird species combined, use of the project site by avian species was slightly higher during the summer breeding season than during the fall migration period. Detailed results and summary tables can be found in Appendix C-4.

3-64

Winter/Spring Surveys (2008-2009)

Fifteen species of birds were observed during winter surveys in 2008–2009, and 65 species during the spring of 2009. In winter, observations were dominated by common raven, American robin, and unidentified finches. The number of species and number of individuals observed in the spring were the highest across all seasons. Similar to other seasons, passerines were the most abundant group, followed by woodpeckers and then raptors. Individual species with the highest use included American robin, dark-eyed junco and yellow-rumped warbler. The data do not indicate that any portions of the project site have substantially higher raptor use than other areas. Detailed results and summary tables can be found in Appendix C-4.

The WDFW Priority Habitats and Species database was searched for known occurrences of raptor nests. The only recorded nest was for an osprey, more than one mile east of the project site.

Bats

Bat acoustic studies were conducted for the Project in 2007, 2008 and 2009. Detailed information on these investigations can be found in Appendices C-8 (2007), C-9 (2008) and C10 (2009).

Bat acoustic studies conducted from 2007 through 2009 were implemented at various locations on the project site. The goal of the studies were to: (1) characterize the local bat populations in a variety of habitats, (2) identify areas of high usage by bats, and (3) characterize the frequency of bat usage of areas representative of where turbine strings would be located. Studies were done across several seasons to estimate annual variation during breeding and periods of migration.

For all studies, passive Anabat® II echolocation detectors coupled with Zero Crossing Analysis Interface Modules (ZCAIM; Titly Electronics Pty Ltd., NSW, Australia) were used in all survey years. Anabat detectors record bat echolocation calls using a broadband microphone. Bat species are generally grouped into those that emit low frequency (<35 kHz) or high frequency (= 35 kHz) calls. The units of activity equaled the number of bat passes, and were used to calculate the number of bat passes per detector night (Hayes 1997). The data thus indicate the level of bat activity rather than absolute abundance.

In 2007, detectors were placed at two locations from August 20 through October 21 (Figure 1 in Appendix C-8). The 2007 studies were intended to provide a general census of bat activity in recently reforested or young forest areas. This type of habitat is similar to what would be found in the areas within 150 feet of the proposed turbines, on the two sides of the turbines. The northernmost detector was located just outside the proposed turbine corridor. This detector was initially placed at ground level; however, it was raised to a height of 130 feet (40 meters) on September 7. The southernmost detector was located outside the project site; however, it was placed in habitat believed to be representative of that found on the project site. The southernmost detector was placed at ground level, and remained at that location for the duration of the study.

Due to equipment failures in 2007, both Anabat detectors were only operable for 24 percent of the sampling period, amounting to 45 detector-nights. Bat activity was similar between north and south ground level Anabat units (mean = 11.67 ± 2.0 and 9.6 ± 4.1, respectively). Bat

3-65

activity recorded after the northern Anabat detector was elevated was much lower (mean = 2.47 ± 1.1) than that recorded at ground level. A list of bat species with potential to occur on the projects site based on range maps, divided between high-frequency and low-frequency species, can be found in Table 3.4-6.

Table 3.4-6
Bat Species Likely to Occur in the Project Area, Based on Range-Maps

Species Status
California bat
Big brown bat
Fringed myotis FCo, SM
Hoary bat
Keen's bat SC
Little brown bat
Long-legged bat FCo, SM
Pallid bat SM
Silver-haired bat
Townsend's big-eared bat FCo, SC
Western long-eared bat

Western pipistrelle SM
Western red bat
Western small-footed bat
Yuma myotis

Status Codes:
FCo – Federal Species of Concern
SC – State Candidate
SM – State Monitor

The bat acoustic survey effort was increased to four locations during the 2008 survey period, and the survey period covered July 3 to October 7, 2008. This period corresponded with summer breeding and fall bat migration. Four survey locations were used, all on the ground (Figure 1 in Appendix C-9). Two were located in clear cuts (SB1 and SB4), one immediately adjacent to a wetland (SB2) and one in a road corridor (SB3). Sampling at the wetland was intended to characterize bat occurrence a location known to have a high level of usage, because wetlands are frequently used as foraging and drinking habitat for bats. Similarly, sampling in the road corridor was intended to capture the highest levels of use within the project site, because road corridors are frequently used by bats to travel between roosting and foraging locations. The two clear cut sites were most representative of the types of habitat where turbines would be located for the proposed project. However, because all detectors were located on the ground, sampling did not entirely capture the potential bat use of the rotor-swept area.

Table 3.4-7 summarizes bat activity at all survey locations. During the 2007 and 2008 surveys, the two clear cut sites (SB1 and SB4) had an average of 14.30 and 73.76 bat passes per night, respectively. The wetland (SB2) and road corridor (SB3), recorded much higher levels of use, at

178.03 and 327.25 bat passes per night, respectively. Seasonal activity patterns were similar for the two clear cut survey locations, with the highest bat activity occurring during the months of July and August. Bat activity in the wetland area was highest during the month of July. In comparison to 2007, bat numbers were on average higher because in 2007 this peak use period was not captured during the sampling period (in 2007 sampling did not begin until August 20).
3-66

Table 3.4-7
Average Bat Detections Per Night During Three Survey Years

Year Location Habitat Ground or Elevated
Average per Detector Night
2007 North Young forest G 11.67
North Young forest E 2.47
South Young forest G 9.60
2008 SB1 Clear cut G 14.30
SB2 Wetland G 178.03
SB3 Road corridor G 327.25
SB4 Clear cut G 73.76

2009 WR1 Clear cut G 17.28
WR2 Clear cut E 10.59
WR3 Young forest G 11.04
WR4 Young forest E 1.53
WR5 Clear cut G 6.43
WR6 Clear cut E 1.64

In 2009, the bat survey efforts were further refined to focus specifically on the types of locations where turbines would be sited. Three locations were selected (Figure 3.4-10), two in clear cuts and one in a recently reforested area (young forest). In addition, each sampling location had a pair of Anabat detectors; one on the ground and one elevated on a meteorological tower. The elevated detectors were intended capture bat use in what would likely be the rotor-swept area, which is where potential bat-turbine collisions would occur. The ground level detectors were intended to provide some comparison to prior year studies, most of which were done at ground level. The numbers of bat detections in 2009 are summarized in Table 3.4-7.

In general, elevated detectors recorded fewer bats than their ground level counterparts, indicating that bat occurrence within the rotor-swept area is lower than those at lower flight elevations. For all years (2007–2009), elevated bat detections were the lowest numbers recorded, between 1.53 and 10.50 bat passes per night. All bat detections in 2009 were collected by Anabat equipment installed in locations most representative of potential turbine locations. The detections were notably lower than some of the other records in 2008 taken from equipment placed in areas of known high bat use.

Amphibians and Reptiles

Amphibians and reptiles likely to occur on the project site are those species that can tolerate disturbance associated with managed timber activities and drier-than-average conditions for at least part of their life cycle. This includes such common species as Long-toed salamander (Ambystoma macrodactylum), Rough-skinned newt (Taricha granulose), Ensatina (Ensatina eschscholtzii), Pacific treefrog (Pseudacris (=Hyla) regilla), and northwestern garter snake (Thamnophis ordinoides). Breeding may occur within the intermittent drainages located in the northeast corner of the site, within cedar swamp, or substantial roadside drainage ditches. These species may stray further from water sources during heavy rains or during winter conditions.

3-67

33758687_162.cdr
Figure 3.4-10
33758687_162.cdr
Figure 3.4-10
Job No. 33758687 2009 Bat Survey Locations

Mammals

Several large mammals have the potential to occur within the project site. Known priority

wildlife habitats, including mule deer and black-tailed deer (Odocoileus hemionus) winter range, are present east of Underwood Mountain, extending to lands to the north/northeast. Winter range for Columbia black-tailed deer is present in lands west of Underwood Mountain, and extends north and south from the project site. Elk (Cervus elaphus) winter range is present throughout the project site. Other species likely to occur throughout the region include cougar (Puma concolor), bobcat (Lynx rufus), coyote (Canis latrans), and black bear (Ursus americanus). Douglas squirrels (Tamiasciurus douglasii) were recorded during surveys for the western gray squirrel.

Fish

No fish have been documented within the project site. The project is on a ridgeline between Underwood Mountain and the White Salmon River, approximately 3 miles north of the Columbia River. The ridgeline is oriented in a north-south direction. The Columbia River receives runoff via the White Salmon drainage area east of the site and via the Little White Salmon River west of the site. The White Salmon River contains evolutionarily significant units and designated critical habitat for three species listed as threatened under the Endangered Species Act: (1) Lower Columbia River Chinook, (2) Middle Columbia River Steelhead, and (3) Columbia River Chum (Figure 3.4-11).

A tributary to Little Buck Creek is located in the northeast portion of the project site. This tributary is typed as a non-fish-bearing stream. No special status fish species are present in Little Buck Creek. However, Buck Creeks drains into Northwestern Lake, which in turn drains into the White Salmon River.

West Pit Road crosses an unnamed drainage. This stream had observed flow through the existing culvert under West Pit Road at the time of the July 2009 field visit. However, the surface flow and the channel disappear downstream of the culvert. There is no surface water connection to Lapham Creek or the Little White Salmon River. Fish are not present in this stream.

3.4.1.7 Noxious Weeds

The project site contains several noxious weed species, which are nonnative, invasive plants. The weed species observed during field visits to date are listed in Table 3.4-8.

The Washington Noxious Weed Control Board identifies lists of noxious weed species that require control, eradication, or monitoring. Class A noxious weeds are nonnative species with a limited distribution within a state and require eradication to reduce the potential of becoming more widespread.

3-69

33758687_163.cdr

Figure 3.4-11

Job No. 33758687 Designated Critical Fish Habitat

Table 3.4-8
Noxious Weed Observations

Scientific Name Common Name Status
Centaurea stoebe Spotted knapweed Class B - Designate
Cirsium arvense Canada thistle Class C - Designate
Cirsium vulgare Bull thistle Class C
Cytisus scoparius Scot's broom Class B - Designate
Daucus carota Queen Anne's lace Class B
Hypericum perforatum Common St. John's-wort Class C
Leucanthemum vulgare Ox-eye daisy Class B
Linaria dalmatica Dalmatian toadflax Class B - Designate
Rubus armeniacus Himalayan blackberry Class C
Senecio vulgaris Common groundsel Class C

Class B noxious weeds are regionally abundant, but may have limited distribution in some counties. In Washington, in regions where a Class B noxious weed is unrecorded or of limited distribution, prevention of seed production is required. In these areas the weed is a "Class B designate." However, in regions where a Class B species is already abundant or widespread, control is a local option. In these areas the weed is a "Class B non-designate."

Class C noxious weeds are already widely established, but placement on the state list allows counties to enforce local control if desired. Skamania County has designated a few Class C weeds. Within the project boundary, only Canada thistle (Cirsium arvense) is a designated Class C weed.

3.4.2 IMPACTS

This section identifies the potential impacts to biological resources as the result of both construction and operation of the proposed project.

3.4.2.1 Proposed Action
Skamania County Critical Areas Ordinance Regulation

The Skamania County Critical Areas Ordinance recognizes the following as critical areas: watershed protection areas (including wetlands, streams, creeks, rivers, ponds and lakes); critical aquifer recharge areas; fish and wildlife habitat; frequently flooded areas; and geologically hazardous areas (including landslide hazards, erosion hazards and volcanic hazards). All critical areas have a required no-touch buffer setback based on the classification of the critical area, as set forth in Skamania County Critical Areas Ordinance Title 21A. All buffers are undisturbed buffers and must be free of any logging, road building, or other development activities including, but not limited to, vegetation removal, grading, filling, mowing, or placement of structures. The project would not affect any critical areas or buffers.

Comment: Skamania County has failed to update its Title 21A Critical Areas Ordinance, to date. They began the process in 2006 and have not managed to get an updated Critical Areas Ordinance done, and this is 2010. There are new, updated Best Available Science and Best Management Practices that are not in Skamania County's Title 21A. Skamania County has also not updated its Title 21 Zoning, having failed to ram through a version that would have industrialized Skamania County. The version supported by the Skamania County commission was soundly rejected after appeals to the Hearings Examiner, who issued a 37-page decision (see attachment) stating that the county could not implement the commissioners' zoning unless they did an Environmental Impact Statement. The county declined—that is the reason they punted (and circumvented the public) Whistling Ridge a.k.a. Saddleback to EFSEC.

3-71

Construction

Habitat Types

Construction and operation of the project would require the removal of vegetation in some areas to accommodate roadway construction and improvement, turbine siting, staging, and construction. The impacts of project construction would not differ substantially from customary forestry activities on the site. Each turbine footing and foundation would measure approximately 3,100 square feet. Vegetation surrounding each turbine would be managed according to the following specifications:

- A circular area extending 50 feet from each turbine tower base would be harvested and graveled
- From 50 feet to 150 feet from the base of the turbine towers, tree heights would be limited to 15 feet above the elevation of the base of the turbine
- From 150 feet to 500 feet from the base of the turbine towers, tree height would be limited to 50 feet above the turbine base within an area formed by a 90 degree arc centered on the ordinary downwind direction (Figure 2-4 in Chapter 2)

The A and F turbine strings and parts of the B and C turbine strings would be accessed by existing roads. Modifications to these roads are anticipated in order to support the long and heavy loads required for delivery of the wind turbine systems. An estimated 5.1 miles of roads within the project site would require improvements as a result of the proposed project. The majority of new roads would be constructed to access parts of the B and C turbine strings, and all of the D and E turbine strings. Access to these turbines would require 2.4 miles of new roadway. All roads used to access turbines would be maintained throughout the life of the project.

All vegetation clearing would be completed using crawler tractors, rubber-tired skidders, mobile feller-bunchers, or cable yarding equipment. This equipment is typically used in timber harvest, and is currently used to harvest other stands located on SDS property. Logs would be transported by truck to SDS facilities in Bingen, Washington. Except for permanently cleared areas, cleared areas would be replanted with trees within one year following completion of construction (typically the following spring). Areas where trees are permanently removed would

be replanted with appropriate native grasses and low-growing shrubs. Because trees would be cleared for the purpose of the project, cleared areas would be considered "forest conversion" under the Washington Forest Practices Act. However, cleared areas would still be reforested in accordance with typical commercial forestry management practices when feasible. Permanent and temporary impacts to habitat types within the project site can be found in Tables 3.4-9 and 3.4-10.

West Pit Road was widened in the summer of 2009. Additional road improvements would be required during the construction phase of the project. However, the loss and modifications of habitat types from these modifications are anticipated to be minor. Tables 3.4-9 and 3.4-10 show that temporary and permanent impacts of the project to the habitat types found on the site and along the portion of West Pit Road that would be improved.

3-72

Table 3.4-9
Temporary Impacts from Project Elements to Habitat Types (acres)

Habitat Type
Turbine
Corridora
Road
Corridorb
Transmission
Line Corridorc
Operations and
Maintenance
Area
Substation
Area
RoadwayCorridor
Outside
Project Aread Total
Grass-Forb Stand 15.12 6.57 0.68 0 0 0.23 22.60
Brushfield/Shrub
Stand 2.31 1.61 0.61 0 0 0.66 5.19
Conifer-
Hardwood Forest 11.56 2.05 1.08 0 0 0.40 15.09
Conifer Forest 7.40 3.07 0.02 0 0 0.23 10.72
Riparian
Deciduous Forest 0 0 0 0 0 0 0
TOTAL 36.39 13.30 2.39 0 0 1.52 53.60

a. Total temporary impact area of proposed development within the 650-foot corridor measured on either side of an imaginary line
connecting each turbine string.

b. The temporary impact area of proposed roadway modifications within the project site area encompassed by a 100-foot corridor
along all roads. Does not include overlap of transmission corridor or turbine corridor.
c. The temporary impact area of proposed development within the area encompassed by a 100-foot corridor along all project
transmission lines. Does not include overlap of road corridor or turbine corridor.
d. The area of temporary impact is based on the assumption that 5 feet on both sides of the roadway would be restored after
construction of permanent roadway modifications.

Table 3.4-10
Permanent Impacts from Project Elements to Habitat Types (acres)

Habitat Type
Turbine
Corridora
Road
Corridorb
Transmission
Line Corridorc
Operations and
Maintenance
Area
Substation
Area
RoadwayCorridor
Outside
Project Aread Total
Grass-Forb Stand 10.47 7.17 0.36 5.0 7.10 0.68 30.78
Brushfield/Shrub
Stand 1.31 1.98 1.14 0 0 1.97 6.40
Conifer-
Hardwood Forest 8.67 1.82 1.95 0 0 1.20 13.64
Conifer Forest 4.94 4.23 0 0 0 0.70 9.87
Riparian
Deciduous Forest 0 0 0 0 0 0 0
TOTAL 25.39 15.20 3.45 5.00 7.10 4.55 60.69

a. Total permanent impact area of proposed development within the 650-foot corridor measured on either side of an imaginary line connecting each turbine string.
b. The permanent impact area of proposed roadway modifications within the project site area encompassed by a 100-foot corridor along all roads. Does not include overlap of
transmissioncorridor or turbine corridor. Also excludes existing roadway.
c. The permanent impact area of proposed development within the area encompassed by a 100-foot corridor along all project transmission lines. Does not include overlap of road corridor or turbine corridor.

d. The permanent impact area is based on the assumption that the existing roadway is 20 feet wide, the new roadway would be 25 feet wide, and that an additional 5 feet on each side of the roadway would be permanently cleared.

3-73

Wetlands

No wetlands or wetland buffers are located within the project footprint. Therefore, no wetlands or buffers are expected to be affected by construction of the project.

A review of the National Wetland Inventory indicates that wetlands may occur along SR 14 but not along County or private roads proposed for the project's construction access and turbine delivery routes. No improvements to SR 14 are anticipated to be required, and therefore no wetland-related impacts would occur. Roadway improvements to the County or private logging roads are not expected to affect wetlands. This information was confirmed through field investigations performed in May and July 2009.

See Section 3.3 for a discussion of impacts to other surface water features such as streams.

Special Status Plant Species

No federal- or Washington State-listed plant species have been documented at the site during multiple field surveys. Therefore, no project-related impacts are anticipated from construction of the proposed project. Two plant species on the WNHP Watch List, gnome plant and phantom orchid, were observed within areas that may be cleared for construction of the project. Both species are growing in areas that have been previously clearcut and were able to re-establish. In addition, there are no regulatory requirements to protect these species.

Special Status Wildlife Species

Potential construction related impacts to bald eagle, golden eagle, northern goshawk, northern spotted owl, olive-sided flycatcher, pileated woodpecker, Vaux's swift, western gray squirrel, Keen's myotis, and Townsend's big-eared bat are discussed in this section.

Bald Eagle. Four bald eagles were recorded on the project site. The project site is over two miles away from the nearest known bald eagle foraging habitat, which is the Columbia or White Salmon Rivers. Therefore bald eagle use of the project site is considered infrequent and sporadic. The removal of coniferous forest as a result of project construction that far away from suitable foraging habitat would not impact bald eagles. No breeding habitat would be affected.

Golden Eagle. Golden eagles have been recorded on the project site; however they are considered an uncommon visitor to this region of Washington State. They are known to forage in mid-elevation clear cut habitat. The permanent removal of 21.31 acres of grass-forb stand or shrub habitat for construction of turbine strings and transmission line corridors would decrease the amount of foraging habitat available to golden eagles within the project site. Any golden

eagles potentially using the project site for foraging would likely be temporarily deterred from using the site by construction vehicle and personnel activity.

Northern Goshawk. Northern goshawks were recorded on the project site. Although they were recorded during the summer, no evidence of nest or breeding individuals was observed during multiple years of surveys. A breeding goshawk may have a wide area of home range spanning multiple age classes of forest. They also may forage in open areas. Construction of the proposed project would result in the permanent loss of 21.86 acres of managed coniferous or mixed deciduous-coniferous forest. This would represent a loss of habitat generally suitable for goshawks, though unlikely to support breeding pairs. Goshawks also forage in open area, where

3-74

they swoop to the ground to capture prey. Approximately 17.13 acres of grass-forb habitat would be permanently lost during construction of the project.

Northern Spotted Owl. Whistling Ridge Energy LLC has sited its proposed project to avoid habitat areas deemed critical to the northern spotted owl or essential to its recovery. Surveys conducted pursuant to the USFWS protocol indicate that spotted owls are not present in or near the project, and that nearby historical sites are no longer occupied pursuant to USFWS Protocol and state law. Because there are no northern spotted owls or activity centers present in the project area, no project construction impacts are expected. Finally, the project would not impact the White Salmon SOSEA's 40 percent suitable habitat level and therefore is not restricted by Washington's forest practice regulations. Given the extensive record and review, this project does not pose a risk of taking northern spotted owls under Endangered Species Act Section 9.

Olive-sided Flycatcher, Pileated Woodpecker, and Vaux's Swift. These three avian species are all passerines with known occurrence within the project area. All three use coniferous forest for nesting. Construction of the proposed project would result in loss of 21.86 acres of forest habitat. Construction during the breeding season would likely result in disturbance of any individuals occurring in the vicinity, thereby temporarily reducing the use of further areas of habitat. Vaux's swift and olive-sided flycatchers forage on the wing over cleared areas, so it is likely that no additional habitat loss would occur for these species as the result of conversion of forested area to clearing (grass-forb stand).

Western Gray Squirrel. The construction of the proposed project would result in the permanent removal of 21.86 acres of managed coniferous or mixed deciduous-coniferous forest. The gray squirrel prefers habitat where contiguous tree canopy allows arboreal travel in a minimum of a 198-foot (60-meter) radius around the nest (Ryan and Carey 1995). Current forest management practices on forest within the proposed project site has created habitat not generally suitable for this species, due to fragmentation of mature forest stands. Contiguous forest habitat located on the project site will not develop in the future. The project site also contains very few oak trees, and those that were observed were of small stature (less than 20 feet tall), stunted, and growing in openings on exposed rocky slopes in shallow soils. Acorn crops from oak trees are an important food source for western gray squirrels, and the lack of this primary food source may deter use of the project site by gray squirrels. Because habitat for this species is considered rare

or of moderate/poor quality on the project site, impacts to western gray squirrel due to loss of coniferous forest habitat are expected to be negligible.

Keen's Myotis and Townsend's Big-Eared Bat. The special status bat species may occur in the project site, based on their documented distribution. Surveys for bats were not able to identify all bats to species level. Both species may utilize mature or old-growth forested habitats within the project area, if suitable nest sites were available. Permanent loss of 21.86 acres of forest habitat and 21.31 acres of shrub/grass/forb habitat may result in a small reduction of suitable habitat for these species. No known roosting or breeding locations would be impacted.

Other Wildlife Species

In general, wildlife in the project area could be affected by the construction of the Project through the loss of suitable habitat, potential fatalities during clearing or grading of the construction area, and disturbance/displacement from construction activity and personnel

3-75

occupying the site. Fragmentation of the remaining habitat also could occur, although current land management practices result in an existing source of ongoing fragmentation on the site. Therefore, permanent vegetation removal and temporary construction disturbance are the primary impacts as a result of the proposed project.

Birds. Direct mortality to birds and/or bird nests could occur during the initial clearing or grading of the construction areas. Additional disturbance could occur indirectly to birds or bird nests occurring adjacent to construction areas. This may occur if a nest or a primary foraging area is nearby. In areas where temporary disturbance would occur, it is anticipated that birds would generally reoccupy restored habitats with time. Some habitat would be permanently converted from one type (forest) to another (clear cut or grass forb). This would result in a temporary disturbance, likely followed by recolonization of the area by a different suite of birds.

Bats. Impact to bats as a result of construction would be minimal unless known nesting or roosting sites were removed. Disturbance or displacements to bats as a result of construction activities would be minimal because bats are primarily active during the night, when construction would not occur.

Amphibians/Reptiles. No wetlands or other surface water bodies are proposed to be filled as a result of the project. Therefore, no amphibian breeding habitat would be directly impacted. Amphibians and reptiles would potentially experience direct loss of non-breeding habitat and further fragmentation of the remaining habitats.

Mammals. No direct mortality of large mammals is anticipated as a result of construction because these species are able to relocate away from heavy equipment used in clearing and grading. Some avoidance of the area due to disturbance would likely occur on a temporary basis. Permanent removal of vegetation would result in the loss of some habitat for these species. The

conversion of one habitat type to another would likely not reduce the amount of area available to the more commonly-occurring species, which utilize multiple habitat types during their life cycle.

Fish. No impacts are anticipated from construction of the project. No perennial streams or fish are located within the construction areas within the project boundaries. In addition, the construction will occur when the ephemeral drainages that cross the access roads are dry. This will eliminate any potential impacts from sediment. The unnamed drainage on West Pit Road may be temporary impacted if this segment of the road needs to be widened. However, no fish are present in this stream.

Comment: See my separate memo on the inadequacy of BPA's input into this DEIS and the most definite impacts on fish and their habitats.

Noxious Weeds

While no Class A weeds have been observed in the project area, several Class B and C weeds are present. Noxious weeds can threaten the general ecological health and diversity of native ecosystems. Noxious weed infestations are the second leading cause of wildlife habitat degradation.

Because many weeds are adapted to disturbed conditions and can establish immediately after construction, constructing the project could foster the spread of noxious weeds throughout the project area. Noxious weeds would be managed within the project site. By implementing BMPs, weeds are not anticipated to spread further as a result of the development of the project.

3-76

Operation

Habitats

Operation of the project would result in no further impacts to habitats on the project site.

Wetlands

No wetlands or wetland buffers are located within the project operation area. Therefore, no wetlands or buffers are expected to be impacted by operation of the project.

Special Status Plant Species

No impacts to special status plant species are anticipated from the operation of the project.

Special Status Wildlife Species

In order to determine which species (including special status species) are most at risk for turbine

fatalities, a relative index to collision risk (R) was calculated for bird species observed in the survey area using the following formula:

R = A*Pf*Pt

Where A = mean use for species i averaged across all surveys, Pf = proportion of all observations
of species i where activity was recorded as flying (an index to the approximate percentage of time species i spends flying during the daylight period), and Pt = proportion of all flight height observations of species i within the rotor-swept height. This is a relative index, which only illustrates which species may be the most susceptible to turbine fatalities. For the Project, the exposure index ranges from 0.29 on the high end (red crossbill) to 0 for many species (indicating that they were recorded on the site but not flying within the rotor swept area. If a species was recorded on the site, but never flying at all, then the exposure index would not be applicable. Exposure indices for all species across all years of survey can be found in Appendix C-4.

This index does not account for differences in behavior other than flight characteristics (i.e., flight height and proportion of time spent flying). In this impacts section, point count data were used to establish diurnal indices of avian use, and how these indices compare to other wind resource areas in the United States.

Bald Eagle. Bald eagles, although now fairly common in Washington State, are likely uncommon visitors to the project site. They are unlikely to nest or forage within the project site because there is no suitable habitat. An exposure index of 0.02 was calculated for the bald eagle (Appendix C-4). The potential for ongoing occurrence of bald eagle on the project site is very low. The potential for bald eagle fatalities as a result of turbine strike is also considered to be extremely low.

Golden Eagle. Two golden eagles were recorded on the project site during the fall of 2004. One occurred within the rotor-swept area and one was above. The golden eagle's exposure index at Whistling Ridge is reported to be less than 0.01 (Appendix C-4). Therefore, golden eagles are considered to be at relatively low risk for collision with turbines at this site.

3-77

Golden eagles typically soar at a height within the rotor-swept area of most modern turbines, and swoop to the ground to capture prey. Golden eagles have recently experienced their first mortality at a wind turbine site in Washington State (Durbin 2009). Numerous golden eagles have been killed at the Altamont wind turbine project in California, indicating that this species is susceptible to turbine collision. Golden eagles have experienced mortality greater than would be anticipated based on their level of occurrence at Altamont Pass (Appendix C-4).

The creation of cleared areas re-vegetated with low growing herbaceous species around turbines may increase the risk of golden eagles entering the rotor-swept area if they forage for prey located beneath turbines. However, given their rare occurrence on the project site, the potential for golden eagles to experience a turbine collision is extremely low.

Northern Goshawk. Extensive surveys over four years recorded no goshawks on the project site, indicating that if they do occur, it would be extremely rare. Based on these years of species specific surveys using multiple methodologies, they were recorded more than would be expected during baseline surveys in 2004 and 2006. Based on those records, the exposure index for northern goshawk at the project site is reported to be 0.02. This includes the occurrence of five individuals, four of which were flying within the rotor swept area. Similar to the golden eagle, this species may be at risk of increased foraging activity in open areas around turbines because they hunt for prey that occurs on the ground in cleared areas. However, given their rare occurrence on the project site, the potential for turbine related fatalities for this species is extremely low.

Northern Spotted Owl. Whistling Ridge Energy LLC has sited its proposed project to avoid habitat areas deemed critical to the northern spotted owl or essential to its recovery. Surveys conducted pursuant to the USFWS protocol indicate that spotted owls are not present in or near the project, and that nearby historical sites are no longer occupied pursuant to USFWS Protocol and state law. Because there are no northern spotted owls or activity centers present in the project area, no project construction impacts are expected. Finally, the project would not impact the White Salmon SOSEA's 40 percent suitable habitat level and therefore is not restricted by Washington's forest practice regulations. Given the extensive record and review, this project does not pose a risk of taking northern spotted owls under Endangered Species Act Section 9.

Western Gray Squirrel. No impacts to western gray squirrels are anticipated from operation of the proposed project.

Olive-sided Flycatcher, Pileated Woodpecker, and Vaux's Swift. These three species are encompassed in the bird discussion under "Other Wildlife."

Keen's Myotis and Townsend's Big-Eared Myotis. These two bat species are encompassed in the bat discussion under "Other Wildlife."

Other Wildlife Species

Birds. Potential operation-related impacts to avian species include turbine collision and displacement. Based on the exposure index derived from abundance and flight behavior, the species most likely to collide with wind turbines located at the project are red crossbills (R = 0.29), American robin (R = 0.14), common raven (R = 0.23), and western bluebird (R = 0.11). The full list of species and their exposure index can be found in Appendix C-4.

3-78

The highest index for any raptor was 0.05 for red-tailed hawk, indicating a risk approximately six times lower than for the red crossbill. A regression analysis using data collected from the Whistling Ridge site and 13 other new-generation wind turbine projects found a significant correlation between raptor use and raptor mortality. Based on this analysis and surveys on the project site, the estimated a raptor/vulture fatality rate is zero per MW/year, which is an

extremely low estimate compared to many wind projects (Appendix C-4). Further, data collected from the project site indicate that the area is not within a major migratory pathway, at least during fall migration.

Comment: "...the area is not within a major migratory pathway, at least during fall migration."?!? What is this supposed to mean? That it might be a migratory pathway during other seasons. The entire Columbia River Gorge and its environs is recognized by Audobon and other reasoning people as a migration corridor for a large number of species. Ridges attach raptors. Turbines are sited on ridges. Turbines kill raptors. Not good. This contradictory DEIS statement should be clarified.

Vaux's swifts, western bluebirds (a State Monitor species), and olive-sided flycatchers were commonly observed flying at rotor-swept heights, and some turbine-related mortality may occur for these species over the life of the project. One prairie falcon and multiple turkey vultures (both State Monitor species) were observed at rotor-swept heights. Turkey vultures are known to have very low susceptibility to turbine collisions (Orloff and Flannery 1992). Pileated woodpeckers were recorded on the site, but not flying. Osprey (a State Monitor species) was recorded during northern goshawk surveys, which was separate from the baseline avian studies and therefore not included in the exposure index calculations.

These collisions would likely be rare, and it is unlikely that the Project would have any negative impacts on population levels on and near the project site. Higher numbers of Vaux's swifts and western bluebirds were recorded during fall migration, whereas olive-sided flycatcher appears to primarily use the project site for breeding.

Waterfowl, waterbirds, and shorebirds were not observed using lands within the project site during this study, and mortality involving this group is expected to be rare. Based on abundance, passerines are expected to make up the largest proportion of fatalities at the project. Post-construction mortality data collected at other wind projects in Washington and Oregon indicate that less correlation between pre-construction surveys and turbine-related mortality is observed in non-raptor species. The lack of correlation may be because most fatalities are among nocturnal migrants that are not accounted for during surveys.

The avian use information for the project site is based on detections of birds seen and/or heard calling. Because songbirds are less vocal during fall, this information may be skewed toward summer use. Similarly, the level of night migration for species associated with the project site is also not known. Risk analyses presented above provide some insight into which species are most vulnerable to turbine collision; however, estimates are based on abundance, proportion of daily activity budget spent flying, and flight height of each species. Observations were made during daylight hours, and do not take into consideration flight behavior or abundance of nocturnal migrants. Further, the analysis does not account for varying ability among species to detect and avoid turbines, habitat selection, or other factors that may influence exposure to turbine collision. As a result, actual risk may be lower or higher than indicated by these estimates (Orloff and Flannery 1992).

Bats. It is likely that some bat mortality would occur during operation; however, mortality

estimates are difficult due to our lack of understanding of why bats collide with wind turbines (Kunz et al. 2007, Baerwald et al. 2008). Several factors may aid in the assessment of potential impacts to bats, including site-specific habitat and topography, species composition, and activity

3-79

patterns. The following impact assessment was completed by examining site-specific habitat features and bat acoustic data collected to date. Additional insight from investigations conducted at other wind projects is presented where relevant.

The number of bat detections varied greatly between the three survey years. This is based on variation in habitat surveyed and the height of detector placement. Overall, the majority of detected species were low-frequency species, such as big brown and silver-haired bats. Hoary bats made up 8.2 percent of all passes by low-frequency species. Based on studies from other wind energy projects in the Pacific Northwest, turbine fatalities would be most expected from hoary bats and silver haired bats. Big brown bats are relatively uncommon at wind turbine fatalities. At elevated stations meant to reflect the rotor-swept area, low-frequency bats were again recorded in much higher numbers than high-frequency species. This likely reflects migration flight heights and foraging preferences.

The timing of peak bat activity on the proposed project site (portions of July and August) does not coincide with when the highest levels of bat mortality have been documented at other wind projects in the US. Fatality studies have shown a peak in mortality in August and September and generally lower mortality earlier in the summer (Johnson 2005, Arnett et al. 2008). While the survey effort varies among the different studies, the studies that combine Anabat surveys and fatality surveys show a general association between the timing of increased bat call rates and timing of mortality, with both call rates and mortality peaking during the fall (Kunz et al. 2007). The highest use of the project site occurred in July and August, prior to the time that most bat mortality occurs at wind resource areas in the Pacific Northwest as well as throughout the US.

High bat activity in July and August is likely due to use of the project site by local bats during the reproductive season, when pups are being weaned and foraging rates are high. Activity beyond mid-August likely represents movement of migrating bats through the area. Activity by hoary bats also was substantially higher in July, and dropped off significantly beginning in early August. After August 31, activity for all bats was very low relative to earlier dates, indicating that most bats had left the area for winter hibernacula or warmer climates. These data indicate higher use of the project site by resident populations of bats, rather than by migrants passing through the area. Further, high bat activity levels during the breeding season, as seen on the project site, do not equate to high bat fatality rates. Low mortality has been documented during the breeding season at several wind projects, even when relatively large bat populations were present in the area (Fiedler 2004, Gruver 2002, Howe et al. 2002, Johnson et al. 2004, Schmidt et al. 2003).

Finally, no known large bat colonies are present near the proposed the Project. The nearest know hibernaculum is located near the town of Trout Lake, nearly 20 miles north of the proposed project (B. Weiler, personal communication). The project site does not contain topographic

features, such as canyons, that may funnel migrating bats toward corridors where turbines would be placed. No turbines would be constructed near wetlands or ponds, and cleared areas surrounding turbine strings would closely mimic clearcuts or young reforested areas, where to date, recorded bat activity levels on the project site were the lowest.

3-80

Some bat fatalities are anticipated as a result of the operation of the proposed project. Variable levels of recorded use by bats across years, habitats and recording height above ground indicate that the extent of impacts is difficult to predict at this time.

Amphibians/Reptiles. No impacts are anticipated to amphibians or reptiles as a result of project operation.

Mammals. Because data on impacts to big game as a result of wind project operation is limited, it is difficult to predict the impact of the proposed project on wildlife using priority habitats on the proposed project site. Additional coordination with WDFW is ongoing, and would continue to address this resource.

Fish. No impacts are anticipated to fish as a result of project operation.

Noxious Weeds

The spread of noxious weeds is not anticipated to occur as a result of project operation with BMPs in place.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant will provide EFSEC with an initial site restoration plan at least 90 days prior to the beginning of site preparation. The plan will address site restoration that would occur at the conclusion of the project's operating life (estimated to be 30 years), and restoration in the event the project is suspended or terminated during construction or before it has completed its useful operating life. The plan will include or parallel a decommissioning plan for the project.

The initial site restoration plan will be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential changes to wetlands, vegetation, wildlife habitat, and noxious weeds. If impacts to biological resources are anticipated as a result of site restoration and project decommissioning, mitigation measures will be proposed as part of the plan.

3.4.2.2 No Action Alternative

Under the No Action Alternative the project would not be built. Timber harvest would still occur within the proposed project boundary, which would continue to affect habitats and potentially increase the spread of weeds. However, there would be no increased avian or bat

fatalities from turbine operations.

Other power generation facilities could be constructed and operated in the region to meet long-term needs for power, including other wind projects or generation using fossil fuels. Fossil fuel combustion would affect vegetation, wetlands, wildlife, and threatened and endangered species, including impacts related to carbon dioxide emissions. The significance of such impacts would depend on the site-specific locations and design of such facilities.

Comment: This is a totally inadequate (how many times will I have to use this word when referencing this very inadequate DEIS!) "No Action Alternative" analysis. SDS doesn't know that other generation facilities would be constructed and operated in the region—based on this DEIS, which might be a Waterloo moment for wind generation and wind farms in the region—it is also likely that wind power and its unpredictability might be reassesses and other methods of conservation found and used. There would be not "increased avian or bat fatalities from turbine operations, but there would also be less pesticide use, less impermeable surfaces built on erosion-prone ridges, less fragmentation of the environment, less impact on wildlife, less impact on humans, etc. There would be many more LESSES if this project wasn't built!!

3-81

3.4.3 MITIGATION MEASURES

• The following mitigation measures are identified to avoid, minimize, and compensate for potential impacts to biological resources during construction and operation to the extent feasible.
• Avoid and minimize the use of overhead collector lines, which create areas where birds may congregate and perch, thus decreasing the potential for turbine collisions.
• Use of tubular turbine towers, avoiding the lattice type towers which creates areas where birds may congregate and perch, thus decreasing the potential for turbine collisions.
• Use of un-guyed meteorological towers, reducing the potential for bird collision with wires.
• Minimize the use of turbine lighting on the project site, thereby reducing the potential for birds and bats to be disoriented by lights or attracted to turbines.
• Install newer generation up-wind turbines.
• Utilize certified "weed free" straw bales during construction to avoid introduction of noxious weeds.
• Re-seed all temporarily disturbed areas with an appropriate mix of native plant species as soon as possible after construction is completed to accelerate the re-vegetation of these areas and to avoid the establishment and spread of noxious weed species.
• Implement a noxious weed control program, in coordination with the Skamania County Noxious Weed Control Board, to control the spread and prevent the introduction of noxious weed species.
• Conduct raptor nest surveys prior to construction during the breeding season (approximately April to July) in order to avoid or minimize impacts to any raptors potentially nesting on or near the project site. Construction activities requiring the surveys would include those that would remove forested areas and/or require the use of heavy equipment substantial enough to potentially disturb nesting activities.
• Implement a two year minimum post-construction avian mortality study.

• Convene a Technical Advisory Committee to evaluate the mitigation and monitoring program and determine the need for further studies or mitigation measures. The Technical Advisory Committee would be composed of representatives from WDFW, USFWS, Skamania County, and the Applicant. The role of the Technical Advisory Committee would be to coordinate appropriate mitigation measures, monitor impacts to wildlife and habitat, and address issues that arise regarding wildlife impacts during construction and operation of the project, including potential adaptive management

3-82

opportunities. The post-construction monitoring plan would be developed in

coordination with the Technical Advisory Committee.

• Coordinate with WDFW for potential impacts to big game species (deer and elk), if appropriate.
• Prepare a SWPP for both the construction and operation phases of the project and submit to EFSEC for approval.

3.4.4 UNAVOIDABLE ADVERSE IMPACTS

The proposed project would result in permanent loss, temporary disturbance and fragmentation of existing habitat for a number of wildlife species. These impacts, while unavoidable, would take place in landscape of managed timber lands which has for many years and will continue to be a fragmented environment with ongoing disturbance. There are no impacts to wetlands, and any particularly sensitive areas would be avoided during micrositing of the turbines.

The proposed project would cause mortality to birds and bats through turbine collisions. However, the level of mortality is not anticipated to be sufficient to negatively affect the population viability of any single species.

Comment: This is a really insufferably dataless, inane statement! "Anticipation" is not science. SDS doesn't know what level of mortality would be sufficient to affect or not affect any single species. Until they gather more data and do a thorough analysis of the regional effects of wind farms on species mortality, the DEIS is incomplete and flawed in regard to bird and bat mortality rates; and, the stated non-effects of turbine collisions on species viability is totally unfounded and unsupported by any data.

It appears unlikely that the project would cause any mortality to a threatened or endangered species. Extensive surveys for northern spotted owl and northern goshawk have been conducted throughout the project area and both species are considered either completely absent or extremely rare. Golden eagles were recorded during surveys in 2004, but not in more recent surveys. Bald eagles were recorded in the winter of 2008 and summer of 2009. The potential for ongoing occurrence of either golden or bald eagles is considered extremely rare.

3.4.5 REFERENCES

Arnett, E.B., K. Brown, W.P. Erickson, J. Fielder, T.H. Henry, G.D. Johnson, J. Kerns, R.R. Kolford, T. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersly. 2008. Patterns of fatality of bats at wind energy facilities in North America. Journal of Wildlife Management 72: 61–78.

Baerwald et al. 2008. Barotrauma is a significant cause of bat fatalities at wind turbines. Current Biology 18:695–696.

Berg, K. 2009. Personal communication with Jeff Reams of Turnstone Environmental via email on May 29, 2009.

BirdWeb. 2009. Internet site of the Seattle Audubon Society. Accessed on November 13, 2009 at http://birdweb.org.

Bat Conservation International (BCI). 2009. Internet site of Bat Conservation International. Access on November 13, 2009 at http://www.batcon.org.

CH2M Hill. No date. Vegetation Technical Report, Saddleback Wind Energy Project.

3-83

CH2M Hill. 2003. Rare Plant Survey Report, Saddleback Wind Energy Project.

CH2M Hill. 2007. Wetland Delineation Report, Saddleback Wind Energy Project, Skamania County, Washington. Prepared for Horizon Wind Energy LLC. Portland, Oregon.

Durbin, Kathie. 2009. Washington wind turbines claim first known eagle victim. The Columbian. May 18, 2009. Accessed at: http://columbian.com/article/20090519/NEWS02/705199958.

Carraway, L. N. and B. J. Verts. 1994. Sciurus griseus. Mammalian Species, No. 474:1–7.

Dalquest, W. W. 1948. Mammals of Washington. University of Kansas Publications, Museum of Natural History, 2:1–444.

Flemming, T. 2009. Personal communication with Devin Sahl, Turnstone Environmental. September.

Fiedler, J. K. 2004. Assessment of bat mortality and activity at Buffalo Mountain Windfarm, eastern Tennessee. Thesis, University of Tennessee, Knoxville, USA.

Franklin, Jerry F. and C.T. Dyrness. 1988. Natural Vegetation of Oregon and Washington.

Oregon State University Press.

Gruver, J. C. 2002. Assessment of bat community structure and roosting habitat preferences for the hoary bat (Lasiurus cinereus) near Foote Creek Rim, Wyoming. Thesis, University of Wyoming, Laramie, USA.

Hayes, JP. 1997. Temporal variation in activity of bats and the design of echolocation-monitoring studies. J Mammal 78: 514–524.

Herman, Jed. 2009. Personal communication with Curt Smitch. WDNR northern spotted owl habitat data. Excel spreadsheet based on GIS database.

Howe, R. W., W. Evans, and A. T. Wolf. 2002. Effects of wind turbines on birds and bats in northeastern Wisconsin. Wisconsin Public Service Corporation, Green Bay, USA.

Johnson, G. D. 2005. A review of bat mortality at wind-energy developments in the United States. Bat Research News 46:45–49.

Johnson, G. D., M. K. Perlik, W. P. Erickson, and M. D. Strickland. 2004. Bat activity, composition and collision mortality at a large wind plant in Minnesota. Wildlife Society Bulletin 32:1278–1288.

Kennedy/Jenks Consultants. 2003. Klickitat County Energy Overlay Draft Environmental Impact Statement. August.

Kunz, T.H., E.B. Arnett, B.M. Cooper, W.P. Erickson, R.P. Larkin, T. Mabee, M.L. Morrison,

M.D. Strickland, and J.M. Szewczak. 2007. Assessing impacts of wind-energy development on nocturnally active birds and bats: a guidance document. Journal of Wildlife Management 71: 2449–4486.

3-84

Orloff, S. and A. Flannery. 1992. Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas. Work performed by BioSystems Analysis, Inc., Tiburon, CA. Sacramento, CA: California Energy Commission.

Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. A variable circular-plot method for estimating bird numbers. Condor 82:309–313.

Ryan, L. A. and A.B. Carey. 1995. Distribution and Habitat of the Western Gray Squirrel (Sciurus griseus) on Fort Lewis, Washington. Northwest Science 69(3):204-216.

Schmidt, E., A.J. Piaggio, C.E. Bock, and D.M. Armstrong. 2003. National Wind Technology Center Site Environmental Assessment: Bird and Bat Use and Fatalities – Final Report.

NREL/SR-500-32981, National Renewable Energy Laboratory, Golden, Colorado.

Thomas et al. 1990. A conservation strategy for the northern spotted owl. Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl. USDA Forest Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service, and USDI National Park Service. Portland, OR. 458 pp.

Turnstone Environmental Consultants, Inc (Turnstone). 2004. Final Report, Northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project. Prepared for SDS Lumber Company.

———. 2009a. 2008 Final Report, Results of northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project. Prepared for SDS Lumber Company.

———. 2009b. 2009 Report, Results of northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project. Prepared for SDS Lumber Company.

US Fish and Wildlife Service (USFWS). 1992. Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls, 1992 Revised Version.

———. 2008. Final Recovery Plan for the Northern Spotted Owl. U.S. Fish and Wildlife Service, Portland, OR. 142 pp.

———. 2009a. Listed and Proposed Endangered and Threatened Species and Critical Habitat; Candidate Species; and Species of Concern in Skamania County (Revised November 1, 2007). Available at: http://www.fws.gov/westwafwo/speciesmap/SKAMAN.html.

———. 2009b. Conservation Plan and Agreement Database. Accessed via the Internet at: http://ecos.fws.gov/conserv_plans/public.jsp on December 9, 2009.

US Forest Service (USFS). 1985. Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington. Pacific Northwest Region. E.R. Brown, technical editor.

3-85

———. 2002. Survey methodology for Northern goshawks in the Pacific Southwest Region.

———. 2006. Northern Goshawk Inventory and Monitoring Technical Guide. Gen. Tech. Report WO-71. July.

Van der Haegen, M., S. Van Leuven, and D. Anderson. 2004. Surveys for western gray squirrel nests on sites harvested under approved forest practice guidelines: analysis of nest use and operator compliance. Wildlife Research Report. Washington Department of Fish

and Wildlife, Olympia, Washington, USA.

Washington Department of Fish and Wildlife (WDFW). 2009. Wind Power Guidelines. Olympia, WA.

Washington Department of Wildlife (WDW). 1993. Status of the Western Gray Squirrel (Sciurus griseus) in Washington. Olympia, WA. Final status report.

Washington Natural Heritage Program (WNHP). 2003a. Special Status Plants Species and Habitats Data Search. Washington Natural Heritage Information System.

———. 2003b. Rare Plant List for Skamania County. Washington Natural Heritage Program. http://www.dnr.wa.gov/nhp/refdesk/lists/plantsxco/skamania.html.

———. 2009. Special Status Plants Species and Habitats Data Search. Washington Natural Heritage Information System.

Washington State Department of Ecology (Ecology). 2004. Washington State Wetland Rating System for Eastern Washington. Revised. Publication # 04-06-15.

Weiler, Bill. Washington Department of Fish and Wildlife. Telephone conversation with Greg Johnson, Western Ecosystems Technology, Inc. 2003.

West, Inc. 2008. Bat acoustic studies for the Saddleback Wind Energy Project, Skamania County, Washington, August 20th – October 21st, 2007. Prepared for SDS Lumber Company.

———. 2009a. Wildlife baseline studies for the Whistling Ridge wind resource area, Skamania County, Washington, Final Report. Prepared for SDS Lumber Company.

West, Inc. 2009b. Bat acoustic studies for the Saddleback Wind Energy Project, Skamania County, Washington, July – October 7th , 2007. Prepared for SDS Lumber Company.

West, Inc. 2009c. Bat acoustic studies for the Saddleback Wind Energy Project, Skamania County, Washington, June 4th – October 25th, 2009. Prepared for SDS Lumber Company.

Whiteacre, L., J. Henderson, R. Holmes, L. Hoover, R. Lesher, J. Lippert, E. Olson, L. Potash, J. Seevers, M. Stein, and N. Wogen. 1998. Survey Protocols for Survey & Manage Strategy 2 Vascular Plants, Version 2.0. Bureau of Land Management. December. Available at: http://www.blm.gov/or/plans/surveyandmanage/SP/VascularPlants/cover.htm.

3-86

3.5 ENERGY AND NATURAL RESOURCES

This section describes potential impacts to energy resources.

3.5.1 AFFECTED ENVIRONMENT
3.5.1.1 Region
Regional Demand

In September 2009, the Northwest Power and Conservation Council released the Draft Sixth Northwest Power Plan (NWPCC 2009), which contains projections for regional power demand. The plan notes that regional population is likely to increase from 12.7 million in 2007 to 16.3 million by 2030. Demand for electricity is expected to grow, in part as a result of this population growth. The Draft Sixth Northwest Power Plan states:

The Pacific Northwest consumed 19,000 average megawatts or 166 million megawatt-hours of electricity in 2007. That demand is expected to grow to 25,000 average megawatts by 2030 in the Council's medium forecast. Between 2007 and 2030, demand is expected to increase by a total of 6,500 average megawatts, growing on average by 270 average megawatts, or 1.2 percent, per year.

The cost of energy of all types is expected to be significantly higher over the next twenty years than during the 1980s and 1990s. Cost increases will be driven by increasing demand and the fact that the cost of finding and producing new energy sources is higher than for existing supplies. Carbon emission taxes or cap-and-trade policies are likely to further raise energy costs. The Northwest Power and Conservation Council predicts that wholesale electricity prices are expected to increase from about $45 per megawatt-hour in 2010 to $85 by 2030 (2006$).

Pacific Northwest Markets for Renewable Energy Resources

According to the Northwest Power and Conservation Council, much of the future demand for electricity in the region could be met through conservation. However, markets for renewable or "green" energy are still growing in the Pacific Northwest, and the Project can help to meet this growing demand. One driver for this shift is the establishment of RPS at the state level, which requires that utilities obtain a percentage of their power from renewable sources. For example, in 2006, voters in the Washington passed Initiative 937, which requires that by 2020 large public and private utilities must obtain 15 percent of their electricity from renewable resources, and undertake cost-effective energy conservation. In 2008, California increased its RPS goal from 20 percent to 33 percent renewable energy by 2020.

In addition to the RPS requirements, Washington law requires larger utilities in Washington to offer a voluntary "qualified alternative energy product," essentially an electricity product powered by green resources, beginning in January 2012 (RCW 19.29A.090). State law defines a qualified alternative energy resource as electricity fueled by wind, solar energy, geothermal energy, landfill gas, wave or tidal action, gas produced during the treatment of wastewater, qualified hydropower, or biomass. As of 2008, 15 of the 16 utilities covered by the report had an active green power program with customers participating, and five additional utilities not

covered by the law reported to the state that they were operating green power programs. Estimated sales of green power for 2008 were up 17 percent over 2007. Wind powered electricity represented 83.3 percent of green power sales (WUTC 2008).

Bonneville Power Administration Transmission System

BPA owns and operates 15,000 miles of power lines that carry power from the dams and other power plants to utility customers throughout the Pacific Northwest. The BPA service area includes Oregon, Washington, Idaho, Western Montana, and small portions of Wyoming, Nevada, Utah, California, and Eastern Montana.

Electric power plants require an interconnection with a high-voltage electrical transmission system for delivery to purchasing retail utilities. BPA owns and operates the FCRTS, which comprises more than three-fourths of the high-voltage transmission grid in the Pacific Northwest, and extra regional transmission facilities. BPA considers and grants interconnection requests to the FCRTS in accordance with its Open Access Transmission Tariff. Under BPA's tariff, BPA offers transmission interconnections to the FCRTS to all eligible customers on a first-come, first-served basis, with a decision on whether or not to make this offer subject to environmental review under NEPA.

Comment: If BPA owns and operates 15,000 miles of power lines, and BPA is concurrently proposing building bigger power lines throughout the NW, where is the cumulative impacts analysis on the environmental effects of 15,000 miles of power lines? Where is the human health cumulative analysis? Where is the cumulative impact analysis on wildlife—habitat fragmentation, habitat destruction, herbicide effects, etc.? From the DEIS we learn that BPA provides energy to a "service area includes Oregon, Washington, Idaho, Western Montana, and small portions of Wyoming, Nevada, Utah, California, and Eastern Montana" but this regional area is not included in any cumulative impacts analysis in this DEIS. Why not? BPA's energy production has cumulative effects on the environment, on ecosystems throughout their service area but there is no cumulative impact analysis reporting in this DEIS. This is another fatal flaw in this DEIS.

3.5.1.2 Project Area

The project would be located north of the Columbia River. The Columbia River corridor is an area of good wind energy potential that currently supports several successful wind power projects. The Columbia River Gorge provides a low-elevation connection between continental air masses in the interior of the Columbia Basin east of the Cascade Range and the maritime air of the Pacific Coast. Especially strong pressure gradients develop along the Cascades and force the air to flow rapidly eastward or westward through the Gorge.

Electric service for the project area is provided by Skamania County Public Utility District #1, which obtains electricity from the Federal Columbia River Power System (FCRPS), the series of hydroelectric projects along the Columbia River, through BPA. Backup power is obtained from Condit Dam, which is scheduled to be decommissioned in 2010. In July 2009 the Public Utility District sought intervener status with EFSEC to argue in favor of the Project, based on the ability

of the project to provide backup power to the Public Utility District once Condit Dam is removed (EFSEC 2009). There is currently no utility service of any kind at the proposed project site.

The proposed project area and the project site are already heavily used by energy and other utilities. Two BPA high-voltage transmission lines cross the project site, a natural gas pipeline runs near the north border of the project site, and there are two communications towers within one mile of the site.

3-88

3.5.2 IMPACTS
3.5.2.1 Proposed Action
Construction

The project would consume limited amounts of energy and natural resources, primarily during construction. The electrical substation would be built immediately adjacent to the BPA lines, reducing the need to build new long-distance high-voltage transmission lines.

Estimated types and quantities of energy and natural resources consumed during construction are as follows:

- 19,250 gallons of fuel (diesel and gasoline) for construction equipment
- 3,700 tons of steel for turbine towers
- 1,000 tons of steel for tower foundation reinforcement
- 100,000 yards of gravel (aggregate) for roads and crane pads
- 10,000 cubic yards of concrete for turbine foundations
- 1.7 million gallons of water for road compaction, dust control, wetting concrete, etc., assuming plain water is used for dust control (this amount could be reduced through the use of lignin or other dust palliative if permitted by EFSEC)

The source of fuel for construction equipment and vehicles would be licensed fuel distributors or gas stations. Petroleum products, including vehicle and equipment gasoline and diesel fuels, and machinery lubricants are available and would be purchased from numerous commercial outlets in the project vicinity. Water for construction would be obtained from a local source with valid water rights, as described in Section 3.3 Water Resources. Concrete would be purchased from existing suppliers located near the project site. Electricity for construction equipment would be provided from portable generators.

Bulk materials such as aggregate gravel and sand, in addition to soils, would be supplied locally from existing quarries. Other building materials, equipment, and other operational commodities would be purchased from equipment and material suppliers. The largest resource use would be steel and concrete. Diesel fuel and electricity also would be consumed during construction. The amounts of all of these resources would be small compared to existing supplies, and none are expected to affect availability or market supply.

Nonrenewable resources in the project vicinity are primarily gravel extracted from local sources

and used locally. Primary consumption of these resources is related to construction projects (sand, gravel, and other mineral resources as used in steel, aluminum, concrete, and other building products). Several gravel pits and quarries are located near the project site. These would be adequate to supply the needs of the project.

3-89

Renewable resources are materials that can be regenerated, such as wood, other fibers, wind, and sunlight. The primary renewable resources in the project area are timber and wind. The project area, including the project site, has been used for the renewable production of forest products for many years. The addition of the Project would diversify this renewable resource-based business by using a second, compatible renewable resource, the wind energy of the site. The project would shift approximately 56 acres of commercial forest land to non-forest uses for the project area roads and the turbine corridors. In the context of the 1,152-acre site and the large areas of surrounding area in private and Washington State timber management, this reduction would not affect the availability of timber as a renewable resource.

Operation

Operation of the project would consume limited amounts of energy and nonrenewable natural resources. During operations, electrical energy from Skamania County Public Utility District #1 would be consumed on a limited basis during times when the wind generated on site is insufficient to power warning lights required by the Federal Aviation Administration and security lights. Some electricity would be used at the Operations and Maintenance and substation facilities. In addition, turbines require electrical energy to run lubrication pumps and cooling systems, electrical monitoring systems, and position motors when wind speeds are below generation levels.

• Types and quantities of energy and natural resources consumed during operations are as follows:
• Fuel for operations and maintenance vehicles (approximately 8,500 gallons annually)
• Minor quantities of lubricating oils, greases and hydraulic fluids for the wind turbine generators
• Electricity for project operations (less than approximately 600 kilowatt hours per wind turbine generator per month)
• Water for use at the Operations and Maintenance facility and periodic maintenance of turbine blades (less than 5,000 gallons per day) Electricity for project operations would mostly be generated by the approximately 75 MW of electricity created by the project itself. Wind farms have a very high "energy payback" (ratio of energy produced compared to energy expended in construction and operation), and wind's energy payback time is one of the shortest of any electrical generation technology. It takes approximately three to eight months, depending on the wind speed at the site, for a wind farm to produce the total amount of energy used to construct the equipment and build the project (AWEA 2007). The Project Proponent expects this to be true for the Project as well.

During periods when the wind turbines are not generating power, electricity would be purchased

from the Skamania County Public Utility District #1.

The impact of this proposed project to the regional electric demands can best be seen by a recent Northwest Power and Conservation Council evaluation of projected electrical demand in the

3-90

region. The NPCC found that a medium forecast predicts a demand of about 5,300 MW by 2025 with a range of about minus 2,500 MW to a high of about plus 7,000 MW. The medium forecast represents a growth of about 1 percent per year. Given the regional energy needs and the unique convergence of gas pipelines, wind energy, and transmission lines in Klickitat County, it is reasonable to estimate that the County could produce a portion of the projected increased energy demand. Currently, the regional power resources come from the following energy technologies:

- Hydroelectric, 55 %
- Coal fired thermal, 19 %
- Nuclear power, 5 %
- Imports, 8 %
- Gas fired combustion turbines, 3 %
- Non-Utility generation, 6 %
- Miscellaneous, including wind power, 4 %

The Klickitat County Energy Overlay Zone Final EIS11, released by the Klickitat County Planning Department, also recently evaluated the projected energy demand in Klickitat County, Washington, the county immediately adjacent to Skamania County. The Klickitat County Planning Department found that the technologies that are currently being used within Klickitat County include hydroelectric, gas fired combustion turbines, biomass fired turbines, and wind energy. These energy technologies are expected to continue to be developed in the County (through the year 2024) and include:

- Seven 250 MW or five 350 MW natural gas thermal projects
- Two 50 MW biomass projects
- Four wind power projects with total generating capacity of 1,000 MW
- Solar projects are anticipated to be small in size and number.

Comment: If Klickitat County evaluated projected energy demand, then where is their cumulative impacts analysis for environmental impacts? Klickitat is in BPA's service area and any cumulative impacts from their energy production should be part of this DEIS. Cumulative impacts are just not calculated for past and present actions—they must also be calculated for FUTURE actions, such as the" seven 250MW or five 350MW natural gas thermal projects, and the two 50MW biomass projects, and the four wind power projects, and the solar projects" mentioned above. Where are the FUTURE cumulative impacts analyses for these FUTURE actions?

The proposed project, although in a small way, would help meet the project demand outlined by the NPCC as mentioned above through its wind power generation. Additionally, the proposed

project would be consistent with the types of projects that have been outlined within the Klickitat County Energy Overlay Zone Final EIS.

11 See: http://www.klickitatcounty.org/default.asp

3-91

Studies of the projected impact of this proposed project to the FCRTS have found that the North Bonneville-Midway 230-kV line interconnection provides sufficient capacity for the proposed 70 MW request. From the proposed BPA substation interconnection, the power flow will be directed 80% towards North Bonneville and 20% towards Midway. The contingency analysis for this interconnection request indicates that no overloads are anticipated to occur, and this proposed project would not be expected to affect the operation of BPA's transmission system.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant will provide EFSEC with an initial site restoration plan at least 90 days prior to the beginning of site preparation. The plan will address site restoration that would occur at the conclusion of the project's operating life (estimated to be 30 years), and restoration in the event the project is suspended or terminated during construction or before it has completed its useful operating life. The plan will include or parallel a decommissioning plan for the project.

The initial site restoration plan will be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential uses of energy and natural resources. If impacts to energy or natural resources are anticipated to occur as a result of site restoration and project decommissioning, mitigation measures will be proposed as part of the plan.

3.5.2.2 No Action Alternative

Under the No Action Alternative, the wind energy project would not be built. The energy and water use for the Operations and Maintenance building would not take place. It is likely that the region's power needs would be met through energy efficiency and conservation measures, existing power generation, or the development of new power generation. Base load demand would likely be filled through expansion of existing, or development of new thermal generation such as gas-fired combustion turbine technology. Other wind sources also could be developed. Such development could occur at appropriate locations throughout Washington State. The impacts on energy and natural resources would depend on the type, location, and size of the facility proposed.

3.5.3 MITIGATION MEASURES

Adverse impacts to energy and natural resources are identified to be minimal and therefore no mitigation measures would be required.

3.5.4 UNAVOIDABLE ADVERSE IMPACTS

The project would have minor unavoidable adverse impacts to energy and natural resources. The overall impact of the project to energy and natural resources would be positive, since it would provide the region with low-cost, clean, renewable energy, in accordance with state and national policies and priorities.

Comment: Just "minor unavoidable adverse impacts to energy and natural resources"? What exactly does minor mean? How many cumulative "unavoidable adverse impacts" are there? "Overall impact...would be positive"? Do we now sing Kumbaya and call it good?!? This is not analysis. This is a proponent making a subjective, wishful statement unsupported by data and factual information. Where is the data to support the assertions in the adverse impact statement?

3-92

3.5.5 REFERENCES

American Wind Energy Association (AWEA). 2007. Wind Power Today. Accessed at: http://www.awea.org/pubs/factsheets/windpowertoday_2007.pdf.

Energy Facility Site Evaluation Council (EFSEC). 2009. Application No. 2009-01: Skamania

County Public Utility District No. 1 Petition for Intervention. Accessed at:

http://www.efsec.wa.gov/Whistling%20Ridge/Adjudication/Petitions%20for%20interven

tion/SCPUD%20Petition%20for%20Intervention.pdf.

Northwest Power and Conservation Council (NWPCC). 2009. Draft Sixth Northwest Power Plan. September. Accessed at: http://www.nwcouncil.org/energy/powerplan/6/default.htm.

Washington Utilities and Trade Commission and Department of Community, Trade and

Economic Development WUTC and CTED). 2008. Green Power Programs in

Washington: 2008 Report to the Legislature. December.. Accessed at:

http://www.wutc.wa.gov/webdocs.nsf/0/547510a1319daa74882575d80057a2bf/$FILE/Green%20 Power%20Report.pdf.

3.6 PUBLIC HEALTH AND SAFETY

This section describes existing health and safety hazards at the project site and identifies potential health and safety risks from project construction and operation. Risks discussed include fire or explosion, release of hazardous materials, vandalism, traffic accidents, turbine structural failure, ice throw, electric and magnetic fields, and shadow-flicker. Mitigation measures are identified for potential impacts.

3.6.1 AFFECTED ENVIRONMENT

3.6.1.1 Existing Health and Safety Risks

Existing health and safety hazards at the project site include those associated with the current commercial forestry operations on the site. Commercial forestry operations include some risks of fire and explosion from equipment operation, especially during dry summer months. Commercial forestry entails a small risk of leaks or spills of fuel, oil, or hydraulic fluid. There is also a small health and safety hazard related to logging trucks currently traveling to and from the site. During the dry summer months, there is some risk of fire from lightning.

Resources for responding to risks to environmental health and safety include fire prevention, law enforcement, and emergency medical response.

3.6.1.2 Fire Prevention

The project site is currently used for commercial forestry and there are no structures on the site.

Two city fire departments (North Bonneville and Stevenson) and seven Skamania County fire districts provide fire protection to Skamania County residents. DNR also provides fire suppression services to forested areas in Skamania County, and would be the first responder to a fire emergency at the project site (J. Weeks, personal communication). Skamania County Fire

3-93

District No. 3 (SCFD3) (also known as Underwood Fire District) provides fire protection and emergency response to a 20-square mile service area immediately south of the project site (D, Cox, personal communication). Although the project site is not formally within SCFD3's service area (T. Skinner, personal communication), SCFD3 would likely respond to a fire at the project site, along with and in coordination with DNR (R. Hovey, personal communication). The Mill A Fire Department is also near the project site, and has a staff that includes less than six volunteer firefighters and no paid personnel (J. Carlson, personal communication).

The project site is located in DNR's West Klickitat Area. The DNR work center closest to the project site is the Husum work center, which is staffed by one fire manager officer and one assistant fire manager (J. Weeks, personal communication). Other staff and equipment at the Husum work center includes six firefighters and two Type 6 wildfire engines (Fullerton and Helgerson 2008). The DNR response time to the project site would vary depending on the location of the engines and the type of fire emergency at the project site, but would range from 45 minutes to one hour (R. Hovey and J. Weeks, personal communications). The engines are usually assigned to work projects in the field.

SCFD3 is located in the unincorporated community of Underwood and is staffed by 17 volunteer firefighters. The SCFD3 service area is 20 square miles. Equipment at SCFD3 includes one each of the following: Type 1 engine, Type 2 engine, Type 3 engine, Type 7 engine, Type 2 tender, and Type 3 tender (Fullerton and Helgerson 2008). The Washington State Ratings Bureau rating for SCFD3 at the project site is "Unprotected – 10," because the site is not located

within the SCFD3 boundaries (T. Skinner, personal communication).

The project site is located outside of the Columbia River Gorge National Scenic Area. If an incident at or near the site, i.e., a wildland fire, threatens the area, the Columbia River Gorge National Scenic Area fire agency could respond. The fire agency is equipped with three Type 6 wildfire engines, one fire prevention module, two command vehicles, two cooperative engines (with the DNR), and one cooperative engine (with the Oregon Department of Forestry). The Columbia River Gorge National Scenic Area fire agency has nine employees and is staffed seven days per week, July through September (Fullerton and Helgerson 2008).

Skamania and Klickitat Counties have jointly prepared a Community Wildfire Protection Plan through a Title III grant from the Secure Rural Schools and Self Determination Act (Klickitat and Skamania Counties 2006). This is a plan developed by a community in an area at risk from wildfire, with the goal of reducing the risk of catastrophic wildfire within the region. .

Table 3.6-1 lists the fire departments that serve the site and surrounding area, along with the departments' staff and equipment. These fire districts have mutual aid agreements with each other (J. Carlson, personal communication).

3-94

Table 3.6-1
Fire Departments in the Whistling Ridge Energy Project Vicinity
Fire Department
Paid Full-Time
Personnel
Volunteer
Personnel Equipment
Protection
Classa
Skamania County
Fire District No. 3
0 17 1 – Type 1 engine
1 – Type 2 engine
1 – Type 3 engine
1 – Type 7 engine
1 – Type 2 tender
1 – Type 3 tender
10
Mill A Fire
Department
0 <6 (c)
Washington
Department of
Natural Resources
6 NAb 2 – Type 6 wildfire engines -

Columbia River
Gorge National
Scenic Area Fire
Agency
9 NAb 3 – Type 6 wildfire engines
1 – fire prevention module
2 – command vehicles
2 – cooperative engines (with DNR)
1 – cooperative engine (with Oregon Department of
Forestry).
-Sources: Fullerton and Helgerson (2008), Washington State Patrol (personal communication), MSRC (2008), J. Carlson (personal
communication).

a. T. Skinner (personal communication): As rated by the Washington Surveying and Rating Bureau. The Bureau rates the level of fire protection provided by fire departments against four main elements: available water supply; logistical characteristics and makeup of the district fire department; available communications systems; and fire control and safety measures taken and ordinances in effect in the particular fire district. Ratings are used to evaluate fire protection availability for insurance purposes. Ratings range from 1 to 10, with class 1 representing the highest level of fire protection and class 10 the lowest level. Ratings were not available for the DNR or the Columbia River Gorge National Scenic Area Fire Agency.
b. Not available.
3.6.1.3 Law Enforcement

The Skamania County Sheriff's Office provides law enforcement services in the project vicinity. Sheriff's Office headquarters are located in Stevenson, approximately 15 miles southwest of the project site. The response time from Sheriff's Office headquarters to the project site is approximately 20 minutes.

The Washington State Patrol patrols SR 14 south of the site. Roads extending north of SR 14 are county roads, and are patrolled by the Sheriff's Office. Table 3.6-2 provides information on the police departments serving the site area, including service area and number of officers.

3.6.1.4 Emergency Medical Services

Two ambulance companies provide emergency response services for the Project site: Skamania County Emergency Medical Service and Skyline Ambulance. Skamania County Emergency Medical Services is the functioning entity of Skamania County Hospital District No. 1, which provides ambulance service to the residents of Skamania County. Skyline Ambulance is based at Skyline Hospital in White Salmon, and is equipped with three ambulance vehicles. Table 3.6-3 lists characteristics of the first response ambulance service providers for the Project site.

3-95

Table 3.6-2

Police Department Staffing Levels in the Whistling Ridge Energy Project Vicinity

Department
2008 Population
of Service Area
Number of
Commissioned
Officers
Ratio of Officers to
1,000 Population
Skamania County Sheriff's Office 10,700 23 2.1a
Washington State Patrol District 5 Goldendale
Detachment 30,800b 9 0.3
Washington State Patrol Vancouver District 5 608,600c 60 0.01
Average for Washington State 6,489,490 10,541 1.6d

a. D. Cox (personal communication), WASPC (2008), Washington State Patrol (personal communication).
b. Includes population of Klickitat and Skamania Counties.
c. Includes population of Clark, Cowlitz, Lewis, and Skamania Counties.
d. WASPC (2008), statistics are for 2007.
Table 3.6-3
Ambulance Service Providers in the Whistling Ridge Energy Project Vicinity

Name Ownership Level of Care
Skyline Ambulance Public Advanced Life Support
Skamania County Emergency Medical Services Public Advanced Life Support

Sources: Skyline Hospital (2008), Skamania County EMS (2008).

The two hospitals closest to the project site are Skyline Hospital in White Salmon (7 miles southeast of the project) and Providence Hood River Memorial Hospital, directly across the Columbia River from White Salmon in the City of Hood River (8 miles southeast of the project). Skyline Hospital is a 32-bed acute care hospital with a Trauma Level IV designation, serving western Klickitat County and eastern Skamania County. Services at Skyline Hospital include acute care, obstetrics, surgery, cardiopulmonary care, radiology and laboratory services, physical therapy, a pharmacy, and emergency services. Skyline Hospital owns and operates a three-vehicle ambulance service (Skyline Hospital 2008).

Providence Hood River Memorial Hospital is a 25-bed facility that provides cardio conditioning, counseling, diabetes treatment, a dialysis center, emergency services, obstetrics, radiology, laboratory services, nutrition, occupational medicine, a sleep center, and surgery12.

3.6.2 IMPACTS
3.6.2.1 Proposed Action
Potential impacts to environmental health may occur during construction or operation.

Construction

Construction impacts include the typical risks to health associated with the construction of an industrial facility, including fire or explosion, release of hazardous materials, vandalism, and accidents.

12 See: http://www.providence.org/hoodriver/

3-96

Fire or Explosion

The only structures proposed on the site are the turbine towers, associated transformers and substation, and the Operations and Maintenance facility. Project construction could temporarily increase the risk of fire at the project site and in the broader project area, as a result of the operation of vehicles and power equipment, which may cause fires through contact with dried plants during dry summer weather. Blasting may be used where solid rock is encountered during construction of turbine foundations or trenches for the underground electrical collection system. Blasting could create a fire hazard during dry weather.

As the landowner and a long-term commercial forestry business, SDS has maintained the ability to respond to fires on their forest land with dozers and water trucks, and will continue to do so. Fire response by SDS will be supplemented by DNR, which provides fire protection on forest lands. DNR has resources in the area and responds to all wildland fires. DNR would likely respond to a structure fire in the woods, as would Underwood Fire District #3 and Mill A Volunteers. SCFD3 is the nearest local fire district. Eric Ziegler, District Chief, submitted a letter to EFSEC during the EIS scoping period stating that SCFD3 can provide service coverage to the project area to respond to fires without any reduction in service to their constituency. Mill A Volunteers is not a recognized fire district with a tax base but a volunteer fire company. Mill A Volunteers has joint responder agreements with Underwood Fire District and the DNR.

There are two locations being considered for the Operations and Maintenance facility site, one site next to the substation and the other at the bottom of West Pit Road. The West Pit Road site would have a lower fire risk and shorter response times for emergency services, since the facility would be along a county road.

Releases of Hazardous Materials

The risk of releases to the environment that would affect health would be similar to any large construction project. The primary potentially hazardous materials used during construction would be diesel fuel for construction equipment, lubricating oils and hydraulic fluids for the turbines, and mineral oil for the transformer at each turbine and the substation. Approximately 19,250 gallons of diesel fuel would be used during construction. Most trucks would fuel up off-site; some fuel would be transported to the site.

Each turbine would contain a small amount of hydraulic fluid, and would have a pad-mounted transformer containing approximately 500 gallons of mineral oil for cooling. The BPA substation would have either one or two transformers, each containing up to 12,000 gallons of mineral oil. These transformers would be filled during construction.

Comment: How dangerous is mineral oil to the environment, in case of leaks? Is there combustion danger? How much of the mineral oil is stored onsite for use? Over the life of each turbine transformer, how much mineral oil is used? How much mineral oil is used over the lifetime of the BPA substations? What is the chemical makeup of the mineral oil?

Vandalism

During construction, the presence of out-of-area workers could create a negligible increase the risk of vandalism in the community. Vandalism of project facilities and theft of equipment during construction also is a potential area of concern. Security provisions could include temporary fencing with a locked gate around the construction site; the use of site trailers for the temporary storage of special equipment or materials; and the use of outdoor lighting and motion-sensor lighting. Access to the project site would be controlled, and site visitors including vendors, equipment personnel, maintenance contractors, material suppliers, and all other third

3-97

parties would require permission for access from authorized project staff prior to entrance. These measures would help to reduce the potential for vandalism and other incidents at the project site that would require a response by local law enforcement agencies. Whistling Ridge Energy LLC may contract for on-site security to supplement coverage by the Skamania County Sheriff.

Traffic Accidents

Project construction could lead to a slight increase in the chance of traffic accidents, due to the presence of a peak of 265 construction workers traveling to the site, along with the transport of construction materials and the turbine components. This impact would last a maximum of one year, with peak impacts limited to a several-month period in the summer. This risk would be minimal and similar to any construction project involving the use of heavy equipment and large structural components on the roadways. The Skamania County Sheriff or the Washington State Patrol would respond to traffic accidents. Medical response would be provided by the local ambulance services (Skamania County Emergency Medical Service and Skyline Ambulance) and the two local hospitals (Skyline Hospital in White Salmon and Providence Hood River Memorial Hospital in Hood River), which have capacity for additional patients.

Turbine Structural Failure

The risk of turbine structural failure during construction would be very small, and would be due primarily to problems in the assembly process, should a failure occur. The turbine supplier will be required to document and provide the quality assurance/quality control procedures used

during manufacturing and assembly to minimize or eliminate the risk of failure.

Ice Throw

Ice storms, both mild and occasionally severe, may occur in the project area. During periods of ice build-up, the exposed parts of the turbine may be coated with ice. When a stationary blade accumulates ice followed by an increase in temperature, the ice on the blade can thaw. If the blades are stationary, the ice will fall near the turbine base, but once the blades begin to rotate, ice fragments may be thrown. Ice throw would not be a risk during construction because the turbines would not be operating.

Shadow Flicker

Shadow flicker caused by wind turbines is defined as alternating changes in light intensity as the moving blade casts shadows on the ground and objects, including windows at residences. Some health concerns have been raised about the effects of shadow flicker. Shadow flicker can only occur if the location of the turbine is close to a receptor that is in a position where the blades interfere with very low-angle sunlight. Shadow flicker would not be a risk during construction because the turbines would not be operational.

Comment: Duh. "Shadow flicker would not be a risk during construction because turbines would not be operational." I really dislike it when people think I'm stupid... SO, what happens after the turbines are constructed? How much shadow flicker is there? How are people and wildlife affected by shadow flicker? Shadow flicker is VERY ANNOYING, as anyone who has had light flickering on their peripheral vision can attest! This is not an analysis of shadow flicker, its effects on humans and wildlife, and its location relative to human habitation in the area.

Electromagnetic Fields

Electrical transmission lines, distribution lines, and substations create electromagnetic fields. Electromagnetic fields also exist in nature and around all types of electrical devices and appliances. They are produced by the presence of differences in electrical potential (voltage) and the movement of charges because of the potential (current). This movement produces magnetic fields. The electrical and magnetic fields around electrical appliances and utility facilities are

3-98

extremely low frequency. They have a significantly lower frequency (60 cycles per second, or Hz), than radio broadcast waves (0.5 to 100 million cycles per second) or electromagnetic energy from sunshine (1,000 trillion cycles per second). Electrical and magnetic fields would not be generated prior to completion of the project other than by electrical generators used for temporary site power.

Comment: SO, what happens after construction. What strength electrical and magnetic fields would be generated? What effects do electromagnetic fields have on humans and wildlife? Are there any genetic effects? Cancer-causing effects?

Operation

Potential health and safety concerns from operation of a wind energy facility include ongoing risks of fire or explosion, releases to the environment, vandalism or traffic accidents, along with concerns regarding turbine structural failure, tower failure, blade throw ice throw from the turbine blades, shadow flicker from the moving blades, and electrical and magnetic fields.

Fire or Explosion

Wild fires in the project area are relatively rare, and fire conditions are monitored continually by the DNR. During project operation, fire protection would continue to be provided by SDS, DNR, Underwood Fire District, and Mill A Volunteers. Potential for fire would be lower once construction is completed, and would relate primarily to lightning and vehicle use during the dry summer months. These risks would be mitigated through appropriate operational practices. DNR has stated that resources for fire protection and suppression services are adequate to serve the project during construction and operation (J. Weeks, personal communication).

Turbine fires are possible; however, with the types of modern wind turbines proposed for the project, turbine malfunctions leading to fires in the nacelle are extremely rare. The turbine control system detects overheating in turbine machinery, and internal fires would be detected by these sensors, causing the machine to shut down immediately and send an alarm signal to the central supervisory control and data acquisition system, which would notify operators of the alarm by cell phone or pager.

Releases to the Environment

Operation of the project would not result in the generation of regulated quantities of hazardous wastes. Since no fuel would be burned to power the wind turbine generators, there would be no spent fuel, ash, sludge or other process wastes generated. The only materials used during project operations that present any potential for accidental spills are lubricating oils and hydraulic fluids used in the wind turbine generators and transformers.

• Turbine Fluids. The fluids within the turbines are checked by staff periodically and must be replenished or replaced on an infrequent basis (generally less than once per year and sometimes only once every five years). When replacing these fluids, the industry standard practice is for staff to climb up to the nacelle and remove the fluids in small (typically five-gallon) containers and lower them to the ground using a small maintenance crane built into the nacelle itself. The containers would then be transferred to a pickup truck for transport to the Operations and Maintenance facility for temporary storage (typically less than one month) before being picked up by a licensed transporter for recycling. Replacement fluids are added in the same method, only in reverse.

• Replacement Fluids. Small quantities of replacement fluids, typically no more than a few 50-gallon drums of lubricating oil and hydraulic oil, may be stored at the Operations and Maintenance facility for replenishing and replacing spent fluids. These fluids would be stored in appropriate containers. All operations staff would be trained in appropriate handling and spill prevention techniques to avoid any accidental spills. Because only small quantities of fluids are transported, added, or removed at any one time and are stored for short periods of time, the potential for an accidental spill during routine maintenance is extremely limited.
• Pad Mounted Transformers. Each wind turbine generator has a pad mounted transformer located at its base. These transformers contain mineral oil, which acts as a coolant. Each pad mounted transformer contains up to 500 gallons of mineral oil. The transformer is designed to meet stringent electrical industry standards, including containment tank welds and corrosion protection specifications. Regular maintenance is performed on the transformers, including checking the condition of the coolant.
• Substation Transformer(s). The BPA substation would be equipped with either one or two transformers. Each substation transformer would contain up to 12,000 gallons of mineral oil for cooling. These transformers are designed to meet stringent electrical industry standards, including containment tank welds and corrosion protection specifications. The substation transformers are equipped with an oil level sensor that detects any sudden drop in the oil levels and send an alarm message to the central supervisory control and data acquisition system. Finally, the substation transformers are supported by a concrete vault to ensure that any accidental fluid leak does not result in any discharge to the environment. It is anticipated that an Operation SPCC Plan would be submitted and approved by EFSEC prior to operation.

Vandalism

Vandalism of project facilities and theft of equipment during operation is similar to that expected during construction. As with the construction period, the project design will include site security measures including fencing and outdoor lighting, and Whistling Ridge Energy LLC may contract for on-site security to supplement coverage by the Skamania County Sheriff.

Traffic Accidents

The risk of traffic accidents during operation would be low. The project would employ between eight and nine operations staff; this number would not generate sufficient additional traffic to increase accident rates. Traffic accident response would continue to be provided by the Skamania County Sheriff and Washington State Patrol, with support by local ambulance services and hospitals as needed.

Tower Failure

Structural failure of the turbine tower is very rare, though some instances of turbine failure have been documented in older turbine models. A review performed for the Kittitas Valley Wind Project EIS located five reported instances of tower failure worldwide. There are at least 55,000

wind turbines installed world-wide (EFSEC 2007). One insurance company representative whose company insured over 12,000 turbines reported that he was not aware of any instances of the failure of tubular turbine towers (EFSEC 2007).

Tower failure can be attributed to improper design, manufacturing defects, extreme weather events, or the wrong application of technology. Reasons for tower collapse can vary depending on conditions and tower type, but may include blade strikes, very strong winds, and improper maintenance. While structural failure is more damaging than blade failure, the consequences and risks to human health are far lower since risks are confined to within a relatively short distance from the turbine (Caithness 2006). There is only one recorded death from a tower collapse, which occurred in Sherman County, Oregon (a construction worker who died during the testing phase and not during operation). A six-month investigation found that the operating company "failed to properly instruct and supervise workers in the safe operation of tools and equipment. It also found that company procedures for working under potentially dangerous conditions fell short of OSHA [Occupational Safety and Health regulations]" (Hill 2008). The investigation did not find any structural problems with the tower itself.

Comment: This is the Gorge. There are strong winds in the Gorge. There is extreme weather in the Gorge. Why is SDS proposing to build huge, dangerous propellers in an area known for gusting, strong, winds?

Blade Throw

Cases of blade throw are rare and have generally been linked to improper assembly or exceedance of design limits (AWEA 2008). In those rare instances where towers or blades have failed, the failure typically results in components crumpling or falling straight down to the ground, although in a small number of cases blades or parts of blades have been thrown from the nacelle. There is limited data available on how far blade components would be thrown since blade throw is extremely rare. In testimony for the Kittitas Valley Wind Project, a representative from Vestas Wind Systems in Denmark stated that there are approximately 10,000 Vestas turbines installed and operating worldwide. There has been only one noted occurrence of blade throw, with a Vestas V39-500kW turbine in Denmark in 1992 where a blade was thrown 50 to 75 meters (approximately 165 to 245 feet) (EFSEC 2007). Based on this information, the Applicant determined that using a minimum of turbine tip height to define the minimum safety setback distance is sufficient to protect against blade throw.

For the Project, members of the public would not have access to the project site, and signs would be used to discourage unauthorized access. The tip height of the turbines would be approximately 426 feet. The property boundaries of the project site would be greater than 426 feet in distance to the nearest turbine in all but a few isolated cases. Exact distances from the turbines to the property boundary would depend on the final design and placement of the turbines; however, it is possible that the nearest turbine would be within this distance of the project boundary for small parts of turbine strings A and B (on the west of side of the project area), F and D (on the south side) and B and C (on the north side). However, most of this area is

under control of the Applicant or in large-scale agriculture, and there are no residences within this buffer area:

• On the west side of the project area, there are six properties, of which only two are owned by a person or entity other than the Applicant. These two are owned by the State and managed by DNR. All these neighboring properties are managed as commercial forest land with no residential structures.

3-101

• On the south side, there are five adjacent off-project properties, located within the Scenic Area. Of these five properties, only one, totaling 29 acres, is owned by someone other than the Applicant. The 29-acre parcel is primarily managed as forest and orchard lands, with 1 acre used for residential purposes. The owner has received approval from Skamania County to relocate their existing home to within 50 feet of their north property line. This new location would bring the residence to within 2,000 feet of the closest proposed turbine corridor. Except for this parcel, all adjacent lands to the south are in commercial timber production.
• On the north side, the land is owned by the State and managed for commercial timber harvest by the DNR.

The wind turbines for the project would be equipped with sophisticated computer control systems to monitor variables such as wind speed and direction, air and machine temperatures, electrical voltages, currents, vibrations, blade pitch and yaw angles, etc. Each turbine would be connected to a central data control system. The system will allow for remote control and monitoring of individual turbines and the wind plant as a whole from both the central host computer or from a remote computer.

Comment: I did not see any wind studies, long-term wind direction distribution curves, data on maximum and minimum temperatures onsite, the different altitude locations for the wind turbines (altitude above sea level affects wind production? Where are the air density tables for the proposed location, etc. Where are the wind studies for this area? What are the environmental issues associated with micro-siting?

All turbines are designed with several levels of built-in safety and comply with the codes set forth by Occupational Safety and Health Administration and American National Standards Institute standards. The turbines would be equipped with two fully independent braking systems that could stop the rotor either acting together or independently. The braking system is designed to bring the rotor to a halt under all foreseeable conditions. The system would include aerodynamic braking by the rotor blades and by a separate hydraulic disc brake system. Both braking systems would operate independently such that if there is a fault with one system, the other could still bring the turbine to a halt. Remote restarting of the turbine would not be possible following an emergency stop. The turbine would be inspected in-person and the stop-fault reset manually to re-activate automatic operation. The turbines also would be equipped with a parking brake used to "park" the rotor while maintenance routines or stationary rotor inspections are performed.

Ice Throw

As noted above, during periods of ice build-up, the exposed parts of the turbine may be coated with ice. When a stationary blade accumulates ice followed by an increase in temperature, the ice on the blade can thaw. If the blades are stationary, the ice would fall near the turbine base, but once the blades begin to rotate, ice fragments may be thrown. The risk of impacts from ice throw is minimal. Most modern turbines include sensors that would shut down the turbine when ice build-up is detected. A 1998 study reported that there had been no injury from ice thrown from wind turbines (Morgan et al. 1998). A 2009 study reported one human injury due to ice-throw, although the specifics of the incident were not provided (Caithness 2009). As stated above, there are at least 55,000 wind turbines in operation world-wide.

Reported data on ice throws at other projects indicate that ice fragments were found on the ground from 50 to 328 feet from turbines (<33 to 197 feet blade diameter) and were in the range of 0.2 to 2.2 pounds in mass (Morgan et al. 1998, EFSEC 2007). When more than a few meters from the turbine, the risk of ice landing at a specific location was found to reduce quite quickly

3-102

with the distance of the location from the turbine. It was also found that ice falls predominantly downwind of the rotor plane. Seifert et al. (2003) conducted risk analyses on ice throw primarily in Europe. The general conclusion was that wind turbines would not cause ice throw risks as they are normally set back from residences and roadways and that the hypothetical risk of being struck by ice is small. However, the actual throwing distance of the ice fragments would vary based on many variables not included in this calculation, including rotor azimuth, rotor speed, local radius, ice fragment size and weight, and the wind speed.

Thus, a buffer based on tip height (approximately 426 feet) would provide adequate protection from ice throw. As discussed in the Blade Throw section above, the project area boundaries are usually farther than this distance from the nearest turbine, and where this is not the case the surrounding area is either under the control of the Applicant, managed for commercial timber harvest by Washington State, or managed for large-scale agriculture. The nearest residence is approximately 2,000 feet from the nearest proposed turbine string.

Shadow Flicker

Shadow flicker is the alternating change in light intensity when moving turbine blades cast shadows on the ground and objects, such as windows in residences. Shadow flicker is not caused by viewing the sun through rotating wind turbines blades or moving through the shadows of a wind energy facility, or sunlight reflected from turbine blades. Shadow flicker occurs when a turbine is located near a receptor (e.g., residence) with an unobstructed line of sight to the turbine, the sun is behind and perpendicular to the turning turbine blades and the receptor is located close enough to the turbine to be in its shadow.

The existence and intensity of shadow flicker are affected by a number of factors including:

• The strength of the sun as affected by cloud cover.
• The line of sight of the observer relative to the sun and the turbine. This is related to the sun's height in the sky, which varies with latitude and longitude, time of day, and time of year
• The distance between the observer and the turbine, which affects the distinctness of the shadows.
• The presence of obstructions such as buildings or vegetation.
• The orientation of the turbine depending on wind conditions. When the turbine is facing the sun, shadow flicker is greater behind the turbine; when the turbine is rotating in line with the sun, there is much less flicker (Committee for Renewable Energy 2008).

Potential shadow flicker from wind turbines can only occur when (1) the sun is very low in the sky; (2) a receptor is very close to the turbine; (3) the receptor is oriented toward a turbine; (4) the receptor has an unobstructed line of sight; and (5) the weather conditions include bright sun. When all these factors exist, they may produce a pulsating shadow which may or may not be perceptible. Shadow flicker frequency is related to the rotor speed and number of blades on the rotor, which can be translated into a "blade pass frequency" measured in alternations per second,

3-103

or hertz (Hz). Although in some instances the flickering of light can induce epileptic seizures in people who are photosensitive (about 3- 5 percent of the 1 percent of Americans who are epileptic are photosensitive), shadow flicker from wind turbines is too slow to induce epileptic seizures. Whether light flicker will provoke a reaction depends on its frequency, light intensity, visual area, image pattern, and color (Epilepsy Foundation 2009). Flicker frequency due to a turbine is on the order of the rotor frequency, i.e., 0.6–1.0 Hz (NRC/NAS 2007). The flicker frequency that provokes seizures in photosensitive individuals is 5–30 Hz, well above the maximum of approximately 1 Hz for wind turbines. There is no scientific data or peer-reviewed studies that suggest a link between epileptic seizures and rotor blade alternatives.

Analyses conducted at other wind energy facilities approved by EFSEC (Kittitas Valley Wind Power Project and the Wild Horse Wind Power Project) examined the potential effects of shadow flicker for residents near the proposed projects and recommended certain measures for minimizing these effects. EFSEC found that as the distance between the wind turbine generators and residences increases, the perception of shadow flicker decreases or attenuates. At a distance beyond 2,500 feet, shadow flicker is considered to be imperceptible. Even if shadow flicker were a proven impact (as the Council found in the Kittitas Valley Wind Power Project case), none of the planned turbines are within 2,500 feet of existing residences (Figure 3.7-1 Noise Level Contours in Section 3.7 shows the locations of the closest residences.). If shadow flicker were found to occur, operational controls could be implemented to completely eliminate this perceived impact. For instance, turbine speed or orientation could be controlled during specific periods.

Electromagnetic Fields

The project will include 34.5-kV collector lines and systems, primarily located underground. There will be a new collector substation located adjacent to BPA's existing North Bonneville to

Midway 230-kV transmission line and a new interconnection from the proposed BPA substation to the 230-kV transmission line.

Electrical transmission lines, distribution lines, and substations create electromagnetic fields, which also exists in nature and around all types of electrical devices and appliances. As shown in Table 3.6-4, much of typical daily exposure to electromagnetic fields from human-made sources is a result of using electric home appliances. Electromagnetic field strength is expressed with a unit of measure called a milligauss (mG), and is measured using a special monitoring device. The strength of electromagnetic fields falls rapidly as one moves away from the source.

3-104

Table 3.6-4
Electromagnetic Field Readings for Common Equipment

Source Readings (mG)
Video Display Terminals (VDTs)(distance 6 inches) 14 mG
Portable Heaters (distance 6 inches) 100 mG
Vacuum Cleanera (distance 6 inches) 300 mG
Can Openera (distance 6 inches) 600 mG
Hair Dryera (distance 6 inches) 300 mG
Distribution Line 37.5-kVb (distance 100 feet) <1-2 mG
Transmission Line 115-kVa (distance 100 feet) 1.7 mG
Transmission Line 230-kVa (distance 100 feet) 7.1 mG

a. National Institute of Environmental Health Sciences (2002). , EMF: Questions and Answers, 2002.
b. Gauger, J.R. (1985), Silva et al. (1988)
Electromagnetic fields from the project will be lower than those of many common household appliances and will not have health and safety impacts. Electromagnetic field readings for items commonly found in homes compared to electrical transmission lines are shown on Table 3.6-4.

Given the low strength of electromagnetic fields from the project and the distance to the nearest residences and the Operations and Maintenance facility, the project would have no impacts from electromagnetic fields.

Other Potential Impacts

Other potential adverse impacts to environmental health during operation could occur from the following:

• Weather. Weather emergency includes hail, high winds, thunderstorms, extreme cold weather, and any other naturally occurring weather situation that may endanger equipment, or require adjustments to the normal operations of the facility. Risks to personnel at the project would be minimized through preparation of and implementation of an Emergency Plan that includes planning for weather contingencies.

• Geological. This type of emergency deals with seismic activity and related geological phenomena. As discussed in Section 3.1 Earth, the likelihood of earthquake at the site is very low.
• Security. This type of emergency includes bomb threats, civil unrest, sabotage, or any other man made threats to the facility or personnel. The risk of a security emergency in this location and to this type of facility is considered very low.

Comment: So this wind farm would be operating in an area that gets up to 3 meters of snow in the Winter? There would be hail, high winds, thunderstorms, and extreme cold weather? Personnel would have operate in this environment? What does OSHA have to say about this?

Project Decommissioning

The health and safety risks associated with decommissioning will be similar to those during the construction process. In compliance with WAC 463-72 Site Restoration and Preservation, the Applicant will provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan will address site restoration that would occur at the conclusion of the project's operating life (estimated to be 30 years), and restoration in the event

3-105

the project is suspended or terminated during construction or before it has completed its useful operating life. The plan will include or parallel a decommissioning plan for the project.

The initial site restoration plan will be prepared in sufficient detail to identify, evaluate, and resolve all major environmental health issues presently anticipated. If impacts to environmental health are anticipated to occur as a result of site restoration and project decommissioning, mitigation measures will be proposed as part of the plan.

3.6.2.2 No Action Alternative

Under the No Action Alternative, the wind energy project would not be built. The risk of fire due to lightning strikes or human activity in the general area would continue at their present levels, as would the risk of hazardous waste release, vandalism, and traffic accidents. The electrical energy that would otherwise be produced by the project would need to be obtained from another generating source.

3.6.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential impacts to public health and safety to the extent feasible.

• Prepare Emergency Plans for the project containing the following components:
-Fire Protection and Prevention Plan. A Fire Protection and Prevention Plan would be developed for EFSEC approval and implemented, in coordination with the Skamania County Fire Marshall and appropriate agencies. As part of the plan, the construction manager would be responsible for

staying abreast of fire conditions in the project area by contacting DNR and implementing any necessary fire precautions.

-Personal Injury Response Plan. Procedures will be developed for construction, operation and maintenance of the project to describe procedures to be followed in the event of a personal injury, including who is to be alerted, contacting 911, how to alert others in the immediate vicinity, remaining with the employee, and administering first aid until medical assistance arrives.

-Safety Plan. Prior to the commencement of any construction work, the construction contractor would be required to prepare a Safety Plan that would apply to all contractor and subcontractor personnel working at the site. The plan would be designed to ensure compliance with all laws, ordinances, regulations, and standards concerning health and safety. The contractor would assign a safety manager with the authority to issue a "stop work" notice when health and safety issues arise.

-SPCC Plan. While storage of chemicals on site would be minimal, the project could require an SPCC Plan that would protect groundwater. The SPCC Plan would apply to both construction and operation if hazardous materials were stored on site in quantities sufficient to trigger the plan requirement.

3-106

-Hazardous Waste Management Plan. Hazardous materials to be used or stored on site would be limited to small quantities of materials used for maintenance (cleaning and painting), lubrication of equipment, and possibly fuel. During construction, the construction contractor would be required to prepare a Hazardous Waste Management Plan that complies with state and federal hazardous waste management laws for handling, storage, and disposal. A similar plan would be prepared and implemented for operation.
• Report conditions affecting the safety of the project to EFSEC, including any condition, event, or action that might compromise the safety, stability, or integrity of any facility or the ability of any equipment to function safely; or that might otherwise adversely affect life, health, or property.
• Develop agreements related to emergency planning with Skamania County Department of Emergency Management prior to project construction. This agreement would be provided to EFSEC and attached to the Emergency Plan prior to implementation.
• Comply with all applicable local, state, and federal safety, health, and environmental laws, ordinances, regulations, and standards. Some of the main laws, ordinances, regulations and standards that would be reflected in the design, construction, and operation of the project are as follows:
-Occupational Safety And Health Act of 1970 (29 USC 651, et seq.) and 29 CFR 1910, Occupational Safety and Health Standards
- Uniform Fire Code
- Americans with Disabilities Act
- Uniform Fire Code Standards
- Uniform Building Code

-National Fire Protection Association design standards for the requirements of fire protection systems
-National Institute For Occupational Safety And Health requirements that safety equipment carry markings, numbers, or certificates of approval for stated standards
- American Society of Mechanical Engineers plant design standards
• American National Standards Institute plant design standards
- National Electric Safety Code
- American Concrete Institute Standards
- American Institute of Steel Construction Standards
- National Electric Code

3-107

• Utilize the following measures to mitigate the risk of fire or explosion:
-The construction manager would be responsible for staying abreast of fire conditions in the project area by contacting DNR and implementing any necessary fire precautions
-A Fire Protection and Prevention Plan would be developed for EFSEC approval and implemented by the Applicant, in coordination with the Skamania County Fire Marshall and appropriate agencies
-Both the wind turbine generators and the substation would be equipped with lightning protection systems

Table 3.6-5 lists sources of potential fire and explosion along with measures to mitigate the risk of either occurring.

3-108

Table 3.6-5
Fire and Explosion Risk Mitigation

Construction or Operation	Potential Fire or Explosion Source	Mitigation Measures
Construction and Operation	General Fire Protection	• All on-site service vehicles fitted with fire extinguishers • Fire station boxes with shovels, water tank sprayers, etc. installed at multiple locations on site along roadways during summer fire season • Minimum of one water truck with sprayers must be present on each turbine string road with construction activities during fire season
Construction and Operation	Dry vegetation in contact with hot exhaust catalytic converters under vehicles	• No gas powered vehicles allowed outside of graveled areas • Mainly diesel vehicles (i.e. w/o catalytic converters) used on site

• Use of high clearance vehicles on site if used off-road Construction and Operation
Smoking • Restricted to designated areas (outdoor gravel covered areas)
Construction and Operation
Explosives used during excavation
• Only state-licensed explosive specialist contractors are allowed to perform this work—explosives require special detonation equipment with safety lockouts
• Clear vegetation from the general footprint area surrounding the excavation zone to be blasted
• Standby water spray trucks and fire suppression equipment to be present during blasting activities
Construction and Operation
Electrical fires • Use generally high clearance vehicles on site
• No gas powered vehicles allowed outside of graveled areas
• All major construction equipment used is to be diesel powered (i.e., without catalytic converters)
Construction and Operation
Lightning • Specially engineered lightning protection and grounding systems used at wind turbines and at substation
• Footprint areas around turbines and substation are graveled with no vegetation
Construction Portable generators – hot exhaust
• Generators not allowed to operate on open grass areas
• All portable generators to be fitted with spark arrestors on exhaust system
Construction Torches or field welding equipment
• Immediate surrounding area would be wetted with water sprayer
• Fire suppression equipment to be present at location of welder/torch activity
Construction and Operation
Electrical arcing • Electrical designs and construction specifications meet or exceed requirements of the National Electric Code and National Fire Protection Agency

3-109

• Require that all on-site operations employees would be responsible for contributing to ongoing fire prevention in the project area through the following programs:
- Operational Safety Program
- Operations Written Safety Program
- Emergency Action Plan
- Fire Prevention Plan
• Develop on-site emergency plans would be prepared for the project in case of a major natural disaster or accident relating to or affecting the project. The plans would describe the emergency response procedures to be implemented during various emergency situations that may affect the project or surrounding community or environment. In addition to the above measures, Whistling Ridge Energy LLC would:
- Provide detailed maps that show all access roads to the project
-Provide keys to a master lock system that would enable emergency personnel to unlock gates that would otherwise limit access to the project
- Use spark arresters on all power equipment, e.g., cutting torches and cutting tools

-Inform workers at the project site of emergency contact phone numbers and train them in emergency response procedures
- Carry fire extinguishers in all maintenance vehicles
- Coordinate with DNR when the fire danger is high
-Comply with equipment rules and regulations required by DNR for work conducted in wildland/forested lands
• Prepare in advance to reduce the potential for traffic accidents. Mitigation for lowering the risk potential of traffic accidents includes:
-A Transportation Management Plan (TMP) that would direct and obligate the contractor to implement procedures to minimize traffic impacts would be prepared in consultation with both WSDOT and Skamania County and submitted to EFSEC for approval. The TMP would include requirements for coordination of project-related construction traffic and WSDOT planned construction projects, along with requirements for coordination of project-related construction traffic and Skamania County, City of Bingen, and City of White Salmon summer recreational traffic.
-Whistling Ridge Energy LLC and its contractors would be required to comply with State and County permitting requirements for over-size and over-weight vehicles.

Comment: There are no designated haul routes for Whistling Ridge, as far as the public is aware. I have gone to our Skamania County Road Department and talked with our Larry Douglas, the department head and he stated that they were working on a draft but that it is not available for public disclosure. They are using Klickitat County's Haul Route Agreement as a go-by; this was for the Windy Ridge project in Klickitat. However, Mr. Douglas stated that Klickitat's engineer had expressed that if they had to do it again, they would put in more restrictions on road usage, in the Haul Route Agreement. Since Skamania County is not giving out the draft Haul Route Agreement that they would be implementing for Whistling Ridge, the public doesn't really know which roads are going to be widened, straightened, re-constructed, etc. The public doesn't really know anything specific about the stresses that will be put on the roads, if roads will have to be rebuilt. This is a serious inadequacy of the DEIS and should be addressed prior to any decision on the proposed project.

3-110

-Whistling Ridge Energy LLC would be required to notify land owners in the project vicinity prior to construction of transportation routes that would be used for construction equipment and labor.

-Approved State and/or County advanced warning construction signs would be placed prior to and during construction.

-Certified flaggers would be used when necessary to direct traffic when over-size and over-weight trucks either enter or exit public roads, to minimize risk of accidents.

-Pilot cars would be used both in front of and behind all trucks transporting over-size or over-weight loads on all public roadways.

-Traffic flow would not be restricted for more than 20 minutes during the construction phase.

-All loads over 10 feet wide traveling on SR 14 from east of the proposed project site between MP 76.77 and 76.91 would require three pilot cars, two in front and one in the rear. The two front pilot cars would be required to maintain a minimum 500-foot separation. The lead pilot car in front of the load would warn oncoming traffic of the over-size load, and the pilot car immediately in front of the over-size load would be responsible to stop all oncoming traffic.

3.6.4 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts to environmental health are anticipated to be minimal.

Because there would be no need to transport, store, or combust fuel to generate power, the risk of unintentional or accidental fire or explosion or discharge to the environment during both construction and operations would be minimal. The risk of accident during construction would be no higher than for any large construction project and would be minimized through standard construction safety requirements and procedures. The risk of accident during operation would be minimal.

3.6.5 REFERENCES

American Wind Energy Association (AWEA). 2008. Wind Energy Siting Handbook. February.

Caithness Windfarm Information Forum (Caithness). 2006. Summary of Wind Turbine Accident data to November 1st 2006. Accessed at: www.caithnesswindfarms.co.uk.

———. 2009. Summary of Wind Turbine Accident Data to 31st December 2009. Accessed at ttp://www.caithnesswindfarms.co.uk.

Committee for Renewable Energy for Barrington. 2008. Health and Safety Report of the Health and Safety Subcommittee. Committee for Renewable Energy for Barrington, Rhode Island. Updated August 21.

3-111

Carlson, John. Skamania County Emergency Management. Phone conversation with Katie Carroz, Carroz Consulting LLC. December 30, 2008.

Cox, Dave. Undersheriff, Skamania County Sheriff's Office. Phone conversation with Katie Carroz, Carroz Consulting LLC. December 17, 2008.

Energy Facility Site Evaluation Council (EFSEC). 2007. Kittitas Valley Wind Power Project Final Environmental Impact Statement. February.

Epilepsy Foundation. 2009. Shedding Light on Photosensitivity, One of Epilepsy's Most Complex Conditions. By Guiseppe Erba, M.D. Accessed at: http://www.epilepsyfoundation.org/about/photosensitivity/gerba.cfm.

Fullerton, Gail A. and Ole Helgerson. 2008. Underwood Community Wildfire Protection Plan Accessed December 12, 2008 at

http://www.skamaniacounty.org/Wildfire/UnderwoodCWPP/Underwood%20CWPP%20 Draft.pdf.

Gauger, J.R. 1985. IEEE Transactions on Power Apparatus and Systems. PA-104. September.

Hill, Gail Kinsey. 2008. Siemens fined $10,500 for wind turbine tower collapse that killed worker. The Oregonian. February 26.

Hovey, Russ. Department of Natural Resources. Phone conversation with Katie Carroz, Carroz Consulting LLC. January 13, 2009.

Klickitat and Skamania Counties. 2006. Klickitat and Skamania County, Washington Community Wildfire Protection Plan. April 26. Accessed at: http://skamania.wsu.edu/documents/KliciktatandSkamaniaCWPP-nosig.pdf.

Morgan, Colin, Ervin Bossanyi, and Henry Seifert. 1998. Assessment of Safety Risks Arising from Wind Turbine Icing. April.

Municipal Research and Services Center of Washington (MSRC). 2008. MSRC Website. Accessed December 17, 2008 at http://www.mrsc.org/Subjects/PubSafe/Fire/fireservice.aspx#Skamania.

National Institute of Environmental Health Sciences. 2002. EMF: Questions and Answers.

National Research Council and National Academy of Sciences (NRC/NAS). 2007. Environmental Impacts of Wind-Energy Projects.

Seifert, Henry, Annette Westerhellweg, and Jürgen Kröning. 2003. Risk Analysis of Ice Throw from Wind Turbines. Paper presented at BOREAS 6, 9 to 11 April 2003. Pyhä, Finland.

Skamania County Emergency Medical Service (EMS). 2008. Website. Accessed December 19, 2008 at http://www.skamaniaems.com/index.html.

Silva, M., N. Hummon, and D. Rutter. 1988. Power frequency magnetic fields in the home. February. IEEE-PES, Paper 88 WM 101-8. ...

3-112

Skyline Hospital. 2008. Skyline Hospital Website. Accessed December 19, 2008 at http://www.skylinehospital.com/index.html.

Washington Association of Sheriffs and Police Chiefs (WASPC). 2008. Criminal Justice

Information: Crime in Washington. Accessed December 19, 2008 at

http://www.waspc.org/index.php?c=Criminal%20Justice%20Information%20Support.

Washington State Patrol. District 5 Public Information Contact, Phone conversation with Katie Carroz, Carroz Consulting LLC. January 26, 2009.

Weeks, Joe. Southeast (Ellensburg) Region of the Washington State Department of Natural

Resources Fire Service. Phone conversation and email with Katie Carroz, Carroz

Consulting LLC. February 5, 2009.

3.7 NOISE

This section describes the existing noise levels in the vicinity of the Project and the potential noise impacts from construction and operation of the proposed project.

3.7.1 AFFECTED ENVIRONMENT

3.7.1.1 Analysis of Environmental Noise

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day and the type of activity during which the noise occurs, and the sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the pitch of the sound and is measured in Hz, while intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above approximately 110 dB begin to be felt inside the human ear as discomfort and eventually pain at 120 dB and higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 1 to 2 dB. A 3 to 5 dB change is readily perceived. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or if minus 10 dB, halving) of the sound's loudness.

Due to the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically; however, some simple rules are useful in dealing with sound levels. First, if the intensity of a sound is doubled, the sound

level increases by 3 dB, regardless of the initial sound level. For example: 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

Sound level is usually expressed by reference to a known standard. This report refers to sound pressure level (SPL). In expressing sound pressure on a logarithmic scale, the sound pressure is compared to a reference value of 20 micropascals (μPa). SPL depends not only on the acoustic power of the source, but also on the distance from the source and on the acoustic characteristics of the space surrounding the source, the receiver, and the path between them. A sound power level, on the other hand, is analogous to the wattage of a light bulb: it describes a source's rate of emitted acoustical energy and is not distance dependent. Using the same light analogy, SPL would be the brightness or intensity of light that can be measured at a specific distance from a source. To clarify the distinction between sound power level and SPL, the latter should always be specified with a location or distance from the noise source.

The distance value associated with SPL is an important metric, as the decrease in measurable sound level due to increasing distance from any single sound source normally follows the inverse square law. In other words, SPL changes in inverse proportion to the square of the distance from the sound source. As a general rule, at distances greater than 50 feet from a noise generator such as a wind turbine, SPL drops at a rate of 6 dB with each doubling of distance. Additionally, some sound energy is absorbed in the medium (e.g., air) through which it travels as a function of temperature, humidity, and the frequency of the sound. This attenuation can be up to 2 dB over 1,000 feet. The overall sound propagation drop-off rate will vary based on other conditions such as natural terrain and intervening obstructions.

Sound frequency (Hz) is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a number of times per second. When the drum skin vibrates 100 times per second it generates a sound pressure wave that is oscillating at 100 Hz, and this pressure oscillation is perceived—by way of the inner ear organs and their connection to the brain—as a tonal pitch of 100 Hz. Sound frequencies between 20 and 20,000 Hz are within the range of sensitivity of the best human ear.

Sound from a tuning fork contains a single frequency (a pure tone), but most sounds one hears in the environment do not consist of a single frequency but rather a broad band of frequencies differing in sound level. The method commonly used to quantify environmental sounds consists of evaluating frequencies of sound according to a weighting system that reflects that human hearing sensitivity: less sensitive at low frequencies and extremely high frequencies than at the mid-range (e.g., speech) frequencies. This is called "A-weighting," and the measured decibel level adjusted by the A-weighting constants is called the A-weighted sound level (dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve of adjustment constants across the audible spectrum.

C-weighting is another type of filter, with adjustments that help expose low-frequency sound sources that the ear does not detect well, such as compressors, pumps, and diesel engines. For

the same measured sound, it is not uncommon for corresponding dBC and dBA levels to vary. As an example, the difference between dBC and dBA levels within an office building may be 20

3-114

dB (i.e., 40 dBA and 60 dBC). These wind turbines are not a source of substantial low-frequency noise. Because low frequency sound is less audible to human hearing, C-weighting is often used to assess potential annoyance from rattling due to low frequency noise that may excite vibration in structures.

Although the dBA may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable. A single descriptor called the equivalent sound level (Leq) may be used to describe sound that is changing in level. Leq is the energy-mean dBA during a measured time interval. It is the "equivalent" constant sound level that would have to be produced by a given source to equal the acoustic energy contained in the fluctuating sound level measured. In addition to the energy-average level, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum Leq (Lmax) and minimum Leq (Lmin) indicators that represent the root-mean-square maximum and minimum noise levels measured during the monitoring interval. The Lmin value obtained for a particular monitoring location is often called the acoustic floor for that location.

To describe the time-varying character of environmental noise, the statistical noise descriptors L10, L50, and L90 are commonly used. They are the noise levels equaled or exceeded 10 percent, 50 percent, and 90 percent of the measured time interval, respectively. Sound levels associated with L10 typically describe transient or short-term events. For the L50 descriptor, half of the sounds during the measurement interval are softer than L50 and half are louder. Levels associated with L90 often describe background noise conditions and/or sound sources thatexhibit continuous, "steady-state" characteristics.

Finally, another sound descriptor known as the day-night average sound level (Ldn) represents the average sound level for a 24-hour day and is calculated by adding a 10 dB penalty only to sound levels during the night period (10:00 PM to 7:00 AM). The Ldn is typically used to define acceptable land use compatibility with respect to noise. Because of the night-time penalty associated with the Ldn descriptor, the Leq for a continuously operating sound source during a 24hour period will be numerically less than the day-night level. Thus, and by way of example, for a power plant operating continuously for periods of 24 hours, the Leq will be 6 dB lower than the Ldn value.

Table 3.7-1 provides sound levels of typical noise sources and environments to provide a frame of reference.

Aside from industrial and other settings where workers may be exposed to very high noise levels and the risk of hearing loss, environmental noise effects are typically limited to subjective impacts (e.g., annoyance, nuisance, dissatisfaction) and activity interference (i.e., impacts to

sleep, speech, and learning). Despite attempts by prominent acousticians to satisfactorily quantify the association between measurable sound levels and corresponding reactions of annoyance and dissatisfaction, there is no way to measure the subjective impacts of noise. Further, the aforementioned variability of individual human sensitivity and/or tolerance to noise defies creation of a common standard.

3-115

Table 3.7-1
Common Noise Levels and Subjective Human Responses

Noise Source
(at a given distance)
A-WeightedSound
Pressure
Level in
Decibels
Noise
Environment
Human Judgment of
Noise Loudness
(relative to a reference SPL
of 70 decibels)
Military jet take-off with after-burner
(50 feet), civil-defense siren (100 feet) 140, 130 Aircraft Carrier
Flight Deck
Commercial jet take-off (200 feet) 120 Thunderclap Threshold of Pain
32 Times as Loud
Pile driver (50 feet) 110 Rock Music
Concert
Average Human Ear
Discomfort
16 Times as Loud
Ambulance siren (100 feet), newspaper press (5
feet), power lawn mower (3 feet) 100 Very Loud
8 Times as Loud
Motorcycle (25 feet), propeller plane flyover
(1,000 feet), diesel truck, 40 miles per hour (50
feet)
90 Boiler Room
Printing Press Plant
OSHA threshold for 8-Hour
Exposure
4 Times as Loud
Garbage disposal (3 feet) 80 2 Times as Loud
Passenger car, 65 miles per hour (25 feet),

vacuum cleaner (10 feet) 70
Data Processing
Center, Department
Store
Reference Loudness
Moderately Loud
Normal conversation (5 feet), air-conditioning
unit (100 feet) 60 Private Business
Office, Restaurant 1/2 as Loud
Light traffic (100 feet) 50
Lower Limit of
Daytime Urban
Ambient Sound
1/4 as Loud
Bird calls (distant) 40 Quiet Urban
Nighttime 1/8 as Loud
Soft whisper (5 feet)
30 Recording Studio,
Library
Very Quiet
1/16 as Loud
20 Whistling, Rustling
Leaves
Just Audible
1/32 as Loud
10
Breathing
Barely Audible
1/64 as Loud
0 Threshold of Hearing
1/128 as Loud

Source: URS internal information and Table N-2136.2 on p. 18 of the Technical Noise Supplement (Caltrans 1998).

3.7.1.2 Regulatory Overview
Washington State and Skamania County Noise Limits

WAC 463-62-030 states that energy facilities shall meet the noise standards established in Chapter 70.107 RCW, also known, in short, as the "Noise Control Act of 1974", as implemented in the requirements of WAC 173-60. SCC Title 8 Chapter 22: Noise Regulations identifies limits and exceptions specific to noise in Skamania County. SCC 8.22 was adopted pursuant to, and is consistent with, WAC 173-60. Environmental designations for noise abatement (EDNA) are established in SCC Section 8.22.080 and WAC 173-60-030. These rules establish maximum permissible environmental noise levels and are based on the EDNA, which is defined as an area

or zone (environment) within which maximum permissible noise levels are established. There are three EDNA classes:

• Class A. Lands where people reside and sleep (such as residential)
• Class B. Lands requiring protection against noise interference with speech (such as commercial/recreational)
• Class C. Lands where economic activities are of such a nature that higher noise levels are anticipated (such as industrial/agricultural).

The noise limits that a new source can impose for each land use classification are presented in Table 3.7-2.

Table 3.7-2
Washington Maximum Permissible Sound Levels
(Leq(1) in dBA)

EDNA of Noise Source
EDNA of Receiving Property
Class Aa
(Residential)
Class B
(Commercial)
Class C
(Agricultural, Industrial)
Class A 55/45 57 60
Class B 57/47 60 65
Class C 60/50 65 70

aSound limits shall be reduced by 10 dBA between the hours of 10 PM and 7 AM at Class A EDNAs

Source: WAC Chapter 173-60. Standard applies at property line of receiving property.

The project is sited on land zoned as Forest Land 20 (FL 20) and Unmapped (UNM) zones. Approximately 0.9 mile west of the project site, the alternative Operations and Maintenance facility site would be located in the R-5 zone. Both the project site and the alternative Operations and Maintenance facility site are used for commercial timber harvest. Based on current zoning and land use, a reasonable interpretation would classify the project site as a noise source having an environmental designation of Class C EDNA, and the alternative Operations and Maintenance site as having an environmental designation of Class A EDNA. With respect to the receiving land uses, this noise analysis has identified some receiver locations being within agriculturally zoned lands that could normally be classified as Class C EDNA. Since the WAC does not specifically address the situation of an occupied residential structure located on an agricultural parcel, one might assess the residence as Class A EDNA and the outlying property

line as Class C EDNA. EFSEC has accepted such an interpretation for other wind energy projects such as Wild Horse and Kittitas Valley, the latter of which had approval upheld by the Washington Supreme Court. While other interpretations may be feasible, Table 3.7-3 illustrates the Class A (Residential) receiver noise level limitations for noise generated from a Class C (Commercial) EDNA (SCC 8.88.090, 100) source, including adjustments based on the duration of noise exposure time.

3-117

Table 3.7-3
Class A EDNA Receiver Noise Limits
(dBA)

Equivalent Noise Level
Exposure Time(Time / Statistic)
Daytime(7 AM – 10 PM)
Nighttime
(10 PM – 7 AM)
1 hour / Leq 60 50
15 minutes / L25 65 55
5 minutes / L16.7 70 60
1.5 minutes / L2.5 75 65

Levels shown are at the property line of the receiving property and indicative of a source that is located in a
Class C EDNA

Notwithstanding the above and per 173-60-050 WAC, there are exemptions to the limits for certain noise-producing activities or source types as follows:

• Construction noise (including blasting) between the hours of 7 AM and 10 PM
• Motor vehicles when regulated by 173-62 WAC ("Motor Vehicle Noise Performance Standards" for vehicles operated on public highways)
• Motor vehicles operated off public highways, except when such noise affects residential receivers
• Noise from electrical substations (WAC 173-60-050[2][a])

Despite these exemptions, 173-60-50(6) WAC states, "Nothing in these exemptions is intended to preclude the Department from requiring installation of the best available noise abatement technology consistent with economic feasibility."

US Environmental Protection Agency and Occupational Safety and Health Administration

While the US Environmental Protection Agency (EPA) has no regulations governing environmental noise, the EPA has conducted extensive studies to identify the effects of certain sound levels on public health and welfare. An EPA document (USEPA 1974) identifies sound

levels "requisite to protect the public health and welfare with an adequate margin of safety." The EPA specifies a day-night sound level (Ldn) of 55 dBA for outdoor areas, where quiet is a basis for use. The Ldn is similar to the 24-hour Leq except that a 10-decibel penalty is added to sound levels between 10 PM and 7 AM to account for sleep interference. For a potentially continuous source of noise such as operation of the project, the 55 dBA Ldn effectively translates to a 49 dBA hourly Leq, which is generally consistent with the 50 dBA Leq(1) required by Skamania County and the State of Washington. However, this EPA finding is guidance, not regulation.

The EPA's 49–50 dBA Leq(1) sound level is far less than what is usually associated with hearing loss. The federal Occupational Safety and Health Administration (OSHA) has developed noise standards designed to address worker health and safety risks associated with noise exposure and

3-118

the potential for noise-induced hearing loss. The action level under these OSHA standards is an 8-hour time-weighted average of 85 dBA. Exposure to sound in excess of this standard requires the employer to initiate a hearing conservation program to evaluate the exposure, its duration, possible engineering controls to reduce noise and the provision of hearing protection to employees. The decibel levels covered by the state standards in WAC 173-60-110 are well below OSHA hearing impact standards.

Low Frequency Noise

Low frequency sound typically ranges from 100 Hz to 20 Hz, the latter of which is the generally understood limit audible to the human ear. WAC 173-60-110 uses the A-weighting scale because it is a standard that characterizes sound frequencies that are more sensitive to the human ear. Local jurisdictions within the State of Washington that have a C-weighted scale standard do not apply it to wind turbines. There is no Washington State standard associated with the C-weighted scale for low-frequency noise because the C-weighted scale is primarily used as an indicator of low frequency induced noise vibrations.

3.7.1.3 Affected Environment
Noise Receivers

Although Figure 3.7-1 shows that there are many potential noise-sensitive receivers surrounding the project vicinity, the three receivers closest to the project wind turbine tower locations are the two closest residences, which are approximately 0.48 mile (2,560 feet) southeast of Tower A1 (R1 on Figure 3.7-1) and 0.8 mile (4,265 feet) southwest of Tower B16 (R2 on Figure 3.7-1). A potential future residence (R3 on Figure 3.7-1) is approximately 0.38 mile (2,000 feet) from Tower A1.

3-119

33758687_164.cdr

Figure 3.7-1
Job No. 33758687 Noise Level Contours

Existing Sound Levels

While some reference materials such as the Federal Transit Administration's Transit Noise and Vibration Impact Assessment Guide (FTA 2006) offer techniques to make a coarse estimate of existing noise levels for an area based on parameters such as population density, the reality is that at residences in or near any project proposed for development, there is no such single and consistent background noise level. The background noise level can vary at a given location or across different locations on a project area due to factors such as changing climate conditions and the presence of contributing noise sources (including flows of water associated with creeks or canals, agricultural equipment operations, irrigation pumps and equipment, livestock, road, rail and air traffic, wildlife such as birds or insects, dogs, and routine human activities). Hence, a field survey that includes documentation of observed or perceived noise events and monitoring of ambient sound at different times of day at different locations helps to accurately depict actual conditions that influence pre-project ambient sound level. These conditions and their influence on ambient sound level offer clues as to how the increase in noise level resulting from the operation of any project, including those that emit a constant level, will likely vary with location and time of day.

To help establish representative baseline ambient sound levels for the project vicinity and characterize the existing noise environment in the areas occupied by the receivers shown in Figure 3.7-1, a set of long and short-term sound level measurements were conducted from January 20 to 22, 2009. The locations of the short-term and long-term measurement sites were selected to approximate the existing ambient sound in the vicinity of Ausplund Road (and hence, Receiver 1). Likewise, the location of ST2 was chosen to generally represent the ambient sound level for the Mill A community and its surroundings west of the project, on which Receiver 2 is located.

The measurement locations included a position near the intersection of Ausplund Road and Kollack-Knapp Road (ST1), and a position near the intersection of Jessup Road and Manzanola Road (ST2). For purposes of the impact analysis described in this document, these measurement locations are considered reasonably representative for each general area, and more specifically R1 and R2, respectively, on the basis of similar expected ambient sound sources, despite the dissimilarity of locations. For instance, the ambient sound environment measured at ST1 likely contains the same typically identifiable sound components (e.g., distant bird song, dog barks, roadway traffic) and a generally unidentifiable "background" that one might measure at the precise geographic location of R1.

A Bruel+Kjaer 2250 (SN: 2653963) ANSI Type-1 real-time sound analyzer, fitted with a standard microphone windscreen and mounted on a five-foot tall tripod, was used for the short-term measurements. The instrument was field calibrated before and after each measurement period with an acoustic calibrator. All sound level measurements were performed in accordance with International Organization for Standardization guidelines (ISO 1996a, b, and c). Weather conditions during the survey period were seasonably cold with overcast skies, but there was no

precipitation during the measurement periods. The air temperature varied from 30 to 44 degrees Fahrenheit, with 33 to 53 percent relative humidity. Measured ground wind speeds in the vicinity of the measurement positions were low, with averages ranging from 0 to 1 mph, and

3-121

directed toward the north for all measurements. Detailed weather conditions for individual noise measurements and a summary of the short-term measurement data are included in Table 3.7-4.

A long-term measurement (LT1) was conducted at a position near the corner of Ausplund Road and Kollock-Knapp Road using a Larson Davis 720 (SN: 0436) ANSI Type 2 Integrating sound level meter. With only the windscreen-covered microphone exposed to the outdoor environment, the sound level meter was placed in a locked, weather-resistant case and secured to a nearby tree. The long-term measurement consisted of consecutive 15 or 30 minute averages conducted over an uninterrupted 24-hour period. The instrument was field calibrated before and after the measurement period with an acoustic calibrator (CAL 200 s/n: 5789). Data from the long-term measurement is presented in Table 3.7-5.

Field observations associated with the short and long-term measurements are as follows:

ST1. This measurement location was at the corner of Ausplund Road and Kollock-Knapp Road. There are several residential receivers located in this general area. The first short-term measurement at this location was conducted between 11:52 AM and 12:12 PM on January 21, 2009. The first measurement noise sources included distant aircraft, distant roadway traffic, dogs barking in the distance, and birds vocalizing. The second short-term measurement was conducted between 6:00 PM and 6:20 PM on January 21, 2009. The second measurement noise sources included distant aircraft, distant roadway traffic, and dogs barking in the distance. The third short-term measurement at this location was conducted between 11:32 PM and 11:52 PM on January 21, 2009. Noise sources during the third measurement included distant roadway traffic and dogs barking in the distance. The first measurement Leq one-minute interval values ranged from 34 to 59 dBA, the second measurement 1-minute Leq values ranged from 27 to 66 dBA, and the third measurement 1-minute Leq values ranged from 25 to 49 dBA. Leq for the entire duration of each of these three measurement periods appears in Table 3.7-4.

ST2. This measurement location was in front of the John Schwab Memorial Tennis Courts on the corner of Jessup Road and Manzanola Road. The sound level meter was approximately 15 feet from Jessup Road. The first short-term measurement at this location was conducted between 12:48 PM and 1:08 PM on January 21, 2009. The first measurement noise sources included distant aircraft, distant roadway traffic, children playing in the distance, and birds vocalizing. The second short-term measurement was conducted between 6:36 PM and 6:56 PM on January 21, 2009. The noise sources for the second short-term measurement included distant aircraft and distant roadway traffic. The third short-term measurement was conducted between

12:08 AM and 12:28 AM on January 22, 2009. Noise sources present during the third short-term measurement included distant roadway traffic. The first measurement Leq one-minute values ranged from 35 to 52 dBA, the second measurement 1-minute Leq values ranged from 34 to

54 dBA, and the third measurement 1-minute Leq values ranged from 31 to 39 dBA. Leq for the entire duration of each of these three measurement periods appears in Table 3.7-4.
3-122

Table 3.7-4
Short-Term Noise Measurement Data Summary

Measurement Location Measured Sound Data
ID Description Time Leq, dBA L10 L50 L90
Leq, dBA
without
Cars Temp (F) %RH
Wind
Speed(mph)
Wind
Direction
ST1 Corner of Ausplund Road
and Kollock-Knapp Road
11:52 - 12:12 46 39 35 34 38 35 53 1 North
18:00 - 18:20 49 36 31 28 32 32 35 1 North
23:32 - 23:52 35 32 28 26 30 30 34 0 -
ST2
Just north of the John
Schwab Memorial Tennis
Courts
12:48 - 13:08 41 40 36 35 37 44 40 1 North
18:36 - 18:56 44 40 36 35 36 32 34 1 North
00:08 - 00:28 35 36 35 34 35 30 34 0 -

Measurements conducted on January 21 and 22, 2009

Table 3.7-5
Long-Term Noise Measurement Data Summary

Site ID Measurement Location
Measurement Period 24-hr Measurement Results (dBA)
Start Date Start Time Duration (hh:mm) Leq
L10
L50
L90
LT1 Corner of Ausplund Road and
Kollock-Knapp Road 01/21/09 11:40 am 24:00 46 41 39 38

3-123

LT1. This measurement location was at the corner of Ausplund Road and Kollock-Knapp Road,

on the north side of the roadway. The sound level meter was placed in a locked, weather-resistant case and secured to a tree near the side of the road. The windscreen-covered microphone, connected to the meter by cable, was attached to the tree trunk at approximately 3 to 4 feet above the ground. Concurrent with these short and long-term ambient sound measurements, S.D.S. Co., LLC meteorological stations 320, 321, and 323 collected data on wind speed, direction, and temperature at various elevations above grade. Average reported wind velocities from the station NRG Type 40 anemometers were quite low, and while apparently consistent with the low average wind velocities measured on the ground at the sound measurement positions, were considered potentially compromised by icy conditions due to the low recorded temperatures and high moisture content of the air.

Table 3.7-4 shows the considerable decibel differences between the Leq measurements and the adjusted values when intervals containing documented automotive pass-by events were removed from the short-term measurement data sets (i.e., "without cars"). This change is unsurprising due to the proximity of the real-time sound analyzer to the roadway at ST1 and ST2. Upon removing these intervals, the remaining collected data more accurately depicts the background or a measurement position that is considerably distant from passing road traffic.

Table 3.7-6 presents the arithmetic average Leq of ST1 and LT1.

Table 3.7-6
Average Ambient for ST1/LT1 Measurement Area

	Daytime (Leq, dBA)	Evening (Leq, dBA)	Nighttime (Leq, dBA)
Average Leq without cars	(39+38)/2 = 38	(39+32)/2 = 35	(38+30)/2 = 34
Average Leq with cars	(44+46)/2 = 45	(42+49)/2 = 45	(38+35)/2 = 36

3.7.2 IMPACTS
3.7.2.1 Methodology
Construction

Project construction would take place over a period of 12 months between the hours of 7:00 AM and 7:00 PM Monday through Friday. During construction activities, a varying number of construction equipment and personnel would occupy the project area, which would result in varying levels of construction noise. The project would use conventional construction techniques and equipment, including excavators, bulldozers, heavy trucks (e.g., water truck, dump truck), and similar heavy construction equipment. Specialized construction equipment for logging, foundation building and other tasks using special equipment (e.g., heavy duty cranes) may be needed.

Conventional construction activities would result in a short-term temporary increase in the ambient noise level resulting from the operation of construction equipment. The increase in noise level would be experienced primarily close to the noise source. The magnitude of the

noise effects would depend on the type of construction activity, noise level generated by construction equipment, duration of the construction phase(s), and the distance between the noise source and receiver.

Construction noise impacts associated with the project were assessed with spreadsheet-based noise calculations. User inputs include:

• Distance from source—the distance between the edge of the construction site and the considered receiver
• Duty cycle—the portion of an hour, in aggregate, that a piece of equipment is energized (stationary or mobile) and creating noise
• Quantity—the number of equipment pieces or noise-producing events over a specific time period (e.g., equipment utilization per month)
• Hours—the number of daytime hours (up to 12) that represent a typical daily work shift

These inputs allow sound propagation prediction using the following formula:

Leq = Source SPL + 10 * log10 (Duty Cycle) + 10 * log10 (Quantity) +

10 * log10 (Hours/12) - 20 * log10 (Distance from Source / Reference Distance)

where source SPL and reference distance describe the typical noise, associated with a single piece of equipment, measured at a pre-defined distance. For instance, a chainsaw may have a source SPL of 78 dBA measured at a distance of 50 feet from its operator. Values for source SPL and reference distance have either been reproduced from available manufacturers' data or calculated from industry-accepted formulas linking sound generation to the rated engine horsepower of the equipment. Note that for purposes of model conservatism, air and ground absorption effects are not included.

Operation

Once the project is commissioned and operating normally, the new ambient sound level that can be perceived will be a logarithmic sum of background and project noise. For a wind project, and aside from non-dominant sources such as electrical substations, operation noise level varies with wind speed at the turbines. When available winds are relatively calm, the turbines emit very little noise compared to what occurs when stronger wind conditions have turbines operating at their highest power generation and, concurrently, highest noise levels. Thus, a wind project's noise level at a particular receptor is primarily determined by the wind speed occurring at the turbine and the distance to the closest turbines.

The Cadna/A® Noise Prediction Model (Version 3.71.125) was used to estimate the project-generated sound pressure levels at the property lines and noise-sensitive receivers. Cadna/A® is a Windows® based software program that predicts and assesses noise levels near industrial noise sources based on International Organization for Standardization (ISO) 9613-2 standards for noise propagation calculations. Routinely used by acoustical professionals to develop sound level

predictions from a variety of complex industrial sources, including wind turbines, the model uses these industry-accepted propagation algorithms and accepts sound power levels (in dB re: 1 picowatt) for the nine standard octave bands ranging from 31.5 Hz to 8,000 Hz, as typically provided by the equipment manufacturer and other sources. The calculations account for classical sound wave divergence, plus attenuation factors resulting from air absorption, basic ground effects, and barrier/shielding. Intervening natural and man-made topographical barrier effects were considered as appropriate, including those from structures such as major buildings, tanks, and large equipment.

Table 3.7-7 summarizes octave band sound power level inputs from each type of pre-defined noise source. Given that the exact turbine model to be used for the project has not yet been determined at the time of this report, conservative but realistic and representative values for the type of equipment being considered for this project have been used. For example, the model currently uses data from an industry leading 1.8 MW 50/60 Hz wind turbine, at wind speeds of about six meters per second and nine meters per second at 33 feet (10 meters), in accordance with the protocol established in International Electrotechnical Commission Standard 6140011: 200213. The decibel values shown for the two wind turbine generator wind speeds in Table 3.7-7 at each octave band center frequency include a +2 dB margin, which produces an A-weighted overall level that represents the top end of a range associated with the manufacturer's warranty values.

Table 3.7-7
Noise Model Sound Level Parameters

Project
Component
Type of
Source
Sound Power Level in dB
at Octave Band Center Frequency (Hz) Unweighted
(linear)
A-
Weighted
Acoustic
Height
(feet) 31.5 63 125 250 500 1,000 2,000 4,000 8,000
Wind Turbine
at 6m/s wind
speed
Point 82.7 88.7 95.3 99.7 101.9 100.7 97.4 88.9 82 106.8 104.7 262
Wind Turbine
at 9m/s wind
speed

Point 84.9 90.9 97.3 101 103.3 102.6 99.5 91.6 84.4 108.4 106.4 262
Turbine
Transformers Point 60 66 68 63 63 57 52 47 40 72 63 7
Sub Station
component Point 80 86 88 83 83 77 72 67 60 92 83 13

Source: URS internal information and Thomas Mills, personal communication

13 As noted, the modeling is based using conservative and representative values for the type of equipment being considered. The noise model currently uses data from an industry leading 1.8 MW 50/60 Hz wind turbine. The project may use larger wind turbines, up to 2.5 MW, and these could have a different noise profile. However, total project noise would be limited by the 75 MW EFSEC certification. If 1.8 MW turbines were selected, the project could use up to 42 turbines, however if 2.5 MW turbines were selected, only 30 turbines could be built, and overall project noise could be lower.

3-126

The project layout configuration (i.e., the arrangement of wind turbine generators and ancillary equipment on the site) was imported into Cadna/A® from project files provided by the client. The Cadna/A model consequently predicts hourly sound levels, which would be equal at all times of the day in this case. The formula used to derive the overall SPL (in dBA) from sound power level (PWL) is as follows:

$$SPL = PWL - 20 \text{ Log } (r) - 10.9 + C$$

where r is in meters and C is a dimensionless absorption constant (Harris 1998).

At each studied receptor, the model calculates the acoustical contribution from each input source, which in this exercise using Cadna/A includes all expected wind turbines associated with the project at locations depicted in Figure 3.7-1. When project micrositing occurs and final turbine layout and turbine model are arrived at, additional noise modeling can be performed to re-predict operation noise level and re-evaluate anticipated project compliance with the standards discussed in this Draft EIS.

3.7.2.2 Proposed Action
General Construction Noise

Table 3.7-8 shows the predicted construction noise levels experienced at the closest residences to the project. As per 173-60-050 WAC, construction noise between the hours of 7:00 AM and

10:00 PM are exempt from the receiver noise limit guidelines. Consequently, the calculated values at the three closest receivers comply with the applicable noise standard.
Table 3.7-8
Predicted Construction Noise Levels at Receivers Closest to Project

ID
Description
(distance/direction)
EDNA
Classification
Construction
Sound Level
Limit (dBA)
Maximum Project
Construction Sound
Level (dBA)
Complies
with Standard
Receiver 1 Residence 0.48 mile (2560')
SE of Tower A1 Class A Exempt 70 Yes
Receiver 2 Residence 0.8 mile (4265') SW
of Tower B16 Class A Exempt 66 Yes
Receiver 3 Residence 0.38 mile (2000')
SE of Tower A1 Class A Exempt 72 Yes

If it is determined to be necessary, blasting would occur during the turbine foundation portion of the construction schedule and only during daytime hours. Blasting noise could possibly be audible at a considerable distance from the construction site and noticeable at residences near the project area. Sound levels from blasting at a receiver would not be extreme, however, and the occurrence would be low in frequency, intermittent, and confined to a period of one to two months. The WAC 173.60.050 exemption for temporary construction noise includes noise from blasting activity, from the aforestated state noise limits between the hours of 7 AM and 10 PM.

3-127

The large distances between much of the project area and potentially affected residences, the temporary nature of construction, and the restriction of construction activities to daytime hours would serve to minimize potential noise impacts from construction activities. Based on the anticipated noise levels and the timing aspects of these impacts, construction noise impacts are expected to be low.

If project construction occurred in phases, the effect on the level of noise impacts would be to extend the total duration of temporary disturbance from project construction, but to reduce the intensity or magnitude of impacts for any individual phase. Construction noise impacts would still be temporary, localized, and low in magnitude, and overall project impacts during construction would remain low in a phased-construction scenario.

General Operation Noise

The predicted operational noise levels at the three closest residences to the project are supplied in Tables 3.7-9 and 3.7-10. This analysis evaluates the existing noise levels at the closest receptors,

and evaluates increases in dBA at these locations. The Washington noise regulations do not require this information; however, the Applicant supplied this information to fully inform EFSEC during the Application for Site Certificate process.

Table 3.7-9
Nighttime Operational Noise Impact Assessment

Receiver
ID
EDNA
Class
Sound Level
Limit (dBA)
Existing
(dBA)
Project
(dBA)
Overall
(dBA)
Increase
(dBA)
Complies
with
Regulation
6 m/sec at 10m height
1 Class A 50 34 36 38 4 Yes
2 Class A 50 35 38 40 5 Yes
3 Class A 50 35 40 41 6 Yes
9 m/sec at 10m height
1 Class A 50 34 37 39 5 Yes
2 Class A 50 35 39 40 5 Yes
3 Class A 50 35 42 43 8 Yes

Figure 3.7-1 depicts these three residential receivers (for the 9 m/s wind speed, 10oC temperature and 70% relative humidity operation case) in two detail maps as part of a larger aerial plan on which predicted noise contours and other known receiver locations have been superimposed. The operation of the project would comply with all applicable noise regulations.

3-128

Table 3.7-10
Daytime Operational Noise Impact Assessment

Receiver
ID
EDNA

Class
Sound
Level Limit
(dBA)
Existing
(dBA)
Project
(dBA)
Overall
(dBA)
Increase
(dBA)
Complies
with
Regulation
6 m/sec at 10m height
1 Class A 60 38 36 40 2 Yes
2 Class A 60 38 38 41 3 Yes
3 Class A 60 38 40 42 4 Yes
9 m/sec at 10m height
1 Class A 60 38 37 41 3 Yes
2 Class A 60 38 39 41 3 Yes
3 Class A 60 38 42 43 5 Yes

Under certain conditions, there is the potential for one or more of the following phenomena to occur that may temporarily cause a variance in the predicted sound levels:

• In the Cadna/A prediction model, all studied wind turbine generators were assumed to operate at the same speed. In reality, very slight differences in operating rotor speeds due to non-uniformities in the passing wind profile can result in intermittent constructive and destructive interference—or what one might call "beats," that can have a perceptible frequency as current research suggests (van den Berg 2006).
• The atmosphere can either be "stable" or "unstable," which in summary are descriptors for how layers of air mass interact. The latter of these two is usually associated with cold air near the ground that is not well coupled to higher air masses. This effect can explain why high wind speeds at wind turbine generator hub height can be substantially greater than those near ground level (van den Berg 2006).
• The relative humidity and ambient temperature have a substantial effect on the attenuation of outdoor sound at high frequencies and long distances through air absorption. Relative humidity and temperature effects can produce a variance of approximately +/- 2 dBA.
• The uncertainty range for the PWL of each wind turbine generator is +/- 2 dBA.
• Due to the very low ground wind speeds recorded during the short-term measurements, actual ambient noise levels at any receiver in the project vicinity may be higher as a result of noise generated by turbulence from wind streaming through vegetative ground cover (i.e., trees and grasses). Further, since wind-generated noise tends to rise at a rate of 2.5

dBA per 1 m/s increase in wind speed, and generally turbine aerodynamic noise rises at a rate of only 1 dBA per 1 m/s increase in wind speed, high wind speeds near the ground may cause background sound (i.e., not project operation) to dominate the perceptible and even measurable ambient sound environment (BLM 2005).
3-129

Because predicted project operation sound pressure levels at the nearest noise-sensitive receivers are at least 7 dBA lower than the 50 dBA Leq compliance threshold, none of these above conditions is expected to result in the project operation exceeding noise regulations.

Low Frequency Sound

Low frequency noise produced by a wind turbine generator can include tonal components produced by the generator and gearbox within the nacelle downstream of the rotor hub, atop the tower mast. The source sound power levels in Table 3.7-7 already include these noise contributors. Modern wind turbine design typically includes sound attenuation features in the nacelle to help reduce the magnitude of these electro-mechanical noise components to the aggregate, so that the spectrum of sound levels at the octave band center frequencies shown in Table 3.7-7 largely describes the aerodynamic effects of the rotor blades interacting with the passing wind profile. Even though there are no relevant regulations and standards related to dBC, the turbine sound power level manufacturer ratings show that C-weighted levels are within 2 dB of A-weighted levels. Therefore, low frequency noise is not anticipated to be an issue for this project.

In earlier generations of wind turbine design, the practice of using downwind rotors allowed turbulence from the tower mast to disrupt favorable aerodynamic conditions for the passing blades, causing considerable low frequency noise. This practice has been abandoned by the contemporary upwind rotor design of virtually all wind turbine generators built in the past five years, including the models contemplated for this project.

The noise produced by air interaction with the rotor blades tends to be broadband noise, but is amplitude-modulated as the upstream blades pass the tower, resulting in what some call a characteristic "swoosh." The blade passage frequency of this "swoosh" is only a temporal modulation of sound and should not be confused with low frequency sounds. Research studies of low-frequency noise emissions from wind turbines have determined that low frequency noise is a function of the wind itself, and that the "swoosh" of the turbines is actually in the readily audible range of frequencies (500 to 1 kiloHertz) (Leventhall 2006). Virtually any sound can be time-modulated without changing its pitch. Thus, low frequency modulation of audible sound does not imply the presence of actual low frequency sound or infrasound, which is discussed in the following subsection.

Information regarding potential impacts from exposure to low frequency noise is inconclusive. Scientific articles suggest that low frequency noise does not pose a health risk (Leventhall 2006). There may, however, be some correlation between an individual receptor's psychological sensitivity to the noise source (like or dislike for the noise source) and complaints regarding discomfort from that noise source. These are sometimes associated with complaints regarding

sleep disturbance. Because sensitivity to noise can be influenced by such psychological factors and can subjectively be deemed significant by an affected individual, regardless of measurable frequency or amplitude level, it is difficult to quantify these impacts or to impose mitigation.

3-130

However, modern turbine designs have been modified to reduce or eliminate low frequency sound.14

Infrasound

The term infrasound describes sound with frequencies of 20 Hz or less that are generally considered below the threshold of human hearing. Such sound, if sufficiently high in magnitude, can still be perceived or even heard as induced by vibration. Natural sources of infrasound include waves, thunder, wind, and even certain species of wildlife.

A review of wind turbine noise measurement studies conducted by Jakobsen (2005) concluded that operation of contemporary wind turbine generators featuring rotors "upwind" of tubular tower masts generated infrasound in the range of 70 G-weighted decibels (dBG) at a distance of one hundred meters. (The G-weighting scale, like the oft-used A-weighting scale for audible sound spectra, is a filter applied to low-frequency sound as described in ISO 7196:1995E.) Jakobsen also notes that this infrasound, usually associated with aerodynamic effects of blade passage past the tower mast, tends to ignore atmospheric sound absorption and ground attenuating effects due its very large wavelength. Hence, one could reasonably expect infrasound to attenuate only with increasing propagation distance.

Recent studies performed for the Canadian Wind Energy Association have described usage of 85–90 dBG as a criterion for human perception of infrasound and, by reasonable extension, the likely threshold for infrasound complaint (HGC Engineering 2006).

The horizontal distances of the project wind turbines to the nearest noise-sensitive receivers are at least 615 meters, which provides sufficient attenuation to offset the amount of decibels that one might add to account for the quantity of wind turbines of the project. Thus, the expected infrasound at the nearest existing receivers (i.e., R1 and R2) would remain under an estimated value of 70 dBG, which is 15 dBG less than the previously stated criteria. This estimated project aggregate wind turbine generator infrasound level also is far below what NASA studies determined (125 dB, linear) as a threshold for potential health impacts (HGC Engineering 2006).

Project Decommissioning

In compliance with WAC 463-72 Site Restoration and Preservation, the Applicant will provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan will address site restoration that would occur at the conclusion of the project's operating life (estimated to be 30 years), and restoration in the event the project is suspended or terminated during construction or before it has completed its useful operating life. The plan will include or parallel a decommissioning plan for the project.

The initial site restoration plan will be prepared in sufficient detail to identify, evaluate, and resolve all major noise issues presently anticipated, including noise impacts from construction activities related to removal of the wind generation equipment and site restoration. If impacts to

14 See, for instance, http://www.bwea.com/ref/lowfrequencynoise.html.

3-131

noise are anticipated to occur as a result of site restoration and project decommissioning, mitigation measures will be proposed as part of the plan.

3.7.2.3 No Action Alternative

Under the No Action Alternative, the project would not be constructed. Existing sound levels would be expected to remain largely the same. Although the generally quiet ambient noise levels in the project area would continue, occasionally elevated noise levels in the immediate project vicinity would be expected from ongoing timber harvest activities at the project site.

3.7.3 MITIGATION

The following mitigation measures are identified to avoid, minimize, and compensate for potential noise-related impacts during construction and operation of the propose project to the extent feasible.

• Equip all noise-producing project equipment and vehicles using internal combustion engines with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) would be equipped with shrouds and noise control features that are readily available for that type of equipment.
• Regulate all mobile or fixed noise-producing equipment used on the project for noise output governed by local, state, or federal agency regulations, to comply with such regulations while in the course of project activity.
• Designate that the use of noise-producing signals, including horns, whistles, electronic alarms, sirens, and bells, would be for safety warning purposes only. Unless required for such safety purposes, and as allowable by applicable regulations, no construction-related public address, loudspeaker, or music system would be audible at any adjacent noise-sensitive land use.
• Implement a noise complaint process and hotline number for the surrounding community. The Applicant would have the responsibility and authority to receive and resolve noise complaints.

3.7.4 UNAVOIDABLE ADVERSE IMPACTS

Construction noise is exempt so long as it occurs during daytime hours, and operation noise is

predicted to be less than the nighttime threshold of 50 dBA Leq per Washington State and Skamania County regulations.

The analysis of noise impacts presented here was based on specific design features of the proposed project that were current as of the date of this Draft EIS. These features, such as the turbine manufacturer and model selection, the layout of the turbines on the project site and their corresponding distances to identified closest noise-sensitive receivers, can greatly influence the

3-132

analysis results. However, assuming that final turbine selections and siting locations are comparable to those features used in this analysis, no substantial adverse construction or operation noise impacts are anticipated for the project.

3.7.5 REFERENCES

Bureau of Land Management (BLM). 2005. Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States. U.S. Department of the Interior. FEIS 05-11. June. Accessed October 30, 2009 at: http://windeis.anl.gov/documents/fpeis/index.cfm.

California Department of Transportation (Caltrans). 1998. Technical Noise Supplement. October.

Federal Transit Authority (FTA). 2006. Transit Noise and Vibration Impact Assessment. FTAVA-90-1003-06. Office of Planning and Environment.

Harris, Cyril M. 1998. Handbook of Acoustical Measurements and Noise Control. Third Edition. p. 3-2, Eq. 3.2a.

HGC Engineering. 2006. Wind Turbines and Infrasound. Submitted to Canadian Wind Energy Association. November.

International Organization for Standardization (ISO). 1996a. Acoustics – description and measurement of environmental noise – Part 1: Basic quantities and procedures. Ref. No. ISO 1996/1-1982 (E).

———. 1996b. Acoustics – description and measurement of environmental noise – Part 2: Acquisition of data pertinent to land use. Ref. No. ISO 1996-2:1987 (E).

———. 1996c. Acoustics – description and measurement of environmental noise – Part 3: Application to noise limits. Ref. No. ISO 1996-3:1987 (E).

Jakobsen, Jorgen. 2005. Infrasound Emission from Wind Turbines. Journal of Low Frequency Noise, Vibration and Active Control 24, no. 3:150.

Leventhall, Geoff. 2006. Infrasound from Wind Turbines – Fact, Fiction or Deception. Canadian Acoustics 34, no. 2:29-36.

Mills, Thomas. Vestas Wind Systems. Email to Mark Storm, URS Corporation, October 19, 2007.

US Environmental Protection Agency (USEPA). 1974. "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. EPA 550/9-74-004.

van den Berg, G. P. 2006. The sound of high winds: the effect of atmospheric stability on wind turbine sound and microphone noise. Rijksuniversiteit Groningen.

3-133

3.8 LAND USE AND RECREATION

This section describes the existing land uses and recreation areas at the project site and in surrounding areas, and identifies potentially applicable land use policies and zoning ordinances. This section also discusses potential project impacts on land use and recreation, as well as the consistency of the proposed project with local land use plans and zoning ordinances.

3.8.1 AFFECTED ENVIRONMENT

3.8.1.1 Existing Land Use

Project Site

The project site is located in an unincorporated portion of southeastern Skamania County, Washington, about two miles north of the Columbia River (see Figure 1-1). The primary use at the project site is commercial forestry. The site has been used for this purpose for the last century. During this time, the owners and operators have logged the property over a series of approximately 50-year logging rotations. Ongoing tree farming activities include regular clearing, replanting, and harvesting.

Portions of the project site are also used for utility corridors. A natural gas pipeline, owned and operated by Williams Gas, runs from east to west across the project site near the north boundary of the site. Two existing transmission line corridors also cross the project. These approximately 250-foot wide corridors, which generally run in an east-to-west direction, are owned and maintained by BPA. Each corridor is occupied by a high-voltage transmission line and its associated support towers and access roads. The corridors are routinely maintained to remove all tall growing vegetation, as well as any adjacent "danger trees" (i.e., those trees with the potential to fall into the existing lines) in order to avoid interference with these lines.

Surrounding Areas

Land use in the project vicinity is predominately commercial forestry with other typical rural uses and both incorporated and unincorporated communities dispersed throughout (see Figure

3.8-1). The incorporated cities of White Salmon and Bingen, Washington are located adjacent to each other approximately 7 miles southeast of the project site, along the north side of the Columbia River. Directly south and across the Columbia River from Bingen is the City of Hood River, in Hood River County, Oregon. The city of Stevenson, the Skamania County seat, is located approximately 15 miles southwest of the project site along the Columbia River. These incorporated cities have mixed urban uses typical of small communities.

In the more immediate vicinity of the project site, the unincorporated community of Willard is located approximately 2.25 miles northwest of the project site, and the unincorporated community of Mill A is located approximately 1.5 miles west of the site. Other residential uses in the immediate vicinity of the project site are generally rural, low- to medium-density single-family homes between 30 and 50 years old. There are approximately 400 residences and businesses within three miles of the project site (see Figure 3.8-2). A new homesite location has

3-134

been approved approximately 2,000 feet (0.38 mile) from the south property line of the project site.

Commercial forestry areas and the Gifford Pinchot National Forest are generally located to the north of the project site. East of the Little White Salmon River, lands are currently being used for commercial timber production under ownership by S.D.S. Co., LLC, Broughton Lumber Company, and Washington State. The Washington State lands are managed by DNR for commercial harvest to support the State's schools.

To the south of the project site is the Columbia River Gorge National Scenic Area (see Figure 3.8-3). The Scenic Area extends along the Columbia River for about 85 miles and includes 292,500 acres in parts of three Oregon and three Washington counties. In addition to forested areas, land uses within the Scenic Area near the project site on the Washington side of the Columbia River include limited agriculture, mostly pear and apple orchards recently augmented with some wine grape vineyards. On the Oregon side of the Columbia River, land use within the Scenic Area is predominantly commercial timber production and residential. Further south of the Scenic Area in Oregon, land uses include commercial forestry, agriculture (primarily pears, apples, and cherries), and some residential.

SR 14 and the Burlington Northern Santa Fe Railway are located between the project site and the Columbia River, within the Scenic Area. I-84 is located on the Oregon side of the Columbia River, within the Scenic Area.

3-135

33758687_168.cdr

Figure 3.8-1
Job No. 33758687 Land Use within Five Miles of the Site

33758687_165.cdr

Figure 3.8-2
Job No. 33758687 Residences within Three Miles of the Project Site

33758687_166.cdr

Figure 3.8-3
Job No. 33758687 Recreation Facilities within Five Miles of the Project Site

3.8.1.2 Recreation

The primary recreation activities within Skamania County are camping, hiking and fishing. Major recreation locations include the Gifford Pinchot National Forest; the Mount St. Helens National Volcanic Monument; the Lewis and Clark Trail Highway, which follows the Columbia River through Skamania County; and the Columbia River Gorge National Scenic Area south of the project area. Informal recreational activities such as hunting, hiking, and mountain biking also take place on private land, subject to landowner approval. There are no formally designated recreational areas within the project site; however, SDS does allow informal recreational use of their land with approval.

Summer recreational activities include water sports such as fishing, swimming, boating, river rafting, kayaking, water skiing, and wind surfing; as well as camping, biking, hiking, horseback riding, hunting, picnicking, and other outdoor sports. Some of these activities continue into the winter, weather permitting. Sightseeing is a popular year-round activity in the Columbia River Gorge. Recreational facilities within a 25-mile radius of the project site are shown on Figure 3.8-3 and listed in Table 3.8-1.

The closest recreational facility is the Underwood Park and Community Center, located near Underwood just off of Cook-Underwood Road, approximately 1.5 miles east of the project site. The community center has a large gymnasium, stage, kitchen, and meeting room; while the park has soccer fields, a pavilion, and a playground. Recreational facilities or activities available closest to the project site include hiking and horseback riding along Buck Creek Trail, Husum Hills Golf Course, BZ Corners Boat Launch, Underwood Park/Community Center, and Drano Lake Boat Ramp.

There are no Skamania County recreation facilities within five miles of the proposed project. However, two national trails, the Lewis and Clark National Historical Trail and the Oregon National Historic Trail, are located within 5 miles of the project site. These trails roughly follow SR 14 and I-84, respectively. Also within 5 miles of the site, the White Salmon River is designated as a Wild and Scenic River, and within 25 miles, the Klickitat River is also so designated.

There are no new parks or recreation facilities planned within a 5-mile radius of the site, either as part of the Skamania County Parks and Recreation Master Plan or the Columbia River Gorge National Scenic Area Management Plan. No federal recreation regulations apply to the site, nor

are there federal or state plans for recreation facilities on or near the site.

3-139

Table 3.8-1
Public Park and Recreation Facilities within 25 Miles

National Scenic Areas and Trails Klickitat County Parks
Columbia River Gorge National Scenic Area Klickitat County Park
Lewis and Clark National Historic Trail Hood River County Parks
Oregon Trail National Historic Trail Tucker Park
Washington State Parks Panorama Point County Park
Columbia Hills State Park Tollbridge County Park
Doug's Beach State Park City of White Salmon
Oregon State Parks/Campgrounds/Trails Jewett Creek Park
Lindsey Creek State Park White Salmon City Park
Starvation Creek State Park City of Hood River
Viento State Park Eliot Park
Wygant State Park Waucoma Park
Seneca Fouts State Park Golf Courses
Koberg Beach State Park Husum Hills Golf Course
Memaloose State Park Indian Creek Golf Course
Mayer State Park Hood River Golf and Country Club
Lang Forest State Park Carson Hot Springs Golf Course and Resort
Wyeth Campground Skamania Lodge Golf Course
Historic Columbia River Highway State Trail - Twin
Tunnels Segment (Mosier Twin Tunnels)
The Dalles Country Club
USFS Parks/Trails/Boat Launches Northwest Aluminum Golf Club
BZ Corners Boat Launch Museums and Sightseeing
Balfour-Klickitat Park Hood River County Museum
Dog Mountain Trail Western Antique Aeroplane & Automobile Museum
Herman Creek Trail International Museum of Carousel Art
Washington State Department of Natural Resources Gorge Heritage Museum
Buck Creek Trail Columbia River Gorge Interpretive Center
Skamania County Parks/Campgrounds/Launches Bonneville Lock and Dam Visitor Complex
Home Valley Campground Columbia Gorge Discovery Center
Underwood Park/Underwood Community Center Wasco County Historical Museum
Big Cedars County Park Fort Dalles Museum
Wind River Boat Ramp Sternwheeler Cruises
Drano Lake Boat Launch
Skamania County Fairgrounds
Rock Creek Community Center

3.8.2 APPLICABLE LAND USE REGULATIONS
Skamania County has two independent sets of land use regulations. The first is a stand-alone

zoning code (SCC Title 22) that regulates uses and development within the General Management Area (GMA) and Special Management Area (SMA) of the Columbia River Gorge National Scenic Area). The Scenic Area Code is based on the Management Plan for the Scenic Area, which is overseen by the USFS and Columbia River Gorge Commission, as directed by the National Scenic Area Act.

3-140

The remainder of unincorporated Skamania County, as well as those portions of the Scenic Area classified as Urban Areas (such as White Salmon, Bingen, and Hood River), is governed by the Skamania County Comprehensive Plan, zoning regulations in SCC Title 21, and Titles 20, Shorelines, and 21A, Critical Areas.

Because the project site is located outside of the National Scenic Area, land use at the site is regulated by the Skamania County Comprehensive Plan and SCC Titles 21, 20, and 21A. In addition, although the project site is immediately adjacent to the National Scenic Area, the National Scenic Area Act expressly provides that land use regulations developed for the National Scenic Area do not apply to adjacent area. Section 544O(a)(10) of the Act states:

Nothing in Sections 544 to 544p of this title shall establish protective perimeters or buffer zones around the scenic area or each special management area. The fact that activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management areas.

16 USC §544O(a)(10). The remainder of this section therefore focuses on describing potentially applicable provisions of the Skamania County Comprehensive Plan and SCC Titles 21, 20, and 21A. For additional information of the provisions of the National Scenic Area Act, see Section 4.11 of this EIS.

3.8.2.1 Skamania County Comprehensive Land Use Plan

On July 10, 2007, Skamania County adopted its current Comprehensive Plan, which includes three Subarea Plans. The project site is not located in one of these subareas. There are three land use designations outside of the specific subarea plans: Rural I, Rural II, and Conservancy (see Figure 3.8-4). The project site is designated as Conservancy. The Comprehensive Plan identifies zoning that is consistent with the Conservancy designation, including: Residential 10 (R-10), Rural Estates 20 (RES-20), Resource Protection (FOR/AG 10 and 20), Commercial Resource Land 40 (CRL 40), Natural (NAT), and Unmapped Classification (UNM).

The alternative location of the Operations and Maintenance facility is in the Rural II designation of the Comprehensive Plan. Most residential zoning classifications are consistent with the Rural II designation, as are the FOR/AG 10 and 20, NAT, and UNM zoning classifications.

The overall Comprehensive Plan vision statement is:

Skamania County is strongly committed to protecting our rural character and natural resource based industries while allowing for planned future development that is balanced with the protection of critical resources and ecologically sensitive areas, while preserving the community's high quality of life.

3-141

33758687_107.cdr

Skamania County

Klickitat County
Klickitat County Site
Boundary Rural 1

Rural 2

Conservancy
West End Subarea
Swift Subarea

Revised Figure Adopted by the Skamania Board of County

Carson Subarea

Commissioners on April 29, 2008.

NSA Subarea
DISCLAIMER: This map product was prepared by Skamania County and is for information purposes only. It may not have been
prepared for, or be suitable for legal, engineering or surveying purposes. Users of this information should review or consult the City Limits

primary data and information sources to ascertain the uasbility of the information.

Forest Resource

Figure 3.8-4

Skamania and Klickitat Counties
Source: Skamania County. Comprehensive Plan Designations

Natural resources-based industry is further encouraged in the Comprehensive Plan's description of the intent of the Conservancy designation:

The Conservancy land use area is intended to provide for the conservation and management of existing natural resources in order to achieve a sustained yield of these resources, and to conserve wildlife resources and habitats. Much of the Conservancy land use area is characterized by rugged terrain, steep in slope, and unsuitable for development of any kind. Logging, timber management, agricultural and mineral extraction are main use activities that take place in this area. Recreational activities of an informal nature such as fishing, hunting, and hiking occur in this area, although formal recreational developments may occur from time to time. Conservancy areas are intended to conserve and manage existing natural resources in order to maintain a sustained resource yield and/or utilization.

Among the uses identified as appropriate in the Conservancy designation are: public facilities, utilities, utility substations, forest management (including temporary logging and mining camps), and surface mining (by conditional use).

The Rural II designation is described in the Comprehensive Plan as follows:

"The Rural II land use area is intended to provide for rural living without significant encroachment upon lands used for agriculture and timber. This land use area is the middle developmental range level suggested by this plan. The lower density will help to protect agricultural and timber lands from dense residential type development, and should maintain the rural character of this designation."

Among the non-residential uses identified in the Comprehensive Plan as appropriate in the Rural II designation are public facilities, utilities, utility substations, telecommunication facilities, hospitals, meeting halls, agriculture, forest management including temporary logging and mining camps, and surface mining.

The following identifies potentially applicable goals and policies in the Comprehensive Plan.

Goal LU.1: To integrate long-range considerations (comprehensive planning) into the determinations of short-term action (individual development applications).

Policy LU.1.2: The plan is created on the premise that the land use areas designated are each best suited for the uses proposed therein. However, it is not the intention of this plan to foreclose on future opportunities that may be made possible by technical innovations, new ideas and changing attitudes. Therefore, other uses that are similar to the uses listed here should be allowable uses, review uses or conditional uses, only if the use is specifically listed in the official controls of Skamania County for that particular land use designation.

3-143

Goal LU.2: To provide for orderly future physical development of Skamania County.

Policy LU.2.4: Encourage new commercial enterprises to locate within or near existing commercial areas to avoid further scattering and to better serve the public.

Goal LU.3: To coordinate public and private interests in land development.

Policy LU.3.3: Encourage industry that would have minimal adverse environmental or aesthetic effects.

Goal LU.4: To promote interagency cooperation and effective planning and scheduling of improvements and activities so as to avoid conflicts, duplication and waste.

Policy LU.4.3: Land use patterns, which minimize the cost of providing adequate levels of public services and infrastructure, should be encouraged.

Goal LU.5: To promote improvements which make our communities more livable, healthy, safe and efficient.

Policy LU.5.5: Promote compatibility of industry with the surrounding area or community by fostering good quality site planning, landscaping, architectural design, and a high level of environmental standards.

Policy LU.5.6: Encourage commercial development that is convenient, safe and pleasant to the general public by: requiring that new establishments provide off-street parking adequate for its needs. Encourage pooled or joint use parking areas for adjacent developments may be utilized; Regulate access points for vehicular traffic for commercial areas to prevent unsafe conditions; the design of commercial sites, buildings, and signs should be compatible with surrounding areas; and, landscaping may be required as a buffer when commercial use adjoins residential or farm property.

Goal E.1: To ensure the proper management of the natural environment to protect critical areas and conserve land, air, water, and energy resources.

Goal T.1: Transportation – Encourage an efficient multi-modal transportation network that is based on regional priorities and coordinated with county and city comprehensive plans.

Goal T.2: Continue the priority of increasing safety of the Skamania County rural 2-lane road system. The majority of the Public Works Department's future efforts will be to reduce the accident rate with Skamania County.

3-144

Goal T.3: Public Facilities and Services – Ensure that those public facilities and services necessary to support development should be adequate to serve the development at the time the development is available for occupancy and use without decreasing current service levels below locally established minimum standards.

Goal AHP.1: Identify and encourage the preservation of lands, sites, and structures that have historical or archaeological significance.

Goal AHP.2: Increase recognition of historic, archaeological, and cultural resources.

Goal AHP.3: Protect historic, archaeological and cultural resources through a comprehensive planning approach.

3.8.2.2 Skamania County Zoning Ordinance SCC Title 21

Title 21 of the Skamania County Zoning Ordinance is the county zoning that applies to the project site. Although extensive updates of SCC Title 21 have been proposed for adoption, the last-adopted version is still in effect because the proposed updates are currently under appeal by local interest groups.

Under SCC Title 21, the project site is located primarily in the UNM zone, with the southern tip of the project site in the FOR/AG 20 zone (see Figure 3.8-5). Both of these zoning classifications are consistent with the Comprehensive Plan's Conservancy designation for this area. None of the project site is designated as farmland.

Approximately 7,152 acres of the 1,152-acre project site are located in the UNM zone. UNM zones are those areas of the county where no formal adoption of any zoning map has taken place. The Skamania County Code provides:

In the UNM zone all uses which have not been declared a nuisance by statute, resolution, ordinance or court of jurisdiction are allowable. The standards, provisions, and conditions of this title [SCC Title 21] shall not apply to unmapped areas.

SCC 21.64.020. Nuisances established by the Board of County Commissioners by resolution and ordinance are identified in SCC 8.30.010; this provision of the County Code does not identify wind energy facilities as a nuisance. In addition, neither the RCW nor the WAC designate wind energy facilities as a nuisance.

In July 2007, the County adopted a moratorium on unincorporated UNM-zoned lands outside the Swift Subarea. The moratorium does not prohibit all development in UNM lands. Rather, it restricts three types of land uses: (1) issuance of building permits on lands created by deed since January 2006 that are 20 acres or larger; (2) land divisions (short plat and subdivision); and (3) acceptance of SEPA checklists in support of converting land to non-forestry uses.

3-145

33758687_167.cdr

Figure 3.8-5
Job No. 33758687 Skamania County Zoning

The remainder (approximately 400 acres) of the project site is located within the FOR/AG 20 zoning classification (see Figure 3.8-5). Pursuant to SCC 21.56.010[A]), the purpose of this zone is:

To provide land for present and future commercial farm and forest operations in areas that have been and are currently suitable for such operations, and to prevent conflicts between forestry and farm practices and nonresource production uses by not allowing inappropriate development of land within this zone classification.

Uses allowed outright in the FOR/AG 20 zone include the following:

A. Forestry practices and associated management activities of any forest crop in accordance with Washington Forest Practices Act of 1974 including timber, Christmas trees, nursery stock, and surface mining.
B. Commercial and domestic agriculture.
C. Orchards and vineyards.
D. Horticulture.
E. Cottage occupation (in accordance with Chapter 21.70).
F. Light home industry (in accordance with Chapter 21.70).
G. Management of unique biological areas.
H. Management and propagation of fish and wildlife.
I. Water resources management facilities.
J. Storage of explosives, fuels and chemicals.
K. Accessory uses normally associated with an allowable use.
L. Public and private conservation areas or structures for retention of water, soil, open space, forest, or wildlife resources.
M. Log sorting and storage areas, scaling stations, temporary crew quarters, forest industry storage and maintenance facilities.
N. Family day care home (in accordance with Section 21.86.020).
O. Residential care facilities (in accordance with Chapter 21.85).
P. Farm labor housing.
Q. Accessory equipment structures.
R. Attached communication facilities not located on BPA towers (in accordance with Section 21.70.160).

Uses allowed by Conditional Use Permit in the FOR/AG 20 zone include:

A. Individual single-family residences not provided in conjunction with forest or farm management, including residential and resource related development may be permitted conditionally, provided they meet (...additional listed conditions).

3-147

B. Recreational facilities.
C. Semi-public facilities and utilities.
D. Sawmills, shake and shingle mills, chippers, pole and log yards.
E. Geothermal energy facilities.
F. Aircraft landing fields.
G. Cluster developments.

H. Child mini-day care center (in accordance with Section 21.86.030).
I. Child day care center (in accordance with Section 21.86.040.
The alternative Operations and Maintenance facility site is located approximately 0.9 mile west of the project site in the R-5 zoning classification (see Figure 3.8-5). This zoning classification is consistent with the Comprehensive Plan's Rural II designation for this area. Pursuant to SCC 21.36.010, the purpose of the R-5 zone is:

To provide a transition zone of medium to low density residential development which will maintain a rural character of the area in the Rural II Land Use Area of the County Comprehensive Plan A.

Comment: The industrialization of Skamania County and other counties in the region is NOT preserving the rural character of the area! The Futurewise article, Planning for Sustainable Rural Areas, written in March 21, 2005 has a definition for rural character: 'The rural area is the land located outside the urban growth area and outside resource lands. Resource lands are agricultural, forest, and mineral lands of long-time commercial significance.

"Rural character" refers to the patterns of land use and development established by a county in the rural element of its comprehensive plan:

(a) In which open space, the natural landscape, and vegetation predominate over the built environment;

(b) That foster traditional rural lifestyles, rural-based economies, and opportunities to both live and work in rural areas;

(c) That provide visual landscapes that are traditionally found in rural areas and communities;

(d) That are compatible with the use of the land by wildlife and for fish and wildlife habitat;

(e) That reduce the inappropriate conversion of undeveloped land into sprawling, low-density development;

(f) That generally do not require the extension of urban governmental services; and,
(g) That are consistent with the protection of natural surface water flows and ground water and surface water recharge and discharge areas.

"Rural development" refers to development outside the urban growth area and outside agricultural, forest, and mineral resource lands designated pursuant to RCW 36.70A.170. Rural development can consist of a variety of uses and residential densities, including clustered residential development, at levels that are consistent with the preservation of rural character and the requirements of the rural element. Rural development does not refer to agriculture or forestry activities that may be conducted in rural areas.' I don't think that putting up 50+ industrial wind turbines and constructing maintenance roads throughout the

landscape conforms to the definition of rural character " (a) In which open space, the natural landscape, and vegetation predominate over the built environment"!!

Uses allowed outright in the R-5 zone include the following:

A. Single-family dwellings
B. Commercial and Domestic agriculture
C. Forestry
D. Public facilities and utilities
E. Cottage occupation (In accordance with Chapter 21.70)
F. Light home industry (In accordance with Chapter 21.70)
G. Residential care facilities (In accordance with Chapter 21.85)
H. Family day care home (In accordance with Chapter 21.86.020)
I. Safe home
J. Accessory equipment structures
K. Attached communication facilities located on BPA towers. (in accordance with Section 21.70.160)

Uses allowed by Conditional Use Permit in the R-5 zone include:

A. Surface mining
B. Recreational facilities
C. Professional services

3-148

D. Geothermal energy facilities
E. Public displays
F. Cluster developments
G. Semi-public facilities
H. Small and Large-Scale Recreational Vehicle Parks.
I. Child day center (In accordance with Chapter 21.86.040)

3.8.2.3 Skamania County Code, Title 20, Shorelines
Because the project site is not located near or on any shorelines of State, County or other significance, there are no applicable provisions of this county code.

3.8.2.4 Skamania County Code, Title 21A, Critical Areas
The Washington State Growth Management Act, RCW 36.70A.060, requires counties to identify and regulate critical areas.15 Critical areas include:

- Fish and wildlife habitat conservation areas
- Frequently flooded areas
- Geologically hazardous areas
- Ponds and lakes
- Streams, creeks, and rivers

In Skamania County, critical areas regulations are found in SCC Title 21A. The project site is not located within any critical recharge areas, frequently flooded areas, ponds and lakes, or rivers. Portions of the project site are located near geologically hazardous areas due to steep slopes classified as Class II and III LHAs. There are wetlands, fish and wildlife habitat areas, streams, and creeks on the site.

3.8.3 IMPACTS
Adverse impacts to land use can are defined two ways:

• Changes to existing land use activities and development patterns. The project could cause adverse impacts if it were to preclude the continuance of existing land uses or cause major changes to the existing patterns of land use activities or development. 15 See: http://www.commerce.wa.gov/_CTED/documents/ID_892_Publications.pdf

3-149

• Inconsistency of a proposed project with existing land use regulations. The project could cause adverse impacts if it was found to be inconsistent with the Skamania County Comprehensive Plan, Zoning Code, or Critical Areas regulations.

3.8.3.1 Proposed Action
Changes to Existing Land Use Patterns and Recreation

Project Construction

During construction, earth movement and construction-related traffic would generate noise and dust that could temporarily affect nearby homes and businesses located along the site access route (described in Section 3.11, Transportation). Cook-Underwood Road would be the primary access route for construction materials and workers. However, construction impacts would not be sufficient to cause changes to existing land use patterns.

Land clearing for the construction of the alternative Operations and Maintenance facility site would occur concurrently with roadway improvements to West Pit Road. The additional earth movement and construction-related traffic would generate slightly more noise and dust in that area along West Pit Road over anticipated levels for roadway construction without the facility. The additional noise and dust could temporarily affect nearby homes along Willard Road. Construction impacts would not be sufficient to cause changes to existing land use patterns.

Construction would not directly affect local recreational facilities beyond the potential for construction workers to use local recreational facilities during the one year construction period. Existing limits on the length of stay in public camping areas would minimize any potential impacts on park users from construction workers staying in parks, and a majority of the construction workers are expected to be within daily commuting distance of the site. Additionally, workers who did stay at local parks would most likely do so on weekdays and would thus not be there on the days with the highest levels of use.

Construction activities could affect some recreation users such as users of the Underwood Park and Community Center located along Cook-Underwood Road, through temporary increases to traffic, and from construction-related dust and noise. These impacts would be temporary and are expected to be minor.

Construction of the Operations and Maintenance facility at the West Pit Road location would not impact local recreational facilities. Existing limits on the length of stay in public camping areas would minimize any potential impacts on park users from construction workers staying in parks, and a majority of the construction workers are expected to be within daily commuting distance of the site. Additionally, workers who did stay at local parks would most likely do so on weekdays and would thus not be there on the days with the highest levels of use.

Construction of the Operations and Maintenance facility at the West Pit Road could affect some recreation users through temporary increases to traffic, and from construction-related dust and noise. Impacts would be primarily limited to recreational users traveling on Cook-Underwood Road. This impact would not be noticeably different from the construction of the on-site location. Construction impacts would be temporary and are expected to be minor.

3-150

Project Operation

Project operation also would not cause changes to existing land uses or land use activities or development patterns. The surrounding land uses are predominantly commercial forestry, agriculture and residential, and these uses would not be directly negatively affected by the project (Figure 3.8-5). The majority of the project site itself would remain in commercial forest production, with a maximum of approximately 56 acres of land (under 5 percent) converted to non-forestry uses related to new and widened roads, the turbine strings, the Operations and Maintenance facility, and the substation. At decommissioning, all of these facilities would be removed and the area returned to commercial forest.

Project operation would not force any changes in forestry operations or activities on the rest of the project area or on surrounding properties. The project would not generate sufficient amounts of noise, traffic, visual changes, energy use, air emissions or water use to cause changes to these existing land use patterns.

Comment: Since there is no watershed data, the proponent cannot say that the project would or would not cause changes in water use. The proponent does NOT know how this project would affect any aquifer(s), water tables, or wells, in the area.

Concern was expressed during scoping that the visibility of the turbines would cause a negative impact on agricultural tourism, specifically visits to area wineries. Wind power and winery tourism already co-exist in the Columbia River area. For example, four wind power facilities are located between Walla Walla and Kennewick (Canyon, Stateline, Vansycle, and Combine Hills). This area is home to a thriving wine industry with over 60 wineries. Section 3.9 Visual

Resources discusses visual impacts.

Project operation would not result in a sufficient increase in population or traffic to impact local recreational facilities. The only potential impact to recreation users would be the minor to moderate visual impacts discussed in Section 3.9 Visual Resources.

Operation of the alternative Operations and Maintenance facility would not change existing land use patterns. The surrounding land uses are predominantly commercial forestry, agriculture and residential, with the nearest home approximately 0.25 mile away. The site is adjacent to West Pit Road, which will be used for access to the project site during both construction and operation. Use of the alternative site for the Operations and Maintenance facility would generate noise, traffic, new lighting, energy use, air emissions, and water use, but not at levels sufficient to cause changes to the existing surrounding land uses. The Operations and Maintenance facility thus would be compatible with surrounding land use and would not hinder the development of permitted land uses on neighboring properties.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant will provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan will address site restoration that would occur at the conclusion of the project's operating life (estimated to be 30 years), and restoration in the event the project is suspended or terminated during construction or before it has completed its useful operating life. The plan will include or parallel a decommissioning plan for the project.

The initial site restoration plan will be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated,

3-151

including potential changes to land use, recreation or recreational access. If impacts to land use or recreation are anticipated to occur as a result of site restoration and project decommissioning, mitigation measures will be proposed as part of the plan.

Consistency with Applicable Land Use Regulations

Overall, the proposed project would be consistent with applicable land use regulations. The project would not involve subdividing any land parcels nor applying for changes to zoning or Comprehensive Plan designations. In a letter to EFSEC dated May 4, 2009, Skamania County found that the proposed project is consistent with the Skamania County Comprehensive Plan, SCC Title 21 Zoning Code, SCC 21A Critical Areas, Title 24 Clearing and Grading, and resource maps. On December 22, 2009, the Skamania County Board of County Commissioners passed Resolution 2009-54, resolving that the revised project, including the use of the alternative location of the Operations and Maintenance facility and the use of the West Pit Road as an access route, is consistent with Skamania County Land Use Plans and applicable zoning ordinances (see Appendix D Land Use Consistency Determination). When a county certifies

consistency with its local land use plans and ordinances, pursuant to WAC 463-26-090, the plan states that "such certificates will be regarded as prima facie proof of consistency and compliance with such land use plans and zoning ordinances absent contrary demonstration by anyone present at the hearing."

The following further evaluates the consistency of the proposed project with applicable land use regulations.

Skamania County Comprehensive Land Use Plan

The project would be consistent with the Comprehensive Plan vision and the Conservancy designation in that it would conserve and manage existing natural forest and wind resources to maintain a sustained yield and utilization of both. Within the Conservancy designation, public facilities, utilities, and utility substations are allowed. Wind energy facilities are consistent with the Conservancy designation because they are utilities. The project would provide an alternative source of electrical energy generation that is not reliant on either fossil fuels or hydropower, while allowing forest management activities to continue around the turbine corridors. In addition, the staff report attached to Skamania County Resolution 2009-54 documents the County's determination that the proposed project would be a semi-public facility under SCC Title 21 (see Appendix D). Semi-public facilities are defined in SCC 21.08.010 as "facilities intended for public use which may be owned and operated by a private entity." The project thus would be a utility consistent with the Conservancy designation's appropriate uses.

The alternative location for the Operations and Maintenance facility on West Pit Road would include an approximately 3,000-square-foot building, located on a 5-acre parcel in an area designated as Rural II in the Comprehensive Plan. The facility would be similar in size to a larger single family home. The project would be a utility that is consistent with the Rural II designation and would not conflict with any of the goals or policies expressed in the Comprehensive Plan.

3-152

Skamania County Zoning Ordinances

The portion of the proposed project that would be located in the UNM zoning classification would be considered consistent with this zoning. There is no conflict from siting wind energy facilities in the UNM zone, and these facilities have not been identified as a nuisance by statute, resolution, ordinance, or court order. Concerning the County's moratorium on unincorporated UNM-zoned lands, the project is not sited on lands created by deed since January 2006 and does not involve any land division. Because of Washington EFSEC's preemptive role in permitting wind energy facilities, including acting as Lead Agency for associated SEPA review, the County's moratorium on acceptance of SEPA checklists for forest practices conversions does not affect the project.

Turbine Corridor A1–A7, with approximately seven turbines, would be located in the small portion at the southern tip of the project site that is within the FOR/AG 20 zone. If the proposed

project were being permitted through Skamania County rather than through Washington EFSEC, it is probable that a Conditional Use Permit from the County would be required for siting these turbines. Since Washington EFSEC is the permitting authority in this case, no such permit is required. Nonetheless, this portion of the proposed project would be consistent with the purpose and intent of the FOR/AG 20 zone in which it would be located, and while not an outright allowed use, this project is considered to be semi-public facility that would be a conditional use in this zone. As discussed above, the project also would provide renewable energy generation while allowing forest management activities to continue around the turbine corridors. The portion of the proposed project that would be located in the FOR/AG 20 zone thus would be considered consistent with this zoning.

The proposed alternative Operations and Maintenance facility located along West Pit Road would be within an area zoned R-5. Like turbine Corridor A1–A7, if the County was the permitting authority for the alternative Operations and Maintenance facility, a Conditional Use Permit likely would be required. However, Washington EFSEC is the permitting authority and no such permit is required. Nonetheless, the alternative Operations and Maintenance facility would be consistent with the purpose and intent of the zone in which it would be located. The Operations and Maintenance building would be located on a 5-acre site, and, at 3,000 square feet, would be similar in size to a larger single-family residence. The building would meet all applicable setback requirements, and would not pose a hazard to the health, safety or welfare of the surrounding community. Traffic associated with the facility would be similar to traffic from staff currently involved in ongoing timber management in the area. A well and on-site septic system would be installed to provide potable water for the Operations and Maintenance building. The anticipated demand for fire and police services would be low, and similar to other commercial operations in the project vicinity. Development of the facility would not hinder or discourage development or continuation of timber management activities on nearby properties, or of residential properties in the area. Finally, the facility would not conflict with the goals and policies expressed in the current version of the County's Comprehensive Plan. Accordingly, location of the alternative Operations and Maintenance facility in the R-5 zone would be considered consistent with this zoning.

The proposed project also would be consistent with the critical areas regulations found in SCC Title 21A. The project site is not located within any critical recharge areas, frequently flooded

3-153

areas, ponds and lakes, or rivers. Portions of the project site are located near geologically hazardous areas due to steep slopes classified as Class II and III LHAs. There are wetlands, fish and wildlife habitat areas, streams, and creeks on the site. The project has been designed to minimize impacts to these areas, as discussed in Section 3.8.4, Mitigation Measures, and primarily in Section 3.3 Water and 3.4 Biological Resources.

Improvements to West Pit Road to widen it in places also would be consistent with SCC Title 21A. The use of the West Pit Road would not create safety concerns. While no new construction would occur within wetlands, streams, or their buffers, West Pit Road crosses one unnamed drainage in the Lapham Creek watershed. In July 2009, the drainage had observed

flow through the existing culvert under West Pit Road, but the surface flow and the channel disappeared downstream of the culvert. The drainage is classified as a Class V stream under SCC 21A.04.020(B),Appendix C. Buffers are established for Class V streams, within which expansion of existing uses is allowed. As long as the proposed expansion or widening is 100 percent or less than the existing footprint, no development review is required under SCC 21A.05 and SCC 21A.06 in fish and wildlife protection areas or geologically hazardous areas. The road improvements in these regulated fish and wildlife protection areas do not exceed the allowed expansion threshold. For a full discussion of fish, wildlife, their habitats, and project impacts to these, please see Section 3.4 of the Application for Site Certification.

Columbia River Gorge National Scenic Area Management Plan

While the proposed project would be located entirely outside of the Columbia River Gorge National Scenic Area, concerns have been raised regarding the compatibility of the project with the objectives and policies of the National Scenic Area Management Plan. The following identifies key objectives and policies, along with a discussion of project consistency with each of these objectives and policies.

• Protection of Resources. The project would not decrease any resources within the Scenic Area. Neither the site nor its access roads are within the Scenic Area, and no recreation resources would be lost.
• Scenic Appreciation and Scenic Travel Corridors. The project would have only minor to moderate impacts on visual quality as viewed from travel corridors inside the Scenic Area. See Section 3.9 Visual Resources.
• Resource Based Recreation. No resource-based recreation resources are within or in proximity to the project area. The only potential impact to recreation in the Scenic Area would be incidental recreational use by construction workers during the construction period. Such use is expected to be minimal.
• River Access and Protection of Treaty Rights. This project is on private lands outside of the Scenic Area and would have no effect on river access or treaty rights.
• Interpretation/Education. An opportunity to provide alternative energy interpretation and education could be included in this project and further the goals of the Scenic Area.

3-154

• Trails and Pathways. The project would not affect any trails or pathways in the Scenic Area. There may be some distant views of wind turbines from trails; the impact is expected to be "low to moderate." See Section 3.9 Visual Resources.
• Transportation. Portions of SR 14 and portions of Cook-Underwood Road that are within the Scenic Area would be used to access the project. Increased traffic would cause a temporary and limited impact to recreational travelers during the construction period.
• Coordination. The project and access road are located outside of the Scenic Area. No coordination is required.

3.8.3.2 No Action Alternative

Under the No Action Alternative, the project would not be built. The site would continue to be used for commercial forestry and timber harvest would continue on a regular rotating schedule. Accordingly, existing land uses at the project site would remain unchanged. In addition, the informal recreation activities at the project site would remain largely the same, and no effect on recreational uses in surrounding areas would occur. The current level of consistency with land use plans and regulations also would continue to exist under this alternative.

3.8.4 MITIGATION MEASURES

No substantial impacts to land use are identified and no mitigation measures are required. The only potential impact to recreation users from operation would be the minor to moderate impact to visual resources from some viewpoints. Mitigation for this potential impact is identified in Section 3.9, Visual Resources.

3.8.5 UNAVOIDABLE ADVERSE IMPACTS

The 1,152-acre project site would continue to be predominantly used for commercial forestry operations. A maximum of approximately 56 acres of forestry land (under 5 percent of the project site) would be converted to energy facility use for the life of the project. This conversion would not constitute a substantial change to area land use patterns given the area of the project retained for active forestry operations, and given the acreage surrounding the project in both private and state ownership that will be maintained in commercial forestry operations.

3.9 VISUAL RESOURCES

This section describes potential impacts to visual resources. It assesses the potential for visual impacts using accepted methods of evaluating visual landscape quality and predicts the type and degree of effects the project would likely have on those attributes. This section also identifies mitigation measures designed to minimize those impacts.

3-155

3.9.1 METHODOLOGY

This section summarizes the visual impact assessment performed for the Application for Site Certification Agreement. The visual assessment used the Scenery Management System defined in Landscape Aesthetics, A Handbook for Scenery Management (USFS 1995) and Visual Impact Assessment for Highway Projects (FHWA 1988). The study was also designed to respond to the provisions of WAC 463-42-362, Built Environment–Land and Shoreline Use, which specifies the analysis of aesthetic and light and glare issues as part of the EFSEC process.

Comment: These 400-foot turbine towers break up the horizon, are visible to the eye, and don't belong in the visual landscape of the Columbia River Gorge National Scenic Area. Klickitat County has pillaged their entire prairie landscape with turbines and maintenance roads and these turbines are intrusive to one's enjoyment of the rural environment. The view shed would be ruined by these monstrous entities.

The Federal Highway Administration (FHWA) methodology is widely used for visual assessment of private lands such as the Project area, where visual quality objectives have not been established. A visual quality objective is a resource management objective established by a district manager or contained in a plan that reflects the desired level of visual quality based on the physical characteristics and social concern for the area. Five categories of visual quality objectives commonly used are preservation, retention, partial retention, modification, and maximum modification.

The FHWA methodology has been used to evaluate other recent wind power projects, including the Desert Claim project16, Lower Snake River (FHWA and BLM) and the Kittitas Valley project (FHWA and USFS methodologies)17. The FHWA method is also used where linear features of the project such as roads or turbine strings move into differing landscapes and visual corridors with differing view groups.

Three methodologies are commonly used to analyze visual impacts in federal and state EISs: the FHWA and USFS methodologies used for this project, and the Visual Resource Management system used by the BLM18. The BLM methodology is generally used where projects are proposed on or in proximity to BLM lands, and visual resource objectives for specific planning areas are already established. Under the BLM methodology a contrast rating can be completed and compared to the established BLM visual classifications. In order to use the BLM process for projects on private lands where no visual resource objectives have been established, it would be necessary to complete a full visual management inventory to delineate all lands in question and then classify each delineated area using the BLM classifications. The FHWA process provides for establishing existing visual quality objectives at a smaller scale or project level.

The BLM analysis would then determine whether and how the project features meet the objectives of the classification using the Visual Resource Management process for contrast rating. The FHWA process also follows this process, but is more conducive to a project of this scale and complexity. Full-scale Visual Resource Management delineation and classification are more appropriate for land management planning on a large scale and for providing visual objectives for public lands with multiple management objectives and uses.

16 See: http://www.efsec.wa.gov/Desert%20Claim/FEIS/3.10Aesthetics.pdf

17 See: http://www.efsec.wa.gov/Desert%20Claim/FEIS/3.10Aesthetics.pdf

18 See: http://www.blm.gov/nstc/VRM/

3-156

While the FHWA process does not rely on pre-existing visual quality objectives, it does incorporate elements of the Scenery Management System, which is part of both the USFS and BLM methodologies establishing existing visual quality and process for determining visual contrast. The FHWA process incorporates Scenery Management System and Visual Resource Management components, including landscape features, ecological conditions, cultural settings,

and social needs to establish the existing visual conditions and the effects of a project on the visual environment.

The methodology used is appropriate since it provides a clear understanding of how the proposed project would affect the visual landscape as seen from the key viewing areas. This methodology portrays the differing viewer groups and their sensitivity to visual change, defines distance zones (foreground, middle ground and unseen areas) and evaluates the contrast between pre- and post-project conditions as seen from the different viewpoints, by different viewer groups, and from different distances.

This analysis of visual effects was based on field observations and review of wind energy facilities' visual effects, public perception, design measures to reduce visual impacts, and local planning documents. Project maps, drawings, technical data, and computer-generated viewshed maps were used to determine areas where the project would be visible, and visual simulations were generated (described in Section 3.9.1.3) to illustrate the change from the existing conditions if the project is implemented. The analysis included systematic documentation of the visual setting, evaluation of visual changes associated with the project, and measures designed to mitigate these visual effects. Mitigation measures include restoration or enhancement activities in areas that would be disturbed during construction.

3.9.1.1 Scenic Quality Assessment

Scenic quality ratings were developed based on observations in the field, photographs of the affected area, methods for assessing visual quality, and research on public perceptions of the environment and scenic quality ratings of landscape scenes. The final assessment of scenic quality was made based on professional judgment that took a broad spectrum of factors into consideration, including:

• Natural features, including topography, watercourses, rock outcrops, and vegetation
• The positive and negative effects of human alterations and built structures on visual quality
• Visual composition, including an assessment of the vividness, intactness, and unity of patterns in the landscape, defined as:
-Vividness refers to the memorability of the visual impression received by the viewer from contrasting landscape elements as they combine to form a striking and distinctive visual pattern

-Intactness is the integrity of visual order in the natural and human landscape, and the extent to which the landscape is free from visual encroachment

3-157

-Unity is the degree to which the visual resources of the landscape join together to form a coherent and harmonious visual pattern

Each viewpoint was assigned a final rating based on the rating scale shown in Table 3.9-1. This

rating scale incorporates the landscape assessment concepts developed in the USFS and FWHA methodologies.

Table 3.9-1
Landscape Scenic Quality Scale

Visual Quality Rating Explanation
Outstanding 6

A rating reserved for landscapes with exceptionally high visual quality. These landscapes are significant nationally or regionally. They usually contain exceptional natural or cultural features that contribute to this rating. They are what we think of as "picture postcard" landscapes. People are attracted to these landscapes to view them. High Landscapes that have high quality scenic value. This may be due to cultural or natural features 5 contained in the landscape or to the arrangement of spaces contained in the landscape that causes the landscape to be visually interesting or a particularly comfortable place for people. These landscapes have high levels of vividness, unity, and intactness.

Moderately High 4

Landscapes that have above average scenic value but are not of high scenic value. The scenic value of these landscapes may be due to human or natural features contained within the landscape, to the arrangement of spaces in the landscape, or to the two-dimensional attributes of the landscape. Levels of vividness, unity, and intactness are moderate to high. Moderate Landscapes that are common or typical landscapes with average scenic value. They usually lack 3 significant human or natural features. Their scenic value primarily results from the arrangement of spaces contained in the landscape and the two-dimensional visual attributes of the landscape. Levels of vividness, unity, and intactness are average.

Moderately Low 2

Landscapes that have below average scenic value but not low scenic value. They may contain visually discordant human alterations, but these features do not dominate the landscape. They often lack spaces that people perceive as inviting and provide little interest in terms of two-dimensional visual attributes of the landscape.

Low 1

Landscapes that have below average scenic value. They may contain visually discordant human alterations, and often provide little interest in terms of two-dimensional visual attributes of the landscape. Levels of vividness, unity, and intactness are below average.

Source: Buhyoff et al. (1994), FHWA (1988), and USFS (1995)

3.9.1.2 Visual Sensitivity Assessment
The analysis also assessed visual sensitivity, which involves predicting the general impact on the

quality of views from a given viewpoint. A combination of three factors determines how sensitive a landscape scene is:

• The number and type of viewers
• The viewing conditions
• The quality of the view

Residential areas with unobstructed views of a regionally important and memorable scene would be very sensitive to objects or structures that would impede views. A view from a seldom

3-158

traveled rural road where motorists have only distant, oblique views of wind turbines in an unremarkable setting would likely qualify as an area of low sensitivity.

The principal types of viewers in the project area who have predictably high levels of sensitivity to visual impacts include:

• Resident viewers
• Roadway viewers (drivers and passengers)
• Recreating viewers such as hikers, water recreationists, and mountain bikers
This analysis defines three levels of visual sensitivity:
• Low. Viewer types representing low visual sensitivity include agricultural and industrial/warehouse workers. Compared with other viewer types, the number of viewers is generally considered small and the duration of view is short. Low levels of sensitivity are assigned to areas 5 miles or more from the closest turbine, where a wind power project would be a distant and a relatively minor element in the overall landscape.
• Moderate. Viewer types representing moderate visual sensitivity consist of highway and local travelers. The number of viewers varies depending on location; however, on average they tend to be moderately large, based on overall densities of surrounding areas and highway commuters. Viewer awareness and sensitivity are also considered moderate because destination travelers often have a focused orientation. Moderate levels of sensitivity were assigned to areas where turbines would be visible from 0.5 mile to 5 miles within the primary view of residences and roadways. The primary view refers to the central area that the eye can see clearly without moving and is surrounded by the peripheral vision. In distinguishing between moderate and low levels of sensitivity in the 0.5-mile to 5-mile zone, contextual factors were also considered, including the viewing conditions in the immediate foreground of the view.
• High. Residential, recreational, and viewers congregating in public gathering places (churches, schools, trails, designated scenic viewpoints, etc.) are considered to have comparatively high visual sensitivity. The visual setting may in part contribute to the enjoyment of the experience. Views may be of long duration and high frequency. High levels of sensitivity are generally assigned in those cases where turbines would be potentially visible within 0.5 mile or less from residential properties, heavily traveled roadways, or heavily used recreational facilities. The principal types of viewers in the project area who have predictably high levels of sensitivity to visual impacts include residential viewers, roadway viewers (drivers and passengers) and recreating viewers such as hikers, water recreationists, and mountain bikers. These criteria were

used to establish the sensitivity levels of each view using a systematic approach based on the distance of the project from the viewpoint, the number of turbines or percentage of the project area that could be viewed from this viewpoint, and the dominant viewer

3-159

types for each view. Through this analysis, an overall sensitivity rating was established for each existing landscape view.

3.9.1.3 Preparation of Visual Simulations

Visual simulations were developed using photographs taken with a 35 mm digital SLR camera. Various focal lengths from 40 to 70 mm were used with the intent to capture the maximum pixels and resolution for the simulation. Visual Nature Studio, a widely-used three-dimensional Geographic Information System (GIS) software, manufactured by 3D Nature, LLC, was used to model the turbine locations on terrain built from USGS digital elevation model data. The photo locations were camera-matched in the software to render the turbines from the same viewpoint as the photographs taken on the ground. The resulting rendered turbine images were then photocomposited into the photographs to create the simulations. Existing topographic and site data provided the basis for developing the initial digital model.

In preparing the visual simulations, the turbine model used was the 2.5-MW Clipper Liberty model C93, which was considered a likely model to be selected based on information provided by the Applicant. This model has an overall height to nacelle of 80 m (262 feet) and blade diameter of 93 m (305 feet), and a blade length of 45.2 m (153 feet). The overall height to the tip of a stationary, vertical blade is 126.5 m (415 feet). The actual turbine size has not been determined, but potential turbines are estimated to have a height to nacelle of 262 feet and blade length between 129 and 164 feet.

Simulations were prepared assuming a conservative scenario of 50 turbines. This approach to creating simulations most likely overstates the visual impacts. This is because the Applicant has applied for EFSEC certification for a maximum of 75 MW. If 2.5 MW turbines were to be used, only 30 turbines could be built, and overall visual impact would be less. If lower-power turbines were used, the turbines would be smaller and thus less visible. Further, in evaluating impacts, the turbine is considered visible if any part of a vertical turbine blade is visible. In practice, turbines with only a part of the blade visible will not be seen when the blade is moving or is stationary but not vertical.

Atmospheric haze varies by location, season, time of day, and weather patterns. In creating photo composite visual simulations, the aim is to match the haze level on the rendered turbines to the observable haze present in the photograph. This is done by comparing the haze effects on the photographed terrain near the turbines to the rendered haze effects on the rendered terrain. This is then translated into a worst-case (lower than expected) haze visibility setting for the turbine renders. The result is that the turbines would be slightly more visible in the final composites than they would actually be if an observer were standing on the ground viewing them from the exact place, date, and time that the photos were taken.

The sky depicted in some of the visual simulations includes clouds, simulating the cloudy conditions that are common at the site.

Site plans and specifications for the proposed wind turbines were used to create three-dimensional digital models of the planned turbine placements. These models were combined with the digital terrain model to produce a complete computer model of the wind farm. For each

3-160

viewpoint, a render camera was placed in the Visual Nature Studio software. The aspect ratio of each render was then matched to the corresponding photograph and the rendered terrain was visually matched to the photographed terrain to confirm scale. Finally the resulting turbine images were matched in perspective, scale, and aspect ratio, are photo-composited into the original digital photo base using Adobe Photoshop. This process produces accurate portrayals of how the given turbine models and placements would look on the given terrain and from the specified viewpoints after construction. Seasonal conditions including weather, air quality, vegetation (foreground and background) and color impact the quality of the compositions. These compositions are a representative example of the area without subjectivity.

Simulations were not developed for nighttime conditions. Night simulations are inherently inaccurate, since they do not show the periodic flashing of the air warning lights, which is the impact most often mentioned. Night simulations are not typically performed as part of the analysis of wind power projects, and have not been requested by EFSEC. The potential impact of air warning lights is discussed in Section 3.9.3.1.

3.9.2 AFFECTED ENVIRONMENT

Each landscape has a specific quality that gives a geographic area its visual and cultural image, and consists of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. The character of an existing landscape may range from a predominantly natural landscape to landscapes that are heavily culturally influenced. The existing scenic quality of an existing landscape includes the natural scenic attributes of the landscape in combination with the existing land use patterns. The list of attributes includes naturally evolving, natural appearing, pastoral, agricultural, or even urban landscapes and generally are at the broadscape or landscape level of the analysis, but can be analyzed for each specific viewpoint at a project level.

The sensitivity of a landscape or view of that landscape is based on the scenic integrity of the landscape and the types of viewers. A landscape that has a high degree of integrity is a landscape that has a sense of wholeness, intactness, or being complete. Its scenic quality is near-perfect, with no evident discordant elements or deviations from the existing character, making it highly sensitive to most changes and to the perceptions of the viewer types.

The existing visual resources are the natural and built features open to view in the project landscape. The combination of land, water, and vegetation patterns represent the natural

landscape features that define an area's visual character, while built features such as buildings, roads, and other structures reflect human or cultural modifications to the landscape. These natural and built landscape features or visual resources contribute to the public's experience and appreciation of the environment. This section describes the broad scale regional and local landscape settings that were used to establish appropriate viewpoints from which the project would be visible.

3-161

3.9.2.1 Regional Landscape Setting

The project is set in two distinct landscapes. One landscape is the areas were the turbines would be sited along ridges located on the northern plateau of the Columbia River Gorge on Underwood Mountain (Figure 1-1). The other landscape is the Columbia River Gorge National Scenic Area, which is outside the project but within the viewshed looking into the project area. The project area is completely outside the Scenic Area, and therefore is not subject to the Columbia River Gorge Scenic Area Management Plan or related regulatory requirements. No improvements to project area roadways will take place in the Scenic Area.

Comment: Although the proposed project is located outside the Columbia River Gorge National Scenic Area (CRGNSA), the haul routes do impact the NSA. And, we really don't know what the tons and tons of materiel—cement trucks, semi-trucks carrying all the wind farm infrastructure materials, etc.—would do to our roads. There will be impacts to the roads but SDS appears to be minimizing any impacts in the NSA because they know that the regulatory requirements for the NSA are more stringent than outside NSA requirements. The DEIS should address the impacts to all the roads that will be used—and these roads need to be named beforehand. There should be no sleight of hand in road usage. SDS and BPA should commit on paper which haul routes they will be using, what the impacts will be to the roads, and what mitigations will take place if the roads are damaged.

The Scenic Area extends 85 miles along the Columbia River, and includes portions of three Oregon and three Washington counties. Formed by ancient volcanoes and sculpted by floods, the Columbia River Gorge carves a corridor through the Cascade Mountains in Oregon and Washington as the river journeys to the Pacific Ocean.

The National Scenic Area Act designated 292,500 acres on both sides of the Columbia River for special protection from the outskirts of Portland-Vancouver in the west to the semi-arid regions of Wasco and Klickitat counties in the east. The Scenic Area is categorized as SMAs, GMAs, and Urban Areas:

• SMAs contain the most sensitive resources. They total 114,600 acres and are managed by USFS.
• GMAs total 149,400 acres and include a mixture of historic land uses such as farming, logging, and cattle grazing. The Columbia River itself is currently designated as a GMA as well. Development on GMA lands is administered by the Gorge Counties and the Gorge Commission.

• Thirteen Urban Areas in the Gorge are exempt from any Scenic Area regulations: Cascade Locks, Hood River, Mosier, and The Dalles in Oregon, and North Bonneville, Stevenson, Carson, Home Valley, White Salmon, Bingen, Lyle, Dallesport, and Wishram in Washington. The Act's second purpose is to protect and support the economy of the Gorge by encouraging growth in existing Urban Areas and by allowing future economic development in a manner that is consistent with protection and enhancement of resources. The project area is outside of the Scenic Area Management Plan and no visual quality objectives or management designations have been established for the area. Areas south of the project within the Scenic Area are designated as Urban or GMA. The views from the Gorge into the project area were examined through viewpoint selection. This area of the Gorge, closest to the project, is considered to have a high visual quality with a moderate sensitivity based on the vividly memorable, and although the area is not free of visual encroachment, the visual resources join together with a moderate degree of unity.

3.9.2.2 Local Landscape Setting

The project site is on land managed for commercial forestry by S.D.S. Co., LLC and Broughton Lumber Company. All of the parcels on which the project is located are managed for a continual

3-162

cycle of growth, harvest, and replanting. As a longstanding commercial forestry site, no old-growth forests exist in areas where the project is proposed. Many of the stands of trees on the sections of land that would have turbines on them are recently harvested and reforested. S.D.S. Co., LLC and Broughton Lumber Company implemented timber harvest plans on approximately 50 acres during 2003. Additional harvests covering approximately 100 acres are planned as part of the ongoing commercial forestry operations (Figure 2-3).

In areas surrounding the proposed wind turbines that have not been recently harvested or that are not planned to be harvested before project construction, trees would be harvested and most of the land would be replanted with seedlings. This clearing would allow for safe construction, and would reduce the potential for tree growth to interfere with the wind resource on the site during the commercial life of the project. Low vegetation would be maintained in some areas to provide safe areas around the turbines (Figure 2-4).

Comment: It is now accepted (OSU and other universities, scientific studies, etc.) that old growth trees sequester more CO2 than younger trees. The age when young trees begin to become part of the sequestration cycle of CO2 is fifteen years. So, the harvesting of the older trees and the replanting with seedlings would actually put MORE CO2 into the atmosphere. This must be computed into the total carbon footprint of this project; it must also be considered when calculating BPA's carbon footprint.

No visual quality objectives have been established in the project area beyond the harvest size and configuration requirements of the Washington Forest Practices Act. These cleared areas are considered a "forest conversion" under the Forest Practices Act and have no established visual quality objectives. These openings, to the extent feasible, would be reforested in accordance

with typical commercial forestry management practices.

S.D.S. Co., LLC and Broughton Lumber Company own this commercial property in Skamania County, Washington. The project and the West Pit Road used for project access are not located inside the Scenic Area. In relationship to the visual quality of the area, there are views from the Scenic Area into the project area. The viewpoints and viewer types in relation to the roadway improvements within the Scenic Area have been considered in this analysis for consistency with the Scenic Area guidance and conformance. SR 14 in this area is a recognized scenic roadway. Typically, this designation means that a scenic corridor management plan would be prepared to provide policy-level guidance in the local adoption of comprehensive plan policies, zoning, and other land use regulation. There is no scenic corridor management plan for SR 14 and, therefore, no regulatory control of aesthetic impacts within the corridor. However, the scenic roadway designation carries an additional level of care and scrutiny in the review of potential aesthetic impacts based on recognition, but not regulation.

The local landscape visual appearance is of moderate visual quality with a moderate level of sensitivity. The levels of vividness (memorability), intactness (freedom from visual encroachment), and unity are average within the broader landscape. The immediate area of the project site is currently characterized by several types of visual disturbance. These include:

• BPA power transmission lines running east-west through the south and center portions of the project area
• Williams gas pipeline running through the north portion of the project area, and compressor station just to the northwest of the project site
• Two rock quarries west of the project area

• Cell towers south of the project area in the Scenic Area
• Forest openings from clear-cutting throughout and surrounding the project area
• Land clearing for agriculture especially south and east of the project area

3.9.2.3 Viewpoints

To analyze the project's effects on visual resources, viewpoints were selected to characterize the aesthetic character of the project area and the differing landscapes in or near the project. Most of the viewpoints are at publicly accessible locations which would have the largest number of viewers. Within the Columbia River Gorge National Scenic Area, Key Viewing Areas (KVAs) have been established as "those portions of important public roads, parks, or other vantage points with the scenic area from which the public views scenic area landscapes." (SCC 22.04.010). Viewpoints included KVAs from which the project could be seen, other viewpoints within the Scenic Area, and viewpoints outside the Scenic Area.

Figure 3.9-1 illustrates (with colored shading) how many of the turbines would be visible. No

turbines are visible from several of the KVAs. For example, SR 14 is a KVA; however, the section of SR 14 nearest the project area has steep hills to the north, which block views of the project area. KVAs with no turbines visible were not selected as viewpoints for visual simulations and were not further analyzed.

Individual viewpoints were chosen based on the following criteria:

• Viewpoints that are most representative of the different roads, population areas, and recreation areas where views of the wind turbines would occur
• Locations that are most accessible to the public
• Locations with the largest number of viewers (including residences)

Figure 3.9-1 shows the locations of these viewpoints and the number of turbines visible from each viewpoint. Views were not modeled from every residence from which the project would be visible; however, residences and representative businesses between one and three miles from the project site are shown on Figure 3.9-2.

Each viewpoint was assessed for its scenic quality and viewer sensitivity, and a rating was applied to provide an overall average for the area. This process established the existing conditions for each of the individual viewpoints, from which impact of the project on these parameters could be measured.

During scoping, a request was received that a visual simulation be prepared to depict views from Dog Mountain, a popular local hiking area and a Scenic Area KVA. To address this request, photo were taken from potential viewpoints located on the northeast and south side of the mountain. The photographs were used to assess views of the proposed project, and to identify potential impacts to visual resources from those locations. It was determined that views of the

3-164

project area were blocked by Cook Hill at all potential viewpoints located both on and off the trail. The project would be visible from Cook Hill; however, there is no known recreational use in this area. Because the project area is not visible from Dog Mountain, scenic quality and viewer sensitivity were not rated, and no visual simulation was prepared to further assess potential impacts to visual resources.

This section describes the existing views from representative viewpoints. The viewpoint numbering below matches the numbering used in the Application for Site Certification. Additional viewpoints, which were excluded from this EIS as duplicative, can be found in the Application for Site Certification (Appendix A). Simulated photos depicting the existing view with proposed turbines are included in Section 3.9.3.

3-165

33758687_169.cdr

Figure 3.9-1

Job No. 33758687 Locations of Simulation Viewpoints

33758687_121.cdr

Figure 3.9-2

Residences with Visible Turbines

Viewpoint 1: Pucker Huddle (Within Scenic Area)

Scenic Quality. Viewpoint 1 is taken from SR 141, which is approximately 4 miles from the project and is a small connector providing access to the Indian Heaven Wilderness in the Gifford Pinchot National Forest. This highway also allows access to several rural communities, including White Salmon, Husum, and Pucker Huddle. Most areas are unincorporated and several of the residences are recreational in nature with some year-round residences. As discussed in the review of the regional and local landscapes, no public roads pass through or are immediately adjacent to the project.

Viewpoint 1 is a wide panoramic view of Underwood Mountain from SR 141 adjacent to the Pucker Huddle area. The view encompasses the east side of the project area and the ridged lines of forest management areas are visible in the middle ground of the viewshed. Natural openings are prevalent from this viewpoint, with several natural appearing features of openings and vegetation that provide an interesting view. The BPA transmission lines bisecting the project area on the north and south ends can be seen from this viewpoint. The quality of the views from this viewpoint along SR 141 was rated as moderate, reflecting the fact that the visible landscape is relatively common in the region and has average scenic value. The ridge line along Underwood Mountain, which is in the area of the project, provides a degree of topographic interest when viewed with the other natural appearing features. The landscape visual scenic quality from this viewpoint is moderate.

Viewer Sensitivity. Traffic volumes along SR 141 are minimal and used for local traffic and recreational traffic in the summer months. Considering the distance of the project from this viewpoint (less than 5 miles), the minimal use of the highway, and the portion of the project that is visible from the viewpoint, the level of view sensitivity is considered low. This is based on the duration of the view from SR 141, the low level of residential viewers from this viewpoint, and the scenic quality rating.

Viewpoint 3: Husum

Scenic Quality. This viewpoint captures the view from SR 141 northeast of the project area. This viewpoint would be the first view of the project from travelers moving south into the project area. The viewpoint encompasses the northern portion of the project from the highway, which is the closest viewing area from that vantage point. The foreground of the viewpoint is pastoral with a middle ground view of the hillsides and a background view of Underwood Mountain and the project area. The view is natural appearing with moderate to high levels of vividness, unity, and intactness in the foreground, middle ground, and background of the photo. The quality of

the view from this viewpoint was rated moderately high because of the above-average quality and the unity of the man-made and natural features on the landscape.

Viewer Sensitivity. When considering the distance of the project from this viewpoint (greater than 5 miles), the duration of the view (roadway travelers), the portion of the project that is visible from the viewpoint, the viewer types (minimal residential/recreational), and the scenic quality rating, the level of visual sensitivity is considered moderate.

3-168

Viewpoint 4: Ausplund Road and Cook-Underwood Road (Scenic Area KVA)

Scenic Quality. This viewpoint captures the view from the Ausplund Road and Cook-Underwood Road where they meet and provide residential, agricultural, and forest management access to the area. These roads are connector and feeder roads that can be accessed from SR 14. This area is elevated from the Columbia River Gorge National Scenic Area but is within its boundaries. The area has a mix of uses including agriculture, forest management, and some recreation. The foreground from the roadway is an agricultural setting with middle and background views of forest vegetation and forest management areas. The view is natural appearing with moderate levels of vividness, unity, and intactness. The quality of the view from this viewpoint was rated moderate because of the average or typical views of this type in the project area.

Viewer Sensitivity. When considering the distance of the project from this viewpoint (0.5 to 5 miles), the viewer types (roadway travelers), the portion of the project that is visible from the viewpoint, the viewer types (residential/roadway), and the scenic quality rating, the level of visual sensitivity is considered moderate.

Viewpoint 5: Willard

Scenic Quality. This viewpoint captures the view from the small residential community of Willard. This area is accessible by a County road from SR 14 and used by residential and private forest management users. The view looks southeast into the project area and provides a panorama of the longest string of turbines. The foreground is a mixture of mixed conifer second growth stands and the middle ground is of mixed timber harvest openings and a transmission corridor. The background view is similar and the mixture of vertical and horizon lines and formations detracts from the overall vividness and unity of the view. The intactness of the views is moderated by the changes in line and form. The quality of the view from this viewpoint was rated moderately low to moderate.

Viewer Sensitivity. When considering the distance of the project from this viewpoint (0.5 to 5 miles), the duration of the view (foreground screening), the portion of the project that is visible from the viewpoint, the viewer types (minimal residential), and the scenic quality rating, the level of sensitivity is considered moderate.

Viewpoint 7: Mill A

Scenic Quality. This viewpoint captures the view from the old mill property west of the project area. This area is accessible from Willard Road and has a mixture of uses. The view looks northeast into the southern end of the A turbine string. The foreground view is obstructed by the vertical lines of transmission towers. The middle ground view is of transmission corridors and extensive timber harvest openings. Many of the residential views are partially screened from the valley floor. There is a visual discord with the man-made alterations. The vividness, unity, and intactness appear uninviting and of moderate to low visual quality. The scenic quality rating for this viewpoint is moderately low.

3-169

Viewer Sensitivity. When considering the distance of the project from this viewpoint (0.5 to 5 miles), the duration of the view (foreground screening), the portion of the project that is visible from the viewpoint, the viewer types (minimal residential), and the scenic quality rating, the level of sensitivity is considered moderate.

Viewpoint 11: I-84 Westbound (Scenic Area KVA)

Scenic Quality. This viewpoint captures the view from I-84 traveling westbound towards the project area from the east. I-84 travels along the Columbia River Gorge National Scenic Area and views along this portion of the highway are generally directed towards the river and the distant scenery. Beyond the foreground view of the highway and other corresponding structures the view is generally intact with average or above vividness, unity, and intactness. Viewers traveling along this corridor have multiple line-of-sight transitions, and this is considered to be average within those views. The scenic quality rating for this viewpoint was rated moderate.

Viewer Sensitivity. When considering the distance of the project from this viewpoint (8–10 miles), the portion of the project that is visible from the viewpoint, the viewer types (roadway), and the scenic quality rating, the level of sensitivity was rated moderate.

Viewpoint 12: Koberg Park (Within Scenic Area)

Scenic Quality. This viewpoint captures the view across the Columbia River from Koberg Park. The foreground view of the river is a complete composition indicative of the area and the middle and backgrounds have a high level of vividness, unity, and intactness. The railway line that bisects the view in the middle ground tends to blend into the scenery without distraction. This view is considered to be above average for the types of views that are throughout the Scenic Area. The scenic quality rating for this viewpoint was rated moderately high.

Viewer Sensitivity. When considering the distance of the project from this viewpoint (8–10 miles), the portion of the project that is visible from the viewpoint, the viewer types (recreational), and the scenic quality rating, the level of sensitivity was rated moderate.

Viewpoint 13: I-84 Eastbound (Scenic Area KVA)

Scenic Quality. This viewpoint captures the view from I-84 traveling eastbound towards the project area from the west. I-84 travels along the Scenic Area and views along this portion of the highway are generally directed towards the river and the distant scenery. Beyond the foreground view of transmission structures the view is generally intact with average or above-average vividness, unity, and intactness. Viewers traveling along this corridor have multiple line of sight transitions and this view is considered to be above average within the context of those multiple views. The scenic quality rating for this viewpoint was rated moderately high.

Viewer Sensitivity. When considering the distance of the project from this viewpoint (3 to 5 miles), the portion of the project that is visible from the viewpoint, the viewer types (roadway travelers with fleeting views), and the scenic quality rating, the level of sensitivity was rated as moderately low.

3-170

Viewpoint 14: Viento State Park (Within Scenic Area)

Scenic Quality. This viewpoint captures the view from Viento State Park, a popular recreation and rest area along the Columbia River. Landscape features are diverse and intact and the contrasts of the features have a high level of unity. This view is the open waters of the Columbia River in the foreground with rock features and vegetation in the middle ground and a background of mountains that provides an overall pleasing composition that is inviting to the viewer. This view is one of the less common views along the Gorge and has an above average scenic value. The scenic quality rating for this viewpoint was rated moderately high to high.

Viewer Sensitivity. When considering the distance of the project from this viewpoint (greater than 5 miles), the portion of the project that is visible from the viewpoint, the viewer types (recreational), and the scenic quality rating, the level of sensitivity was rated as moderate to high.

Viewpoint 15: Frankton Road (Within Scenic Area)

Scenic Quality. This viewpoint represents the view from the higher-elevation residential areas west of Hood River. The view looks across the Columbia River into the project area. Frankton Road is a local access road and traffic is considered low. Residences in this area have views both north and south. Many of the views are screened to the north and take advantage of the view south into Oregon. The view has residential development in the foreground, which is common along this roadway. The middle ground is vegetation, some agriculture, and some forest management. The background is the ridge along the project area. These types of views are relatively common and of average scenic value when compared to the broader area. Vividness, unity, and intactness are moderate to high levels. The scenic quality rating for these viewpoints is moderate.

Viewer Sensitivity. When considering the distance of the project from this viewpoint (greater than 5 miles), the portion of the project that is visible from the viewpoint, the viewer types (residential), and the scenic quality rating, the level of sensitivity was rated as moderate.

Viewpoint 17: Providence Hospital Hood River (Within Scenic Area)

Scenic Quality. This viewpoint represents the north view of the project from the City of Hood River. The foreground is an urban setting with a middle ground of vegetation that screens the background to some degree, providing a diverse composition of features. The view has a somewhat vivid appeal based mostly on the man-made features; however, the unity and intactness are below average and are visually discordant. This detracts from the background view. Viewers would generally be more focused on the business of the urban environment. The scenic quality of these viewpoints was rated moderately low.

Viewer Sensitivity. When considering the distance of the project from this viewpoint (more than 5 miles), the portion of the project that is visible from the viewpoint, the viewer types (urban/residential), and the scenic quality rating, the level of sensitivity was rated as low.

3-171

Viewpoint 19: Columbia River Highway (Within Scenic Area)

Scenic Quality. This viewpoint represents the view of the roadway traveler on the Columbia River Highway (Highway 30) southeast of the project area. This view has a higher scenic quality and is more representative of the high-quality views within the Columbia Gorge area. The foreground, middle ground, and background all have an above average arrangement of spaces in the landscape. The view appears intact and has a unity with the road and even the transmission line that is visible in the middle ground. The landscape provides diversity but not to the extent of clutter. This view is rated moderately high for scenic quality.

Viewer Sensitivity. When considering the distance of the project from this viewpoint (greater than 5 miles), the portion of the project that is visible from the viewpoint, the viewer types (roadway travelers/sightseers), and the scenic quality rating, the level of sensitivity was rated as moderate.

Viewpoint 23: Ausplund Road End (Within Scenic Area)

Scenic Quality. This viewpoint represents the view from local area roadways at specific intersections where local area travelers might converge. These roads are old logging roads that have been upgraded to meet the local residential use. However, they are still used for logging and would be used in the construction portion of this project. This would include upgrading and in some instances widening the roads, which can affect visual quality. This view is from the end of the Ausplund Road, which would be used to access the area for construction and maintenance. Very few viewers beyond those associated with the project would see this viewshed. Without the vehicles in the foreground, the scenic quality rating assigned to this view is moderate.

Viewer Sensitivity. When considering the distance of the project from this viewpoint (less then 1 mile), the portion of the project that is visible from the viewpoint, the viewer types (local area workers and residence), and the scenic quality rating, the level of sensitivity was rated as low to moderate.

3.9.3 IMPACTS

Visual impacts are a primary consideration for wind power projects. The alteration of the landscape by the introduction of wind turbines, and the visual impacts of wind turbines on the landscape is a complex issue, and factors other than the attributes described above play a major role in the observer's reaction or perception of the visual impacts or change.

Wind turbines are relatively large, and being available to the wind requires the turbines to be in a location that is open and highly visible. Viewers' reaction to the visual impacts of wind turbines on the landscape is a complex issue, and is influenced by the generally positive perception of wind as a renewable energy alternative. However, many supporters of renewable energy projects express a desire that the projects be placed elsewhere. This message was voiced by several people in the public scoping meetings for this Draft EIS. Studies have shown that some negative opinions change once the wind projects are constructed and in operation.

3-172

3.9.3.1 Proposed Action

The appearance of the project is determined by the project facilities that may be seen by the public during operation of the project. Project facilities include turbines, a meteorological tower, the BPA substation, the Operations and Maintenance facility (at one of two alternative locations) and roads. The substation, Operations and Maintenance facility, and project area roads would be difficult to see from outside of the project area, and would be typical of development in this rural area dominated by forest management and large-scale agriculture. The meterological tower is slender and would have no moving parts, and would not be as noticeable as a wind turbine. Consequently, the visual impact assessment focused on the potential impact of the turbines. This section describes project facilities and their visibility from outside the project area.

Comment: Speaking of moving parts—these turbines are machines. Machines make noise. How much noise does each turbine make?

The project facilities are:

• Turbines. The turbines would be the most visible project facilities. Commercial-scale turbines are similar in appearance and are composed of a tower, a nacelle, and turbine blades attached to a rotor. The tower would appear to be a steel pole, tapered from base to hub, with a base diameter of approximately 14 feet. At the top of and perpendicular to the tower, the nacelle would appear to be an elongated metal boxlike structure. Three aerodynamically shaped blades connected to a nose cone attach to the front of the nacelle. Depending on the turbine model chosen, each turbine would be up to approximately 426 feet tall (262-foot hub height and 164-foot radius blades, measured from the ground to the turbine blade tip), and would be mounted on a concrete foundation. Wind turbines would be grouped in "strings," with each turbine spaced approximately 350 to 800 feet from the next (or approximately 1.5 to 2.5 times the diameter of the turbine rotor). Typically, wind turbines are painted white to comply with FAA daytime

lighting requirements. A gravel buffer and crane pad will be maintained at each turbine site, and will not be visible from outside the project area. The tall turbines will introduce vertical lines into the viewshed. Blades will be visible when stationary and moving at low speeds, but will not be visible when moving more quickly. The visibility of the turbines would be affected by the angle of the sun and climate conditions. At low sun angles (morning and evening) sunlight will reflect off a greater surface of the turbine and result in greater visibility. Conversely, when the sun is directly overhead, a relatively small surface of the turbine will reflect. On cloudy days, visibility of the light-colored turbines will be less since the turbines will blend with the background. Available data indicates that on average, there are 145 sunny days per year in Skamania County, Washington, that is, 39.7 percent of days are sunny.19 Therefore, the majority of the time some clouds are present. The turbines will therefore blend with the background the majority of the year.

Comment: This statement "turbines will therefore blend with the background" is an opinion and is not factual. Those of us who live in the NSA and surrounding areas certainly would notice, as I can state from personal experience, 400 foot spinning turbines in the landscape! These suckers are BIG and they do impinge on one's visual area of interest.

• Electrical System. The electrical system would primarily be underground, and would connect the turbines to the BPA substation. The substation would occupy a portion of a
19 http://www.bestplaces.net/County/Skamania-Washington.aspx#.

3-173

fenced 5-acre area at the southwest end of the project site, immediately adjacent to the

BPA 230-kV transmission line. A 50-foot cleared area would be maintained around

substation. The substation would difficult to see from outside the project site.

• Operations and Maintenance Facility. The Operations and Maintenance facility would be a 3,000 square foot metal building approximately 16 feet tall, with a gravel parking lot and surrounding fence and gated entrance. The facility would be built at one of two alternative locations, either on the project site or to the west of the site on West Pit Road. In either location the visual impact of the facility would be minimal, and similar to small utility or agricultural facilities in the area.
• Roads. The project will require 7.9 miles of new permanent gravel roads, and 2.4 miles of improved existing roads. New permanent and improved roads will be visually similar to existing secondary and gravel roads in the project area and most would be difficult to see from outside of the project area.
• Meteorological Tower. The project would include one meteorological tower, approximately 221 to 262 feet tall. The tower height would be the same as the hub height for the selected wind turbine. Because meteorological towers are slender and do not have large components like turbine blades, the meteorological tower would be difficult to see from outside the project area.

The primary visual concern is the potential impacts of the proposed installation of up to 50 wind turbines on existing views and the overall aesthetic character of the project area. The specific turbine type and manufacturer have not been selected; however, it is likely that the turbines would be in the 1.2- to 2.5-MW range, and would measure approximately 426 feet in height (262-foot hub height and 164-foot radius blades). Each turbine would have three rotor blades made of laminated fiberglass. The diameter of the circle swept by each blade would be from 264 to 320 feet, depending on which turbine was selected. Turbine "strings" would include rows of from three to 21 turbines placed at approximately 350 to 500 foot intervals.

For many viewers, the location of the project would minimize visual impacts. Location effects include the limiting effect of topography, tree cover, the relatively long distance to surrounding residences, and the orientation of the project vis-à-vis viewers. Figure 3.9-2 shows the number of turbines visible from residences and a selection of local businesses. The figure does not attempt to show all businesses in the project area; the businesses added are for general reference. The figure shows that the project will not be visible from many of the residences to the southeast of the project, and will be most visible to residences to the west, in and around Mill A. This figure may overstate the visibility of the project somewhat, for two reasons:

• Turbines are judged to be visible if any part of the turbine blades would be visible. In practice, if only the tip of a blade is visible then viewers will not see it when it is not vertical or when the blade is moving.
• The visual simulation is based on topography alone, and does not take into account the masking effect of trees.
3-174

However, public input and comments during EIS scoping indicated that for some viewers, the presence of the wind turbines represents a negative impact because it alters the appearance of the rural landscape over a large area. The flashing of aviation warning lights on the tops of turbines at night would similarly be considered a negative impact.

The visual impact assessment was based on evaluating the changes to the existing visual resources that would result from construction and operation of the project. These changes were assessed, in part, by evaluating the "after" views provided by the computer-generated visual simulations and comparing them to the existing visual environment. Consideration was given to the following factors in determining the extent and implications of the visual changes:

• Changes in the affected visual environment's composition, character, and valued qualities
• The affected visual environment's context, including distance
• The extent to which the affected environment contains places or features that have been designated in plans and policies for protection or special consideration
• The number of viewers, their activities, and the extent to which these activities relate to the aesthetic qualities affected by the changes
• The distance factor was considered in the sensitivity rating for establishment of baseline and therefore becomes a factor in the impact assessment

Levels of impact were classified as high, moderate, and low:

• High. High levels of impact were assigned when turbines would be highly visible in areas with a high number of sensitive viewers, and would greatly alter levels of vividness, unity, and intactness, decreasing the level of visual quality. This is the largest number of viewers from that key viewpoint. The assessment accounts for the number of viewers and would add that into the discussion.
• Moderate. Moderate levels of impacts were assigned in situations when turbines would be visible in areas with moderate levels of visual sensitivity and viewers, where the presence of the turbines would moderately alter levels of landscape vividness, unity, and intactness.
• Low. Low levels of visual impact were found in situations when the project would have relatively small effects on overall landscape level attributes, where existing levels of landscape aesthetic quality are low, or where there are low levels of visual sensitivity and a low number of viewers.

Construction

During construction, large earth-moving equipment, trucks, cranes, and other heavy equipment would be visible from some nearby areas. At times, small, localized clouds of dust created by road building and other grading activities may be visible at the site. Because of construction

3-175

related grading activities, areas of exposed soil and fresh gravel that contrast with the colors of the surrounding undisturbed landscape would be visible.

In close-up views the changes associated with the construction activities would be highly visible and would have a moderate to high visual impact. Close-up views would include those seen by travelers on the segment of the local roads that pass around the project site and those seen from the closest residences. From more distant locations, the visual effects of construction would be relatively minor and would have little or no impact on the quality of views.

Construction impacts would be short-term, lasting no more than the one-year construction period.

Operation

During project operation, the turbines would be visible from some viewpoints. The potential level of visual impacts from key and representative project viewpoints is summarized in Table 3.9-2 and shown on Figures 3.9-3 through 3.9-15. Additional viewpoints are analyzed in Section 4.2-3 of the Application for Site Certification (Appendix A). A more detailed description for each viewpoint follows the summary table and figures. The visual impact analysis showed that the project has the potential to create low to moderate levels of visual impact at key viewpoints.

3-176

Table 3.9-2

Summary of Existing Scenic Quality Assessment and Project Visual Impacts

Viewpoint
Within or
Outside
of Scenic
Areaa
Distance from
Nearest
Turbine
(miles)
Existing Scenic Quality
Anticipated
Level of
Visual impact Visual Quality
Viewer
Sensitivity
Viewpoint 1: State Highway
141/Pucker Huddle (Figure 3.9-3) SA 3.99 Low Moderate Low to
Moderate
Viewpoint 3: Husum, Highway 141
north (Figure 3.9-4) --4.76 Moderate to
Moderately High Moderate Moderate
Viewpoint 4: Ausplund Road, Cook-
Underwood Road (Figure 3.9-5) KVA 1.23 Moderate Moderate Moderate
Viewpoint 5: Willard (Figure 3.9-6) --1.35 Moderately Low
to Moderate Moderate Moderate
Viewpoint 7: Mill A (Figure 3.9-7) --1.62 Moderately Low Moderate Low to
Moderate
Viewpoint 11: I-84 Westbound (Figure
3.9-8) KVA 8.39 Moderate Moderate Moderate to
Low
Viewpoint 12: Koberg Park (Figure 3.99)
SA 6.60 Moderately High Moderate Moderate
Viewpoint 13: I-84 Eastbound (Figure
3.9-10) KVA 3.43 Moderately High Moderately
Low
Moderate to
Low
Viewpoint 14: Viento State Park
(Figure 3.9-11) SA 3.99 Moderately High
to High
Moderate to
High
Moderate to
High

Viewpoint 15: Frankton Road (Figure
3.9-12) SA 4.51 Moderate Moderate Moderate
Viewpoint 17: Providence Hospital
(Figure 3.9-13) SA 5.07 Moderately Low Low Low
Viewpoint 19: Columbia River Highway
(Figure 3.9-14) SA 6.46 Moderately High Moderate Low
Viewpoint 23: Ausplund Road End
(Figure 3.9-15) SA 0.64 Moderate Moderate Moderate

a. -- += not in Scenic Area; SA = within Scenic Area; KVA = Key Viewing Area within Scenic Area

3-177

33758687_126.cdr

Source: GeoDataScape.

Figure 3.9-3

Viewpoint 1 - Pucker Huddle

33758687_127.cdr

Source: GeoDataScape.

Figure 3.9-4

Viewpoint 3 - Husum

33758687_128.cdr

Source: GeoDataScape.

Figure 3.9-5

Viewpoint 4 - Ausplund Road and Cook-Underwood Road

33758687_129.cdr

Source: GeoDataScape.

Figure 3.9-6

Viewpoint 5 - Willard

33758687_130.cdr

Source: GeoDataScape.

Figure 3.9-7

Viewpoint 7 - Mill A

33758687_131.cdr

Source: GeoDataScape.

Figure 3.9-8

Viewpoint 11 - I-84 Westbound

33758687_132.cdr

Source: GeoDataScape. Figure 3.9-9

Viewpoint 12 - Koberg Beach State Park

33758687_133.cdr

Source: GeoDataScape. Figure 3.9-10

Viewpoint 13 - I-84 Eastbound

33758687_134.cdr

Source: GeoDataScape. Figure 3.9-11

Viewpoint 14 - Viento State Park

33758687_135.cdr

Source: GeoDataScape. Figure 3.9-12

Viewpoint 15 - Frankton Road

33758687_136.cdr

Source: GeoDataScape. Figure 3.9-13

Viewpoint 17 - Providence Hospital

33758687_137.cdr

Source: GeoDataScape. Figure 3.9-14

Viewpoint 19 - Columbia River Highway

33758687_138.cdr

Source: GeoDataScape. Figure 3.9-15

Viewpoint 23 - Ausplund Road End

Viewpoint 1: Pucker Huddle (Figure 3.9-3)

From Viewpoint 1, approximately 25 turbines would be visible on the ridge tops at distances of approximately 4 miles to the nearest turbines. At the distance depicted in the photo, the visual clutter of more turbines has more impact than the considerable scale of the larger turbines. The composition would be silhouetted against the sky, increasing their visual impact. However, the distance and the line of sight from the residential areas would minimize the contrast. The presence of the turbines would reduce the scene's degree of intactness by introducing a large number of highly visible engineered vertical elements.

The potential visual impact from Viewpoint 1 would range from low to moderate.

Viewpoint 3: Husum (Figure 3.9-4)

From Viewpoint 3, approximately 27 turbines would be visible on the ridge tips at a distance of approximately 4.75 miles to the nearest turbines. Figure 3.9-4 illustrates the simulated views from SR 141 traveling south into the project area. Travelers moving along this highway are generally using the road to access recreation areas or for leisurely drives. Residential viewers would be screened to some degree from the view based on vegetation, landscaping, and the line of sight from the valley floor. Introduction of these vertical structures in the background of this view would decrease the intactness of the landscape, based on the numbers of turbines that would be visible. The composition of the view would be altered with the introduction of these engineered structures and would be apparent on the horizon to the travelers and residence in the area.

Due to the low levels of viewers, duration of the views, and viewer awareness, the visual impact from Viewpoint 3 is considered moderate.

Viewpoint 4: Ausplund Road and Cook-Underwood Road (Figure 3.9-5)

From Viewpoint 4, approximately 14 turbines would be visible looking northwest from the roadway, at a distance of approximately 1.23 miles to the nearest turbines. Figure 3.9-5 illustrates the simulated view from the roadway at the intersections of Ausplund and Cook-

Underwood Roads. Because of the position of this viewpoint (direct line of sight) and its distance from the turbines, the turbines apparent scale would be visible and apparent. The presence of the turbines would likely have a moderate effect on the vividness of the existing view and a moderate impact on the overall sense of unity and intactness by the roadway and residential viewers.

The potential visual impact from Viewpoint 4 would be moderate.

Viewpoint 5: Willard (Figure 3.9-6)

From Viewpoint 5, approximately 24 turbines in turbine strings A and B would be visible from screened views from residences in the area of Willard. Figure 3.9-6 shows the simulated view from Viewpoint 5 in the northern portion of the project looking southeast. These turbines would be located in the ridge tops, with the nearest turbines approximately 1.35 miles away. Because the turbines would be seen against the sky at medium range and screened in many residential views, they would still be visible in the background. This would reduce the visual unity and

3-191

intactness minimally when compared to the existing components in the landscape. The wind turbines would be arrayed uniformly along the ridgeline and would create a moderate change in the setting's existing low to moderate visual quality.

The potential visual impact from Viewpoint 5 would be moderate.

Viewpoint 7: Mill A (Figure 3.9-7)

From Viewpoint 7, approximately 35 turbines in strings A and B would be visible in the foreground, middle ground, and background of this view. The nearest turbines would be located approximately 1.62 miles away. Figure 3.9-7 shows the simulated view. The turbines would be seen against the sky. The presence of the long line of turbines may create a slight increase in the vividness of this view. The unity of the view would be decreased further by the long turbine line and the intactness of the view would be moderately compromised compared to the existing view.

The potential visual impact from Viewpoint 7 is considered to be low to moderate.

Viewpoint 11: I-84 Westbound (Figure 3.9-8)

From Viewpoint 11, approximately 19 turbines would be visible in the distance background to roadway travelers looking west into the project area from I-84. The nearest turbines would be

8.39 miles away. Figure 3.9-8 shows the simulated view. Although the turbines would be visible to travelers on the far horizon, their presence is not expected to decrease the existing quality of this view, because of their relatively small size at this viewing distance. The visible turbines would have a minimal effect on this view's vividness, unity, and intactness.
The potential visual impact from Viewpoint 11 was rated as moderate to low.

Viewpoint 12: Koberg Park (Figure 3.9-9)

From Viewpoint 12, approximately 17 turbines would be visible in the distant background to recreational users of the park and river. The nearest turbines would be approximately 6.60 miles away. The view looks west into the project area. Figure 3.9-9 shows the simulated view. Although the turbines would be visible to the viewers on the far horizon it is not expected to decrease the existing quality of this view to a great degree, because of their relatively small size at this viewing distance. The visible turbines would have a minimal effect on this view's vividness, unity, and intactness.

The potential visual impact from Viewpoint 12 was considered to be moderate.

Viewpoint 13: I-84 Eastbound (Figure 3.9-10)

From Viewpoint 13, approximately eight turbines would be visible in the background to travelers on the roadway looking west into the project area from I-84. The nearest turbines would be approximately 3.43 miles away. Figure 3.9-10 shows the simulated view. This view for travelers would be of short duration. Although the turbines would be visible to travelers on the horizon it is not expected to decrease the existing quality of this view because of the number of turbines visible and the partial screening from the middle ground ridgeline. The visible turbines would have a minimal effect on this view's vividness, unity, and intactness for these reasons.

3-192

The potential visual impact from Viewpoint 13 was rated as moderate to low.

Viewpoint 14: Viento State Park (Figure 3.9-11)

From Viewpoint 14, approximately 20 turbines in the background would be visible to the recreational users of the area. The nearest turbines would be just under four miles away. Figure 3.9-11 shows the simulated view. Although the water-related recreational activities would have the line of sight more related to the water and river banks, the recreational users moving through this area would be affected by this contrast in the view. The vividness of the scenic quality may be positively or negatively affected, depending on the user perception of turbines in the background. The unity and intactness of the existing view would be moderately compromised and the visible turbines would have a moderate effect on the view's scenic quality compared to existing conditions, due to the distance from the park and activities in the foreground and middle ground.

The potential visual impact for Viewpoint 14 was considered to be moderate.

Viewpoint 15: Frankton Road (Figure 3.9-12)

From Viewpoint 15, approximately 10 turbines can be seen, with the nearest turbines approximately 4.51 miles away. Figure 3.9-12 shows the simulated view. At this distance, the

contrast would have a minor effect on the overall visual impact. Consequently, because the prominence of the turbines in the view would be low, the turbines would have a minor effect on the vividness, unity, and intactness from this viewpoint.

The potential visual impact from this viewpoint would be moderate.

Viewpoint 17: Province Hospital Hood River (Figure 3.9-13)

From Viewpoint 17, only two turbines can be seen, and they are diminished by the distance (just over five miles). Figure 3.9-13 shows the simulated view. At this distance, viewers would have to scan the horizon to find the turbines. Consequently, minor effect or negligible effects to the scenic quality is expected.

The potential visual impact from this viewpoint would be low.

Viewpoint 19: Columbia River Highway (Figure 3.9-14)

From Viewpoint 19, approximately nine turbines are visible in the distant background. The nearest turbines would be approximately 6.46 miles away. Figure 3.9-14 shows the simulated view. Although the turbines would be visible in the background the viewer would have to have a focused orientation to see them in the landscape. The amount of turbines and the limited prominence based on the distance is expected to have a minimal effect on the scenic quality from this viewpoint.

The potential visual impact from this viewpoint would be low.

Viewpoint 23: Ausplund Road End (Figure 3.9-15)

From Viewpoint 23, approximately eight turbines can be seen. The nearest turbine would be approximately 0.64 mile away. Figure 3.9-15 shows the simulated view. This area would be

3-193

within one mile of the project and the turbines would be highly visible at the end of this road. However, very minimal use of these roads beyond workers associated with forest management reduces the viewer types. Regardless, the impacts of the turbines on the landscape would affect the scenic quality of the view.

The potential visual impact from this viewpoint would be moderate.

Viewpoint 24: Dog Mountain

Because the project area cannot be seen from the Dog Mountain trail (either during the day or at night), no simulated view was prepared. There would be no impact.

Night Lighting

The project would be required to comply with the Federal Aviation Administration aircraft safety lighting requirements for structures greater than 200 feet tall, which includes turbines and meteorological towers. The exact number of turbines that would require lighting would be specified by the Federal Aviation Administration after final project plan review; however, current guidance requires that warning lights be mounted on the first and last turbines of each string, and from those end turbines, lights should then be positioned such that the next lit turbine is no more than 1/2 mile, or 2640 feet, from the last lit turbine. The lights would be synchronized to flash together to illuminate the full extent of the wind project area (Patterson 2005). These lights would be visible as small blinking points of red light; they would not light up the sky or the surrounding landscape. Aside from any required aircraft warning lights, the turbines would not be illuminated at night. There will be one meteorological tower located within the project site area. Its location will be selected during the micro-siting process. Depending on its proximity to turbine towers, it may or may not require aircraft safety lighting.

The Draft EIS for the Nine Canyon Wind Project contains a generic illustration of night lights and can be found online at
http://www.efsec.wa.gov/wildhorse/deis/figures/40%20Fig%203.109%20and%2010.pdf.

Columbia River Gorge National Scenic Area

During scoping, some commenters expressed concern that project operation would impact the Scenic Area adversely since turbines would be visible from some Key Viewing Areas inside the Scenic Area. Analysis of KVAs and viewpoints within the Scenic Area were sought and analyzed. The presence of the project would cause low to moderate visual impact to viewpoints within the Scenic Area,

Congress has determined that the National Scenic Act is not to be used to regulate activities outside of the Scenic Area boundary. The Act states that "no protective perimeters or buffer zones shall be established around the scenic area or each special management area. Activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management areas" (16 USC § 544O(a)(10). This federal policy and Congressional mandate discourage projecting National Scenic Act policies, regulations and directives beyond the boundary of the Scenic Area.

Comment: "Discourages" does not mean that people and agencies can't speak up when they don't want turbines littering the rural landscape. The NSA is a national treasure. It is also an economic boon to this area. Tourism contributes millions of dollars to the coffers of the counties located in the NSA. SDS Lumber's wind farm will employ 5 people when all is said and done, and maybe contribute a miniscule amount of money to Skamania County's $50,000,000 yearly budget. The visual scenery that thousands of people come to enjoy, and those of us who live here enjoy it all the time, would be destroyed by horizon-topping wind turbines. This is too high a price to pay. Wind farms don't belong in forests and they don't belong on the boundaries of the NSA.

3-194

Mitigation

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant will provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan will address site restoration that would occur at the conclusion of the project's operating life (estimated to be 30 years), and restoration in the event the project is suspended or terminated during construction or before it has completed its useful operating life. The plan will include or parallel a decommissioning plan for the project. Visual and aesthetic impact from decommissioning would be similar to those expected during the construction phase.

The initial site restoration plan will be prepared in sufficient detail to identify, evaluate, and resolve all major visual resource issues presently anticipated. If impacts to visual resources are anticipated to occur as a result of site restoration and project decommissioning, mitigation measures will be proposed as part of the plan.

3.9.3.2 No Action Alternative

Under the No Action Alternative, turbines would not be built. Existing visual conditions would continue unchanged, and would be influenced primarily by ongoing timber harvest until and unless a different applicant proposed to develop the wind energy potential of the area. In the event the failure to construct this project results in continuation and expansion of fossil fuel energy generation sources, it is foreseeable that air quality, including haze conditions, would continue to be a negative impact to the air quality and scenic resources of the of the Columbia River Gorge National Scenic Area.

3.9.4 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential visual resource impacts during construction and operation of the propose project to the extent feasible.

Comment: These are not "potential" visual impacts! These are real impacts and they would be very annoying and intrusive in our rural environment.

• Ensure that a non-reflective flat neutral gray or light color is the choice of color for the turbines so that visual impacts would be minimized. The primary mitigation measure available for visual impacts is the choice of color for the turbines. Although a brown turbine color would reduce visual contrast in views where the turbines are seen against the landscape, it would also accentuate the visibility of the turbines where they would be seen against the sky. In addition, the brown color would have a greater contrast when snow is on the ground. Because the turbines are most frequently seen against the sky, particularly in close-range views where visual concerns are the greatest, a non-reflective

flat neutral gray or light color would be ideal.
• Comply with Federal Aviation Administration requirements for safety lighting. Lights typically used to meet Federal Aviation Administration requirements would to some extent be shielded from ground level view due to a constrained (3–5 degree) vertical beam. The Federal Aviation Administration will independently review the lighting of individual turbines during the micrositing process and consult on mitigation. However, the project must comply with the safety lighting requirement.

3-195

3.9.5 UNAVOIDABLE ADVERSE IMPACTS

The project would cause some visual impact to surrounding areas where turbines were visible, including some areas inside the Columbia River Gorge National Scenic Area. However, the visual impact analysis showed that the anticipated level of visual impact would not be higher than low to moderate at any of the viewpoints examined.

3.9.6 REFERENCES

Buhyoff, G.J., P.A. Miller, J.W. Roach, D. Zhou, and L.G. Fuller. 1994. An AI Methodology for Landscape Visual Assessments. AI Applications 8, no. 1: 1-13.

European Wind Energy Association (EWEA). 2003. Focus On Public Opinion: A Summary of Opinion Surveys on Wind Power. Accessed at:

http://www.ewea.org/fileadmin/ewea_documents/documents/publications/WD/WD22vi_public.pdf.

Federal Highway Administration (FHWA). 1988. Visual Impact Assessment for Highway Projects.

Patterson, James W. 2005. Development of Obstruction Lighting Standards for Wind Turbine Farms. FAA Technical Note DOT/FAA/AR-TN05/50. November.

US Forest Service (USFS). 1995. Landscape Aesthetics, A Handbook for Scenery Management.

3.10 HISTORICAL AND CULTURAL RESOURCES

This section describes existing historical and cultural resources in the project vicinity and identifies potential impacts to these resources from construction and operation of the proposed project. Cultural resources include buildings, sites, structures, and objects, each of which may have historical, architectural, archaeological, cultural, or scientific importance. Artifacts, records, and material remains associated with these properties, and traditional cultural properties, which can include archaeological, traditional procurement, and religious sites and landscapes, are types of cultural resources.

The primary source of information for this section is the Cultural Resources Inventory Report

prepared in support of the Application for Site Certification by URS (2009), as supplemented by fieldwork done by URS in December 2009 (URS 2010). The Cultural Resources Inventory Report was designed to identify, evaluate, and record pre-contact and historic cultural resources in accordance with Chapter 36 CFR §800 of the National Historic Preservation Act (NHPA). The survey objectives include identifying archaeological resources and historic properties that might be considered eligible for the National Register of Historic Places (NRHP) located within the direct area of potential effects (APE) for the proposed project.

3-196

3.10.1 REGULATORY SETTING

3.10.1.1 Laws and Regulations

Several federal and state laws protect cultural resources, including NEPA and SEPA, which require that impacts of federal and state actions on cultural resources be identified and assessed in environmental documents, as well as the NHPA, which establishes a national policy of historical preservation and requires that the effects of Federal actions (such as BPA's interconnection with the project) on significant cultural resources be determined. Collectively, these regulations and guidelines establish a comprehensive program for the identification, evaluation, and treatment of cultural resources.

To be eligible for the NRHP, properties must be 50 years old (unless they have special significance) and have national, state, or local significance in American history, architecture, archaeology, engineering, or culture. They also must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet at least one of four criteria:

- Criterion A: be associated with important historical events or trends
- Criterion B: be associated with important people
- Criterion C: have important characteristics of style, type, or have artistic value
- Criterion D: have yielded or have potential to yield important information

If a resource is determined eligible for the NRHP, then Section 106 of the NHPA (80 Stat. 915; 16 USC 470) and its implementing regulations (36 CFR 800) require that effects of the proposed project to that resource be assessed. If a property eligible for the NRHP would be adversely affected by the proposed action, the action agency must evaluate alternatives or modifications to the proposed action that would avoid, minimize or mitigate adverse effects.

3.10.1.2 Area of Potential Effect

The NHPA requires that the APE for the project area be determined. The APE for direct effects to cultural resources is considered to be the footprint for potential ground-disturbing activities that are anticipated to occur during construction and long-term maintenance of the project. For the Project, ground disturbance could take place in the turbine string corridors, road corridors inside the project site, the West Pit Road outside the project area, overhead and underground transmission corridors inside the project site, the Operation and Maintenance facility (two alternative sites), and the substation and lay-down areas. These activities have a total footprint

of approximately 384 acres (Figure 3.10-1) and constitute the APE for direct effects to cultural resources. The indirect APE is the area outside of the project boundary where the project may have, for instance, a visual impact on significant cultural resources. On February 1, 2010, the Washington Department of Archeological and Historic Preservation (DAHP) sent a letter to EFSEC concurring with the definition of the APE. See Appendix E.

3-197

33758687_170.cdr

Figure 3.10-1
Job No. 33758687 Area of Potential Effects

3.10.2 AFFECTED ENVIRONMENT
3.10.2.1 Cultural Context
Pre-Contact Background

The archaeological record of the Columbia Plateau documents the prehistory of a region that is distinguished by local adaptations to a unique set of resources and its inland maritime environment (Chatters and Pokotylo 1998). Archaeological research near the site has focused principally within the Columbia River corridor, and models for the Portland Basin of the Northwest Coast culture area (Pettigrew 1981), the Columbia Plateau culture area (e.g., Galm et al. 1981), and the White Salmon and Klickitat rivers specifically (Masten and Galm 1989) can be applied. An overview of archaeological research within the Columbia River Gorge has been summarized by Beckham et al. (1988). Recently, Griffin and Churchill (2001) synthesized the multiple cultural chronologies that have been posited for the region; the following discussion is based on their synthesis.

The Early period dates from 11,000 to 4,500 years BP, though recent studies at Paisley Caves in Oregon suggest an even earlier date of regional occupation at least by about 14,300 BP (Jenkins 2009). A mobile lifestyle focused on intensive riverine resources with periodic use of uplands is inferred. Subsistence shifted from reliance on large game to an increase in the importance of fish, root, and vegetable resources by the end of the period. Permanent structures are not found in association with the earliest sites, but semi-subterranean house settlements appeared along major rivers at the latter stage, reflecting an increase in sedentism. Sites dating to this period have mostly been found around The Dalles at the eastern end of the Columbia River Gorge (Griffin and Churchill 2001).

The Middle period occurred from approximately 4,500 BP to 250 years BP and is characterized by increased occurrences of semi-subterranean houses and the appearance of food storage facilities, indicative of further sedentism and decreased mobility. Concurrently, there was intensification of use of fish, roots, and vegetable resources during the first half of the period, with hunting of secondary importance. The pattern of winter sedentism was apparently established during this period. There are more archaeological sites, including villages, fishing camps, and hunting camps that date to this period and that are found in the area between the Cascade Mountain Range and the town of Lyle, as well as The Dalles area (Griffin and Churchill

2001).

The Late period, dating from 250 to 100 years BP, is defined by the appearance of the horse on the Columbia River Plateau (circa 1730s), which increased the mobility and resource acquisition patterns of local groups. The period is also marked by the introduction of trade goods and the devastating effects of introduced diseases on the local populations, as well as the arrival of Euro-Americans. There is an increase in the quantity and distribution of sites dating to this period, with most being located along the confluences of major rivers and the Columbia River, though several sites are found on sandy terraces as well as within the islands. A large number of historic villages were noted by Lewis and Clark between Beacon Rock and The Dalles during their 1805–1806 travels (Griffin and Churchill 2001).

3-199

Along the lower White Salmon River, Middle and Late period projectile point styles are common. Recorded site types in this area include housepit villages, temporary camps, petroglyph sites, and cemetery sites (Griffin and Churchill 2001).

Ethnographic and Ethnohistoric Background

The proposed project site is located near the boundary between two ethnographic culture areas of the Pacific Northwest, the Northwest Coast, and the Columbia Plateau. Local groups living in the Columbia River Gorge at the time of historic contact are known from the languages they spoke as the Upper Chinookans and the Echeesh-Keens (Sahaptins)20 (Beckham et al. 1988; Griffin and Churchill 2001). In the general area of the project, the Columbia River Gorge was used by the Eastern Chinookan-speaking Wishram, White Salmon, and Cascades people, as well as the Echeesh-Keen-speaking Yakama and Klickitat (Griffin and Churchill 2001).

The Upper Chinookans occupied the Gorge from the vicinity of the mouths of the Sandy and Washougal rivers east to the Deschutes River. Various Echeesh-Keen speaking groups lived to the east, including the Tenino, Klickitat, Yakama, and Umatilla. The Yakama primarily occupied territory north of the Tenino, while the Klickitat occupied inland regions to the northwest, extending to the Columbia River in the vicinity of the Klickitat River, along with Wishram peoples (Beckham et al. 1988, French and French 1998). Of these groups, the project area falls within territory that would have probably been used most intensively by the White Salmon, who comprised several small bands residing primarily in an area extending from about ten miles below The Dalles to the White Salmon River area, especially at the mouth of this river, although they lived away from the river as well (Ruby and Brown 1992).

During the nineteenth century, White Salmon usage most notably overlapped with the Klickitat, the Echeesh-Keen-speaking group primarily occupying the upper drainages of the Klickitat and White Salmon rivers. Several villages were found at the mouth of the White Salmon River, including at least one that was shared with the Klickitat (French and French 1998, Ruby and Brown 1992, Spier and Sapir 1930). White Salmon winter villages were found upriver along the White Salmon near the contemporary communities of Husum and BZ Corner, and along Rattlesnake Creek to the north (Griffin and Churchill 2001). Use of Namnit (45SA22), an

important ethnohistoric period fishing village at the mouth of the White Salmon River, continues into the present.

Less information appears to be available in the historic record regarding traditional use of the Little White Salmon River west of the White Salmon River. Another important village site was situated at the mouth of the Little White Salmon River: Skatxlmmax, or 'eating place,' and sqtdalpt, or 'it keeps tearing out', both refer to the village located at modern-day Cook along the Columbia River (French and French 1998). Salmon came to spawn here, and in winter whitefish could be taken from the spawning pools (Nielsen 1959). A trail from Drano Lake traversed the east side of the river into the upper valley. Two main huckleberry fields, including Big

20 Griffin and Churchill (2001) note that the Yakama Nation prefers the use of "Echeesh-Keen" over the term
"Sahaptin."

3-200

Huckleberry Mountain on the south side of the lava beds and Little Huckleberry Mountain towards the headwaters of the Little White Salmon River, were frequented. Bark was peeled from many cedar trees along this trail for use in basket making. The racetrack near Red Mountain was the location of a big annual social event held in conjunction with the berry picking and drying (Nielsen 1959).

The Upper Chinookan and Echeesh-Keen peoples followed a similar seasonal pattern of subsistence activities, except that the former relied more heavily on fish than the latter (Griffin and Churchill 2001). In winter, limited hunting and fishing took place but subsistence was based on stored foods. With the arrival of the spring Chinook salmon, people would gather roots in the nearby hillsides. After the snow packs melted away, movement into the uplands occurred since fishing sites were usually inundated. Dried roots would then be hauled to the winter villages for storage in semi-subterranean cellars. Important spring gathering areas included Camas and Panakanic prairies, Deadhorse Meadow, and the Snowden area. Following the spring root gathering, people returned to the fishing areas along the major rivers to fish for blueback and Chinook salmon, and women would gather golden currant, gooseberry, dogwood, service berry, and choke cherry from the river and nearby uplands. A type of tobacco was planted and harvested by Chinookans (French and French 1998). In late summer and early fall, huckleberries were picked in the uplands near Mt. Adams, and hunting for deer and elk occurred. Toward late fall, the winter villages would be reoccupied. The White Salmon River was a focal area for tule salmon harvested in the fall that attracted many families to the region (Griffin and Churchill 2001, Norton et al. 1983, Schuster 1998, Winthrop and Meninick 1996). The fishing village at the mouth of the White Salmon River also functioned as a minor trading center (Griffin 2001).

In sum, the ethnographic and ethnohistoric context indicates that the project area is situated along a high-elevation ridgeline about two to three miles from two ethnographic riverine village sites, and within approximately one mile of the Little Salmon River valley, which would have formed a natural travel corridor providing access from the Columbia River to upland regions to the north, such as the popular berry picking grounds in the Mount Adams country. No specific

reference to the promontories that are in or near the project area, now known as Chemawa Hill or Underwood Mountain, were encountered in the reviewed literature, but proximity to known village sites suggests these high places and the adjacent ridgelines composing the project area could have been visited occasionally for non-residential, transient uses such as for spiritual activities, burials, or resource acquisition activities related to hunting, cedar peeling, plant gathering, and berry picking.

Historic Background

The first white pioneers to settle the section of the Columbia River between the Cascades and the confluence of the Snake River were reportedly the Joslyn family, who arrived at the White Salmon flats in 1852 and attempted to purchase their lands from the local Klickitats, in addition to filing a Donation Land Claim (McCoy 1987). Increased settlement by whites led to the creation of reservations throughout the region during the 1850s. Fourteen tribes and bands were signatories to the Yakama Treaty of June 9, 1855, when the Yakama ceded around 11 million acres to the US Government, while retaining rights for hunting, fishing, and gathering at traditional locations, and agreed to the establishment of the 1.3 million-acre Yakima Reservation.

3-201

The White Salmon Reservation was temporarily established at the mouth of the White Salmon River at the Joslyn claim in 1856 for around 800 Native peoples who were not active in the Yakima War of 1855–1856, during which time a coalition of interior tribes led by Kamiakin fought against the US Army and local settlers. At the end of the war two years later, the White Salmon Reservation was closed and residents were removed to the Yakama Reservation. Some avoided relocation and claimed lands their families had traditionally used, including around Northwestern Lake and along the area's minor drainages such as Buck Creek. Although a few took up farming, most continued to practice traditional subsistence activities at traditional places such as the Underwood In Lieu Site (Griffin and Churchill 2001).

The Underwood town site, located about six miles southeast of the project area and along the Columbia River, was among the earliest of the pioneer settlements in this portion of the Columbia River Gorge. Amos Underwood was a contemporary of the Joslyns who arrived in the region in 1852 and married Chief Chenowith's daughter, Ellen. In 1861, Amos and Ellen Underwood built a log house at the site of the present town bearing their name, as well as a dock and pier to accommodate sternwheelers. Amos' brother Edward Underwood also settled here and his house reportedly served as an Indian gathering place, especially in the fall during the salmon runs on the White Salmon River (Thun 1959). The Underwood brothers platted a town site in 1904, in anticipation of growth related to the construction of the Spokane, Portland, & Seattle Railway beginning the following year (McCoy 2003).

The upper drainage of the Little White Salmon River Valley, including the location of the proposed alternate site for the Operations and Maintenance facility along Willard Road, was not homesteaded until the 1880s and 1890s, when the more desirable lower-elevation lands had already been taken (Thun 1959). There were a reported 35 homesteads from Cooks to the present day Oklahoma park at the head of the river (Nielsen 1959). A review of late-nineteenth

century General Land Office maps (BLM 2009a) dated 1876 does not depict any settlement or other features of historic interest in or near the project area.

The history of the White Salmon and Little White Salmon region has a long association with the logging industry. Initially, the Menominee Lumber Company cut the easily-accessible timber into logs that could be floated down the White Salmon River. Oxen and horses were used to drag the timber, which traveled across several constructed rollaway dams before reaching the Columbia River, where they were rafted for towing to the Hood River mill (McCoy 1987). Wind River Lumber Company succeeded Menominee, using their dams along the White Salmon as they removed virgin timber from the Buck Creek, Mill Creek and Underwood Mountain areas (McCoy 1987). It was at this time that the upland forests of the project area were probably first harvested.

As of 1896, there were seven sawmills operating in Skamania County, the most notable of these being the Oregon Lumber Company's along the Little White Salmon River (Price 1896). After the logging of Underwood Mountain was complete, the Oregon Lumber Company established the Mill A sawmill and headquarters along the west side of the Little White Salmon River, and another sawmill at Chenowith Flat on the east side of the Little White Salmon River at what was known as Mill B (less than one mile to the south of the proposed Maintenance Yard Alternative Location at Willard Road) (Attwell 1975, McCoy 1987). There were flumes on both sides of the

3-202

river that carried the lumber to the Columbia (Atwell 1975). When the supply of timber became more difficult to access, the company closed the mill in 1907, and moved it to Oregon (McCoy 1987, Nielsen 1959, Thun 1959).

Broughton Lumber Company was established around 1916 by Harold Broughton and D.M. Stevenson, who operated a mill at Willard along the Little White Salmon River. Using water diverted from the Little White Salmon River, Broughton Lumber Company transported the timber via a flume connecting the mill at Willard to the Columbia River, and then rafted the logs across the river to Oregon for railroad transport. The flume originally consisted of a 4.5-mile long segment from Willard to Drano Lake, and was constructed by the Drano Flume Company around 1913. In 1923, Broughton purchased the Drano Flume Company and expanded their operation by building an additional 4.5 miles of flume from Drano Lake eastward along the Columbia River to a new resaw and planing mill located along the railroad near Underwood (McCoy 1987, Thomas 2007). Following its completion, boards could travel the nine -mile long flume to the planning mill in less than an hour.

From 1923 to about 1940, Broughton Lumber Company constructed and operated a railroad for transport of logs to the primary mill. Two steam engines were used and a maximum of nine miles of track that were laid to haul timber from the woods to the mill at Willard, but the tracks had no permanent location, as they were moved and re-laid as necessary. The Broughton Lumber Company operation closed in 1986, and portions of the flume from Willard to the Columbia River were dismantled by the company shortly thereafter (Thomas 2007).

The logging activity that cleared extensive areas on Underwood Mountain in the early-twentieth century opened up these lands for orchard use at the same time. Settlement occurred quickly as a result of the "Apple Boom," the period between 1905 and 1920 when vast orchards were planted along the White Salmon Valley, on Underwood Mountain, and elsewhere throughout the region. In 1908, the completion of the railway across the north shore of the Columbia River contributed to this influx of residents. White Salmon emerged as a main trading center by 1910, and fruit packing plants were established along the railway (McCoy 1987 and 2003).

Land patents were filed relatively late, from 1905 to 1910, for the high elevation ridgelines that characterize most of the project area (BLM 2009b). The correlation of the land patent dates with the regional orchard boom and railroad completion date in the project area is suggestive of prospective claims either for orchards or as investments for lumber resources. It has not been determined how many of the early-twentieth century claimants actually resided on their parcels. A 1929 USGS Hood River topographic quadrangle depicts the presence of one residential structure, an access road, and a trail within the project area.

Orchard growers at Underwood initially attempted to irrigate their crops with water pumped from the White Salmon River, but when the pump house was washed away by a flood, they attempted to take water out of Little Buck Creek using a gravity flume until the flume burned. Irrigation was not restored, and some orchard growers and farmers lost their land by foreclosure due to inability to pay taxes. A hard freeze in 1919 killed many apple trees, and several growers switched to winter pear crops (Thun 1959). Commercial orchards generally failed in the White Salmon Valley due to dry land and lack of organized irrigation, severe winters, and a short

3-203

growing season at higher elevations. Many orchards were simply abandoned and reclaimed by second-growth timber (McCoy 1987 and 2003).

Improvements in transportation along the north shore of the Columbia River occurred after the 1919 opening of the North Bank Highway, especially when the five tunnels west of Underwood were completed in 1937. The Hood River to White Salmon Bridge was opened in 1924 (McCoy 2003), further connecting the economies of the two towns.

3.10.2.2 Cultural Resources Overview

Tribal Consultation and Traditional Cultural Resources

Based on the archival review, no specific traditional cultural properties or sacred sites are documented within the project area. Given that this information is culturally sensitive, however, the reviewed records are not likely to contain specific references to traditional or sacred sites that could occur within the project area and tribal consultation is required to address their potential presence (Parker 1993). BPA will conduct the government-to-government tribal consultation for this project as per Section 106 of the NHPA.

To incorporate tribal involvement at an early stage in the process, the Applicant has initiated

contact with the Confederated Tribes and Bands of the Yakama Nation. The Applicant invited the participation of both the Yakama Nation Cultural Resources Department and two local resident tribal members to assist with the identification of potential sensitive, traditional, and/or sacred resources.

Through the Yakama Nation's Cultural Resources Department, the Applicant has requested participation of tribal members for the archaeological field inventory, has sponsored a field trip to the project area, and has attempted to solicit concerns with regard to potential cultural resources of importance to the tribe. The Applicant contacted the Yakama Nation Cultural Resources Department to review their confidential data sources and to report any potential areas of sensitivity, as appropriate, so that these areas can be avoided and protected early in the planning process. A field investigation by Yakama Nation cultural resources specialists occurred in December 2009. The Yakama Nation's findings, currently in preparation, will supplement the information contained in this EIS.

Separate from Yakama Nation Cultural Resources Department, the Applicant has invited the participation of two local residents, also members of the Yakama Nation, who have long-standing ties to the area. Chief Wilbur Slockish of the Klickitat Tribe and Chief Johnny Jackson of the Cascades Tribe met with URS archaeologists prior to the November 2009 field inventory and jointly toured the project site. Both individuals stated that based on their knowledge of this area, the project area was not specifically used by their ancestors or contemporary Indians. Neither individual identified any traditional cultural properties or other sensitive or sacred sites within the project site.

3-204

Previously-Recorded Cultural Resources in the Project Vicinity

The DAHP maintains a state-wide database of previously-recorded cultural resource sites, historic register properties, and completed inventories. The locations of the cultural resource sites (e.g., archaeological sites) are managed as restricted access information. The locations of historic register properties (e.g., buildings and structures listed on the state or national register) are non-restricted information.

The DAHP database does not have any record of previous inventories within the project area. Prior inventory coverage in the general vicinity depicts a few small, scattered inventories in upland areas near Underwood Mountain, mostly related to development review projects in the Columbia River Gorge National Scenic Area. A limited linear inventory for a proposed timber sale occurred adjacent to and north of the APE and did not identify any resources (Stilson 2005). In general, few inventories have been completed in the vicinity; those that have been completed are limited in scope and do not allow for comparisons or predictions to be made about the types of resources that could be found in the project area. Intensive inventory coverage has only occurred along the White Salmon River drainage several miles to the east of the project area, where numerous pre-contact and historic period sites have been identified.

One cultural resource was previously-recorded within the project area, consisting of the

Broughton Lumber Company flume (45GP596). The flume formerly paralleled Willard Road at the western boundary of the alternative location for the Maintenance and Operations facility. The flume was dismantled and removed from this area following the 1986 closure of the mill along the Columbia River. Although sections of the historic flume are still present elsewhere, none remain in the project area. This site therefore reflects a former alignment rather than extant physical remains.

Within a one-mile radius of the project area are two additional sites: a mortar and peeled cedar found about 0.5 mile west of the Maintenance Yard at Willard, and an early-twentieth century debris scatter associated with an old homesite, found about one mile north of the APE within a similar forested, upland setting. No historic register properties (e.g., buildings and structures) are found within the project area or within 1.5 miles of the project area based on the DAHP database.

In general, the density of cultural resources is greatest along the White Salmon River to the east, with scattered resources also found along the north shore of the Columbia River. Most archaeological research in the area has focused on riverine sites found along the Columbia River, and, more recently, along the lower White Salmon River. Fewer non-riverine archaeological sites have been documented in the general area, with several archaeological sites, mostly historic period, found in the Underwood Heights vicinity, several miles from the project area. It is unclear whether the higher site density documented along the White Salmon River is reflective of more intensive survey coverage, more intensive use of this area, or both, as compared to the Little White Salmon River. However, it appears unlikely that the higher elevation project area would have the same density of sites as the riverine areas along the Columbia and White Salmon rivers.

3-205

3.10.2.3 Project Site Inventory

A preliminary cultural resources inventory of the project site was conducted in 2003, based on the project design at that time (Ballentyne 2003). Because the proposed project area was subsequently revised and expanded, a new survey was completed in 2009 (URS 2010). A wider survey corridor of 650 feet for the turbine strings necessarily overlapped the 2003 inventory's 300-foot wide survey corridor. Much of the project area was therefore inventoried on two separate occasions, six years apart. The two survey areas are shown on Figure 3.10-2.

The 2009 URS inventory of the project area consisted of a pedestrian survey of the 384-acre APE where direct impacts to cultural resources could occur. Prior to the field inventory, oral interviews were conducted with the landowner and local tribal informants, and historic maps and historic and modern aerial photos were reviewed to identify potential resources within the project area.

Field Methods

An intensive pedestrian survey of the APE was conducted for this project in November 2009 for

the cumulative 384-acre APE. Transects were spaced no greater than 100 feet (30 meters); most were at 65-foot (20-meter) intervals or less. Survey methods depended on the project component being surveyed and the steepness of the slopes, as well as the presence of any hazards such as burning slash piles. Slopes greater than 30 percent were usually not inventoried. In several areas, survey coverage extended beyond the APE, depending on the topography. Ground visibility at the time of the inventory was variable; areas that had been most recently harvested provided excellent visibility, while forested areas were found to have dense accumulations of duff, slash, and dense vegetation that obscured the ground surface. Soil exposures provided by animal burrows, cut banks, roadways, and root casts were inspected closely.

Promontories associated with the proposed turbine strings were examined for potential rock cairns, rings, walls, or other alignments that could indicate sensitivity. Large old-growth stumps were examined for evidence of scarification, and large boulders were examined for evidence of petroglyphs, pictographs, or processing activities. The inventory was especially vigilant in looking for historic features such as residences, camps, roads, railroad alignments, flumes, or other evidence of historic logging and homesteading activities.

3-206

33758687_171.cdr

Figure 3.10-2
Job No. 33758687 Cultural Resources Survey Locations

Limited subsurface probing was conducted for this project at the location of an historic period archaeological resource, referred to as the Haran Farmstead, recorded at the time of the 2009 field inventory. This resource is located within one of the turbine strings, and is characterized by several rock features and a small artifact scatter related to an abandoned early-twentieth century residence and fruit orchard. The subsurface probing investigation employed close-interval systematic, as well as intuitive, sampling methods. Shovel probes were placed at close intervals around each of the recorded rock features to determine whether any associated archaeological deposits could be identified. Wider-spaced, systematic (20 to 30-meter interval) probes were placed within the lower-probability former orchard fields and within expansive areas found between several the rock features, where no surface artifacts were observed, to determine the presence or absence of buried resources.

A total of 52 shovel probes were excavated. The probes measured 30-cm in diameter and were generally excavated at 5 to 30-meter intervals to an average depth of 50 cm. Sediment was passed through alternating screen mesh sizes, both 1/4-inch and 1/8-inch mesh sizes were utilized. All artifacts were replaced within the excavated probe after documentation; none were collected.

Prior to subsurface probing, a metal detector was used to aid in the identification of metal artifacts obscured by the layer of duff that is present across much of the site due to its forested setting. The metal detector was used intensively around each of the recorded rock features. Systematic transects of 10 to 30 meters were walked in lower probability areas such as the

former orchard field. Shovel scrapes, or simple removal of snow and duff to expose the ground surface soil, were utilized as an additional method to improve surface visibility. Shovel scrapes were placed at 30-meter intervals within the former orchard lands, where probability is considered low, in order to provide additional validity to the surface reconnaissance.

Beyond the Haran Farmstead, no additional exploratory probing was conducted elsewhere in the project area. The majority of the potentially higher sensitivity landforms such as the ridgelines and promontories either had excellent ground surface visibility due to recent timber harvesting activities, and/or had exposed basalt rock with little potential for subsurface soils. Much of the project area is characterized by steep topography where exploratory subsurface testing is neither warranted nor practicable. Although Little Buck Creek crosses the project area within a proposed Overhead Transmission Line corridor, this area was found to be a small stream crossing surrounded by steep terrain with no areas likely to contain potential cultural resources.

Inventory Results

The 2003 draft survey report, which was never finalized or submitted for agency review, preliminarily noted two separate resources, including an historic rock wall feature and a small, disturbed historic artifact scatter of glass, ceramics, and tin cans within a roadway (Ballentyne 2003). As part of the 2009 inventory, one historic period archaeological site, the Haran Farmstead, was identified within one of the turbine string corridors, and incorporates the rock wall feature identified in 2003. The historic artifact scatter previously documented in 2003 was not relocated during the 2009 inventory, and appeared to have been buried or obliterated by later road improvements in this same area (URS 2010).

3-208

The Haran Farmstead, documented in 2009, consists of several rock features and a sparse historic artifact scatter associated with a former rural homesite related to James A. Haran, who had a small plum orchard here around the 1920s. A total of nine archaeological features were recorded, including two rock walls21 (probable property or field clearing boundaries), two structural rock foundations (probable residence and milking parlor), and several rock features of indeterminate function but possibly remnants of appurtenances such as privy, pump house or food storage structures. One small concentration of fewer than 20 historic artifacts, including aqua and colorless glass fragments, galvanized metal water pipes, crockery and porcelain fragments, and tin cans, also was observed. Approximately 100 to 150 artifacts, mostly metal fragments and tin cans, were found scattered across the site during a pedestrian survey supplemented by use of a metal detector.

In December 2009, URS archaeologists conducted exploratory subsurface sampling across the site to define the site boundaries and to determine the presence or absence of associated buried deposits. About 20 artifacts were encountered during the subsurface probing investigation, limited to wire nails, a water pipe, several small colorless glass fragments, and metal can or non-diagnostic metal fragments.

The NRHP eligibility of the Haran Farmstead is addressed in the Cultural Resources Inventory

Report. Each of the four criteria of eligibility is applied, and aspects of integrity are addressed. The Haran Farmstead is recommended as ineligible for the NRHP, due primarily to insufficient association and altered key aspects of integrity, which limit its potential to be considered under Criterion A (association with important events), Criterion B (association with important people), and Criterion C (having important characteristics of style). For Criterion D (information potential), the results of the inventory and exploratory subsurface probing indicate there is inadequate data potential to warrant eligibility. URS's recommendation for ineligibility is pending agency review and concurrence.

Summary

One historic period cultural resource was recorded within the APE: the Haran Farmstead archaeological site, which consists of rock features and a sparse artifact scatter related to a circa 1920s orchard and residence. Systematic subsurface probes were placed within this site and did not identify significant, buried deposits. The site is recommended as ineligible for the NRHP.

Additional historic farmsteads or other sites within the project area are not indicated by the results of archival research, which included review of historic maps and aerial photos. Field inventory confirmed that no aboveground resources, such as buildings, railroads, or flumes, are found in the project area.

A preliminary review of the ethnographic and ethnohistoric literature did not document this area as having any specific association for traditional resources, though uplands such as these could

21 The Haran Farmstead as recorded in 2009 incorporates the rock wall observed during the 2003 inventory. The other resource identified during the 2003 inventory, a small concentration of historic artifacts found within an existing access road, was not located in 2009.

3-209

have been used at least transiently, for example, for plant resource gathering or spiritual purposes. The Applicant has initiated participation of the Confederated Tribes and Bands of the Yakama Nation in order to identify any potentially sensitive resources or traditional cultural properties in the project area. Two local tribal members with long-standing ties to the area toured the project area and did not identify any cultural resources or concerns. A review by Cultural Resources Department of the Yakama Nation is pending. The 2003 and 2009 inventories did not observe any pre-contact Native American site types, such as lithic scatters, petroglyphs, or peeled cedars during the inventory.

Only one water source was observed during the field inventory: the outlet of Little Buck Creek, downstream of the earthen dam that was constructed in 1947 to create the "Cedar Swamp" fire pond (located outside the APE). This small watercourse is surrounded by steep terrain and is not likely to have significant, associated archaeological resources.

Promontories associated with the proposed turbine string, especially Chemawa Hill and others with panoramic views of the surrounding area, were inspected closely for potential rock cairns,

rings, walls, or other alignments that could indicate sensitivity. No such features were observed. It appears that even if such resources had been present, the historic and modern logging practices would have obscured this type of resource.

Although the project area was logged at least 100 years ago, no features such as camps, historic roads, railroad features, or other evidence clearly related to the historic use of the area was observed. Large old-growth stumps are occasionally encountered, but most are in an advanced state of decay and springboard notches were not observed. No evidence for historic road alignments was observed during the inventory; existing roadways are mechanically-graded, usually rocked and graveled, modern-use alignments that lack historic distinction. As no old-growth forest remains in this area, potential sensitivity for scarified, peeled trees is not indicated.

Much of the current APE examined in the Cultural Resources Inventory Report conducted in 2009 was surveyed in 2003. This overlapping of inventory coverage, nearly six years apart, at different times of the year, and with the surrounding forest in different stages of harvest, provides additional support for a general absence of cultural resources to be found in the APE.

3.10.3 IMPACTS
3.10.3.1 Proposed Action
Construction

The proposed project has the potential to affect one historic period archaeological site, the Haran Farmstead, through ground disturbance during construction of the new project road and turbine and transformer pads. The degree of impact would depend on the final location of the road and turbines. The Cultural Resources Inventory Report recommended this site as ineligible for the NRHP subject to agency review and concurrence. If the Haran Farmstead is determined through agency concurrence to be ineligible for the NRHP, then no further management would be required and the project would not be considered to have an impact on significant cultural resources. If the Haran Farmstead is determined to be eligible for the NRHP, then the Applicant

3-210

would consider avoidance and/or mitigation alternatives so that a finding of no effect or no adverse effect would be achieved.

Construction also would have the potential to impact other, currently undiscovered cultural or historic resources. Based on the extensive inventories conducted, the likelihood of encountering additional sites is low.

Effects on traditional cultural properties or other sensitive or sacred resources that might be of concern cannot be determined until consultation with the tribes is concluded. This consultation is not expected to be completed until after the Draft EIS is issued.

Operation

The ongoing maintenance of the access road or emergency procedures such as fire suppression

activities have the potential to cause additional impact to the Haran Farmstead or other, currently undiscovered resources.

Project Decommissioning

Project decommissioning could have impacts similar to those during initial construction, including ground disturbance from turbine, transformer and pad removal. As with construction, the degree of impact would depend on the final location of the road and turbines, and on the determination of NRHP eligibility for the Haran Farmstead.

3.10.3.2 No Action Alternative

Under the No Action Alternative the project would not be built, and no impacts to historic or cultural resources would take place.

3.10.4 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential cultural resource impacts during construction and operation of the propose project to the extent feasible.

• Implement avoidance and data recovery if the Haran Farmstead (a historic period cultural resource recorded within the APE) is determined to be eligible for nomination to the NRHP. The Haran Farmstead archaeological site, which consists of rock features and a sparse artifact scatter related to a circa 1920s orchard and residence. If the Haran Farmstead is determined to be eligible for nomination to the NRHP, then avoidance and mitigation measures such as data recovery would be considered to achieve a finding of no adverse effect for the project. Though none have been identified to date within the project area, properties considered as significant for reasons other than research potential, such as traditional cultural properties, may require mitigation measures other than data recovery that would be determined in consultation with the Tribe and agencies.

3-211

• Utilize BMPs to minimize impacts to any additional cultural or historic resources that may be encountered during construction of the proposed project. These BMPs include preparation and use of an Inadvertent Discovery Plan, which would establish procedures to deal with unanticipated discovery of cultural resources before and during construction. The plan, among other provisions, will require immediate work stoppage and appropriate notification in the event of discovery of previously unknown cultural materials. The plan also will specify protocols for the treatment of human remains that fulfill the requirements of the Native American Graves Protection and Repatriation Act in the event that human remains and/or funerary items are encountered during construction or operation of the project.
• Design the locations of road, turbine, and transformer to avoid and minimize impacts during construction regular maintenance operations.

3.10.5 UNAVOIDABLE ADVERSE IMPACTS

With the use of appropriate mitigation measures, the proposed project is not expected to produce any unavoidable impacts to historic or cultural resources.

3.10.6 REFERENCES

Attwell. 1975. Columbia River Gorge History: Volume 2. Tahlkie Books, Stevenson, Washington.

Ballantyne, Raena. 2003. PPM Energy Saddleback Wind Project Cultural Resource Assessment. Prepared for PPM Energy by CH2M Hill, Portland, Oregon. November 3.

Beckham, Stephen Dow, Rick Minor, Kathryn Anne Toepel, and Jo Reese. 1988. Prehistory and History of the Columbia River Gorge National Scenic Area, Oregon and Washington. Submitted to USDA Forest Service, Columbia River Gorge National Scenic Area, Hood River, Oregon.

Bureau of Land Management (BLM). 2009a. Survey Plats and Field Note Records. Online database accessed November 2, at: http://www.blm.gov/or/landrecords/survey/ySrvy1.php.

———. 2009b. Land Patent Search. Online database accessed November 2, at: http://www.glorecords.blm.gov/PatentSearch/Default.asp?.

Chatters, James C., and David L. Pokotylo. 1998. Prehistory: Introduction. In Plateau, Vol. 12, Handbook of North American Indians, edited by Deward E. Walker. pp. 73-102. Smithsonian Institution, Washington, D.C.

French, David H. and Catherine S. French. 1998. Wasco, Wishram, and Cascades. In Plateau, Vol. 12, Handbook of North American Indians, edited by Deward E. Walker. pp. 360

377. Smithsonian Institution, Washington, D.C. 3-212

Galm, Jerry R., Glen D. Hartmann, Ruth A. Masten, and Garry O. Stephenson. 1981. Cultural Resource Overview of Bonneville Power Administration's Mid-Columbia River Project, Central Washington. Eastern Washington University, Archaeological and Historical Services, Reports in Archaeology and History 100-66.

Griffin, Dennis and Thomas E. Churchill. 2001. Cultural Resource Survey and Traditional Cultural Property Study of the Lower White Salmon River, Klickitat/Skamania Counties, Washington. Archaeological Frontiers Report No. 19. Prepared for Yakama Nation, Toppenish, Washington, and Pacificorp, Portland, Oregon. Eugene, Oregon. October 15.

Jenkins, Dennis. 2009. NGBPP Research at Paisley Caves. Accessed November 3, 2009 at: http://www.uorgeon.edu/~ftrock/paisley_caves_description.php.

Masten, Ruth A. and Jerry R. Galm. 1989. An Overview of Cultural Resources in the Wild and Scenic Areas of the White Salmon and Klickitat Rivers, Klickitat and Skamania Counties, Washington, Vols. 1 and 2. Eastern Washington University Reports in Archaeology and History 100-69.

McCoy, Keith. 1987. The Mt. Adams Country: Forgotten Corner of the Columbia River Gorge. Pahto Publications, White Salmon, Washington.

———. 2003. Mid-Columbia North Shore: Odds and Ends. Trafford Publishing, Victoria,

B.C. Nielsen, Carl. 1959. Little White Salmon. In Skamania County History, Volume 1. Reprinted in 2007 by the Columbia River Gorge Interpretive Center Museum, Stevenson, Washington, as printed by the Original History Committee of 1959. p. 96-97.

Norton, Helen H., Robert Boyd and Eugene S. Hunn. 1983. The Klickitat Trail of South-Central Washington: A Reconstruction of Seasonally Used Resource Sites. In Prehistoric Places in the Southern Northwest Coast, Robert Greengo, editor. Thomas Burke Memorial Museum Research Report No.4., University of Washington, Seattle.

Parker, P.L., ed. 1993. Traditional Cultural Properties: What You Do and How We Think. CRM Volume 16 Special Issue. National Park Service, Washington, D.C.

Pettigrew, Richard M. 1981. A Prehistoric Culture Sequence in the Portland Basin of the Lower Columbia Valley. University of Oregon Anthropological Papers No. 22. University of Oregon, Eugene, Oregon.

Price, J.H. 1896. Bureau of Statistics, Agriculture and Immigration on the Agricultural, Industrial, and Commercial Conditions of the State. State of Washington First Annual Report, Olympia. Accessed: http://books.google.com/books.

Ruby, Robert H. and John A. Brown. 1992. A Guide to the Indian Tribes of the Pacific Northwest. Revised edition. University of Oklahoma Press, Norman.

Schuster, Helen. 1998. Yakima and Neighboring Groups. In Plateau, Vol. 12, Handbook of North American Indians, edited by Deward E. Walker. pp. 327-351. Smithsonian Institution, Washington, D.C.

Spier, Leslie, and Edward Sapir. 1930. Wishram Ethnography. University of Washington Publications in Anthropology 3(3):151-300. Seattle.

Stilson, M. Leland. 2005. Whistling Ridge Timber Sale Cultural Resource Survey. Washington Department of Natural Resources, land and Resources Division. Washington State Department of Archaeology and Historic Preservation, Olympia.

Thomas, Cam. 2007. The Story of the Flume: One common in the Northwest, the Broughton Lumber Company flume was America's last. Twentieth anniversary special edition DVD. Original 60-minute documentary. Cam Thomas Productions.

Thun, Louis. 1959. Early History Report. In Skamania County History, Volume 1. Reprinted in 2007 by the Columbia River Gorge Interpretive Center Museum, Stevenson, Washington, as printed by the Original History Committee of 1959. p. 108-110.

URS 2009. URS Corporation. Draft Cultural Resources Inventory Report for the Project. December 4.

URS 2010. URS Corporation. Revised Draft Cultural Resources Inventory Report for the Project. In preparation.

Winthrop, Robert, Johnson Meninick, and Staff. 1996. Inventory and Evaluation of Traditional Cultural Properties Associated with the Condit Hydroelectric Project, FERC Project No. 2342. Draft report to PacifiCorp and the Yakama Nation. Cultural Solutions, Ashland, Oregon.

3.11 TRANSPORTATION

This section discusses the existing network of roadways and rail, river, and air transportation in the project vicinity, as well as the potential impact of the proposed project on transportation.

3.11.1 AFFECTED ENVIRONMENT

3.11.1.1 Roadway Transportation

Existing Roadways

In the Columbia River Gorge, the two major roadways extending generally from east to west along the Columbia River are State Route (SR) 14 on the Washington side of the Columbia River and Interstate 84 on the Oregon side of the Columbia River. Other major roadways, such as State Routes 141 and 142 in Washington and State Routes 35 and 197 in Oregon, intersect these two highways generally in the vicinity of cities and communities located in the Gorge.

3-214

SR 14 between Interstate 5 in the Vancouver, Washington area and the project site is generally very narrow with 12-foot lanes and 2- to 4-foot paved shoulders. It also has many hills, and curves with tight corners in several places. East of the project site on SR 14, there is one low and very narrow tunnel east of the town of Lyle, Washington, and also a very narrow bridge east of The Dalles at approximately milepost (MP) 86. Between Cook-Underwood Road and SR 97 (Goldendale), SR 14 is generally narrow with 12-foot lanes and 2- to 4-foot paved shoulders. It also has some tight low-recommended-speed corners and a number of hills. Between SR 97 and the junction with SR 395/I-82, SR 14 is generally narrow with 12-foot lanes and 2- to 4-foot paved shoulders.

Existing access to the project site is provided by various county roads that extend northward from SR 14, along with existing private logging roads (see Figures 3.11-1 and 3.11-2). Key roads in the immediate project vicinity include:

• Cook-Underwood Road. Cook-Underwood Road has two 12-foot lanes and paved shoulders that are 1 foot or less in width. In general, the side slope begins at the fog line. This road is under the jurisdiction of Skamania County and generally is in good condition. There are currently no over-size or over-weight load restrictions in force. The Skamania County Comprehensive Plan lists Cook-Underwood Road as Federal Functional Classification "Major Rural Collector."
•Willard Road. Willard Road has two 12-foot lanes and paved shoulders that are 1 foot or less in width. This road is under the jurisdiction of Skamania County and generally is in good condition. There are currently no over-size or over-weight load restrictions in force. The Skamania County Comprehensive Plan lists Willard Road as Federal Functional Classification "Rural Local Access."
• West Pit Road. West Pit Road is a private logging road that connects to a network of existing private logging roads located on S.D.S. Co., LLC and Broughton Lumber Company property. West Pit Road varies in width from 20 to 26 feet. It is a dirt road covered in light pit run. This road has portions that generally are in poor condition; however, during summer 2009, various roadway improvements were made and segments of the road were widened for logging purposes.

Existing Traffic Volumes

Average annual daily traffic (AADT) values for SR 14 are shown in Table 3.11-1. Peak hour directional volumes were developed based on typical rural highway traffic patterns and proximity of business centers. Typical rural highway traffic patterns conservatively assume AM peak hour volumes to be approximately 7 percent of the total daily volumes, and PM peak hour volumes to be approximately 10 percent of the total daily volumes, with a directional split of 70/30. PM peak hour volumes are traditionally considered to by the highest during a given day. Since no current traffic data is available for Cook-Underwood Road at either the west or east junctions with SR 14, existing traffic volumes are based on typical patterns for small rural towns. Estimated 2009, 2011, and 2012 peak hour traffic volumes at the west and the east junctions of Cook-Underwood Road with SR 14 are presented in Table 3.11-2. Traffic volumes for 2011 and

3-215

33758687_124.cdr

Figure 3.11-1 Project Roadway Access from the East

33758687_125.cdr
Figure 3.11-2
33758687_125.cdr
Figure 3.11-2
Project Roadway Access from the West 2012 were based on an expected average weighted growth rate of approximately one percent per year.

Table 3.11-1
Annual Daily Traffic at West and East Junctions of SR 14 and Cook-Underwood Road

Location
Average Annual Daily Traffic (all vehicles)
2008 2009 (est)a
SR 14 – west junction w Cook-Underwood Road 3,000 3,100
SR 14 east junction w Cook-Underwood Road 3,300 3,400

Source: WSDOT (2008)

a. A growth rate was developed for the project vicinity using historic data from annual traffic reports between 1996 and 2008. During several years between 1996 and 2008, there was no recorded historical growth in this area. Using this data, an average weighted growth rate of approximately 1 percent per year was determined.

Table 3.11-2
Estimated 2009, 2011, and 2012 Peak Hour Traffic Volumes
at West and East Junctions of SR 14 and Cook-Underwood Road

Location
West Junction of Cook-Underwood
Road with SR 14
East Junction of Cook-Underwood
Road with SR 14
2009 2009
AM Peak PM Peak AM Peak PM Peak
Eastbound SR 14 160 90 170 100
Westbound SR 14 70 220 70 240
Southbound Cook-
Underwood Road 10 10 10 10
2011 2011
AM Peak PM Peak AM Peak PM Peak
Eastbound SR 14 160 100 180 110
Westbound SR 14 70 230 80 260
Southbound Cook-
Underwood Road 10 10 10 10
2012 2012
AM Peak PM Peak AM Peak PM Peak
Eastbound SR 14 170 100 180 110
Westbound SR 14 70 240 80 260
Southbound Cook-
Underwood Road 10 10 10 10

AM Peak Hour is 7:00 AM to 8:00 AM

PM Peak Hour if 4:00 PM to 5:00 PM

Existing Level of Service

Level of service (LOS) is an estimate of operational performance based on delay to motor vehicles. The Highway Capacity Manual (TRB 2000), which is generally used when determining LOS, defines LOS using a letter scale from A to F. LOS A is defined as minimal or no delay to vehicles and LOS F is defined as extreme delays to vehicles. LOS C or better is

3-218

typically considered acceptable for rural intersections and is the LOS threshold of acceptable traffic flow for Skamania County. Table 3.11-3 presents the LOS delay criteria for two-waystop-control intersections.

Table 3.11-3
Level of Service Criteria for Two-Way-Stop-Control Intersections

Level of Service Expected Traffic Delay
A < 10 seconds
B > 10 - 15 seconds
C > 15 - 25 seconds
D > 25 - 35 seconds
E > 35 - 50 seconds
F > 50 seconds

Source: TRB (2000)

Existing LOS was estimated for SR 14 and Cook-Underwood Road, using estimated 2009 traffic volumes and the software package Highway Capacity Software Plus, which uses algorithms based on the Highway Capacity Manual (TRB 2000). Based on this analysis, the longest delays occur at Cook-Underwood Road during the PM peak hour; however, these delays are relatively short (see Table 3.11-4). Up to approximately 10 seconds of delay is experienced by some vehicles at the west junction of Cook-Underwood Road with SR 14 during the PM peak hour. Slightly more than 10 seconds of delay is experienced by some vehicles at the east junction of Cook-Underwood Road with SR 14 during the PM peak hour. These delays translate to LOS A conditions at the west junction and LOS B at the east junction. Delays during the AM peak hour at Cook-Underwood Road and during both peak hours at SR 14 are all less than 10 seconds, which translates to LOS A.

Table 3.11-4
2009 Level of Service Summary at West and East Junctions of
SR 14 and Cook-Underwood Road

Roadway and
Turning Movement Peak Hour

West Junction East Junction
Delay (sec/veh) LOS Delay (sec/veh) LOS
SR 14 AM 7.6 A 7.6 A
Eastbound Left Turn PM 7.9 A 8.0 A
Cook-Underwood Road AM 9.4 A 9.4 A
Southbound Left/Right
Turn PM 10.0 A 10.2 B

Delay = Average per vehicle

Existing Traffic Safety

Traffic safety was analyzed along SR 14 between the towns of Stevenson and Bingen for 2006 to 2008. Collision Data Summaries were obtained from WSDOT. SR 14 is functionally classified as a rural collector roadway. SR 14 between Stevenson and Bingen is located within the Southwest Region of the state of Washington. During this three-year period, a total of 158 collisions occurred between the west city limits of Stevenson at MP 43.91, and the east city limits of Bingen at MP 66.88.

3-219

Between 2006 and 2008, a total of 17 collisions occurred within the Stevenson city limits, and another 17 occurred within the Bingen city limits. Only one collision occurred at the west junction of Cook-Underwood Road and SR 14 (MP 56.28), and three collisions occurred at the east junction of Cook-Underwood Road and SR 14 (MP 63.32). Four collisions occurred at the intersection of Maple Street and SR 14 within the city of Bingen (MP 66.47). The majority of collisions occurred within Skamania County between MP 44.66 and MP 63.48. Several collisions also occurred within Klickitat County between MP 63.48 and MP 64.71, and within the White Salmon city limits between MP 64.71 and MP 65.50.

The number of collisions that occur along a given roadway is generally expressed in terms of a rate, where collision occurrence is indexed to the number of vehicles traveling on a particular length of the given roadway. The collision rate is based on the number of collisions per millionvehicle-miles (MVM) traveled. Table 3.11-5 shows collision rates for each year as well as multi-year rates for the three year period for SR 14 between Stevenson and Bingen, in addition to collision rates for the city of Bingen.

The multi-year collision rate along SR 14 between Stevenson and Bingen is 1.43 collisions per MVM. The 2007 average collision rate for all Washington state rural collector roadways was

1.65 collisions per MVM and for 2008, 1.63 collisions per MVM. The average collision rate for all Washington rural collector roadways within the Southwest Region during 2007 was 1.72 collisions per MVM, and during 2008, 1.87 collisions per MVM. The multi-year collision rate on SR 14 between Stevenson and Bingen is lower than both the 2007 and 2008 average Washington State and Southwest Region collision rates.

Table 3.11-5
Collision Numbers and Rates for Years 2006 through 2008

Number of Segment LengthAADT Collision Rate
Location Collisions MP Range (miles) (veh/day) (Collisions/MVM)
2006 Data

Stevenson to Bingen
Bingen City Limits
48
5
43.91 to 66.88
66.50 to 66.88
2007 Data
22.97
1.38
4,500
7,600
1.27
1.31
Stevenson to Bingen
Bingen City Limits
61
4
43.91 to 66.88
66.50 to 66.88
2008 Data
22.97
1.38
4,400
6,700
1.65
1.19
Stevenson to Bingen
Bingen City Limits
49
8
43.91 to 66.88
66.50 to 66.88
Multi-Year Data
22.97
1.38
4,200
6,300
1.39
2.52

Stevenson to Bingen
Bingen City Limits
158
17
43.91 to 66.88
66.50 to 66.88
22.97
1.38
4,400
6,900
1.43
1.63

AADT – average annual daily traffic
MVM million-vehicle-miles

The multi-year collision rate for the city of Bingen is 1.63 collisions per MVM. The multi-year collision rate for the city of Bingen is equal to or close to both the 2007 and 2008 Washington State collision rates and is lower than both the 2007 and 2008 average Southwest Region collision rates. No average collision rate data is available for year 2006.

3-220

Transportation Plans and Programmed Transportation Improvements

Skamania County. The Transportation Element of the Comprehensive Plan represents the County's policy plan for the next 20 years and specifically considers the location and condition of the existing traffic circulation system, the projected transportation needs, and plans to address future transportation needs while maintaining established LOS standards. This plan is implemented through the Six-Year Transportation Improvement Program and Annual Construction Program. The most recent Six Year Transportation Improvement Program was approved in April 2009, and lists one improvement to Cook-Underwood Road: a resurfacing project between MP 0 and MP 3. This improvement is listed for years 4–6 of the program, or between 2012 and 2014.

Washington State Department of Transportation Statewide Transportation Improvement Program. This is a list of funded transportation improvement projects. The Transportation Improvement Program for 2009–2012 presents a list of regionally significant projects for the upcoming three years (WSDOT 2009a). A search of the project database for Clark, Skamania and Klickitat Counties showed no projects scheduled for any of the roads in the immediate project vicinity. The only planned transportation improvement project near the project site is resurfacing 1.0 mile of Wind River Road.

WSDOT also is planning to improve SR 14 between Camas and Washougal, east of Vancouver. The project will widen SR 14 from two lanes to four lanes from the end of the West Camas Slough Bridge to Union Street (SR 500). Included in the project will be construction of a new

bridge parallel to the existing bridge on the east end of Lady Island, and construction of a split-diamond interchange at Union Street and 2nd Street. The project is planned to go to bid in 2010, and construction is scheduled to be completed in 2012 (WSDOT 2009b).

Skamania County and Klickitat County Regional Transportation Plans. These Regional Transportation Plans were developed by the Southwest Washington Regional Transportation Council, in coordination with other jurisdictions and WSDOT (SWRTC 2009a and 2009b). Regional transportation plans are intended to develop regional solutions to transportation needs. Both plans emphasize maintenance and preservation as priorities. Improvements are recommended to address identified deficiencies. Recommended improvements in these plans include several projects to upgrade portions of SR 14. However, funding is not provided through this planning process and these projects are not currently included in the Statewide Transportation Improvement Program.

3.11.1.2 Rail Transportation

The Burlington Northern Santa Fe Railway operates a rail mainline that runs parallel to SR 14 to the south of the project site. This line is a major link that ties the important industrial areas of Vancouver, BC; Portland, Oregon; and Seattle/Tacoma, Washington to the north-central states of the United States and eastern railroads via Chicago. In the project vicinity, SDS currently has two rail spurs from the Burlington Northern Santa Fe mainline to an existing SDS facility located along the Columbia River in Bingen, Washington. One spur terminates near Maple Street and is approximately 800 feet long. The second spur terminates at a plywood facility in the area and is approximately 2,000 feet long.
3-221

3.11.1.3 River Transportation

River transportation in the project vicinity includes barge and boat shipping transport on the Columbia River, which is located about two miles south of the project site and runs predominantly east to west towards the Pacific Ocean. The Columbia River is a major throughway used for transporting commodities such as grain, wheat, and lumber down river from the interior Pacific Northwest to ports such as the Ports of Longview and Vancouver for shipping to various U.S. and international destinations. The Columbia River also is used to ship goods upriver to destinations in the interior Pacific Northwest. Although there are many hydroelectric dams and associated lockage facilities along the Columbia River, the only such facility between the Pacific Ocean and the project site is Bonneville Dam, at about river mile 146 on the Columbia River.

Barges moving upriver from the Ports of Longview or Vancouver are transported to the Bonneville Dam using tug boats. The barges and tugs bypass the Bonneville Dam via the lockage facility at the Dam. The Bonneville lockage facility accommodates commercial, government, and recreational vessels. The heaviest lockage traffic on average occurs during the month of August. Vessel traffic is typically heaviest on Thursdays, Fridays, Saturdays, and Sundays. River vessels then continue upriver past the SDS facility in Bingen. At this SDS facility, there is a dock and crane suitable for unloading heavy materials and other equipment.

3.11.1.4 Air Transportation

Air transportation in the regional area includes the Portland International Airport approximately 60 miles southwest of the proposed project site, and several other smaller public and private local airports within a 10-mile radius.

3.11.2 IMPACTS

To determine potential transportation impacts, the Skamania County Public Works Department Manager, the County Engineer, and the Maintenance Superintendent were consulted. Potential impacts to potential project access routes were considered, and levels of service were estimated for the construction and operation periods. Impacts were considered high if they would result in a decrease in LOS to below the Skamania County standard of LOS C at a given intersection after mitigation. Impacts would be moderate if the project would result in a modest change to traffic volumes, patterns, or LOS. Impacts would be low if the project would result in no noticeable change to traffic volumes, patterns, or LOS. Potential impacts to rail, river, and air transportation also were evaluated to determine whether there would be significant increases in uses or interference with their operations.

3.11.2.1 Proposed Action
Construction

Impacts to Project Vicinity Roadways

During project construction, various types of construction vehicles would access the project site. Most project construction vehicles would be expected to travel to the general project vicinity via

3-222

SR 14 since it is the most convenient major highway leading to the area. From SR 14, the construction access route would follow Cook-Underwood Road to Willard Road, and then use a short segment of newly-constructed roadway to access West Pit Road (see Figure 3.11-2). From West Pit Road, construction vehicles would use a network of existing, improved, and new private logging roads at the site to access areas where project facilities would be built (see Figure 3.11-3).

Project construction would last for approximately one year, and would involve transport of large wind energy components, such as the tower sections, the nacelle and turbines, and blades, to the project site during a two to three month period. All wind energy components initially would be delivered from their manufacturing points to one of two ports in Washington state – either the Port of Longview or the Port of Vancouver. From these Ports, the project components would be transported to the project site. Potential methods for transporting these materials to the project site include:

• Using specialized trucks that would use existing State, County, City, and private

roadways to deliver the components directly to the project site;
• By train via the existing Burlington Northern Santa Fe rail lines that run parallel to SR 14 to deliver the components to an existing SDS facility in Bingen, Washington, and then using specialized trucks to deliver these components to the project site; and
• By barge and tug boat up the Columbia River and through the lockage facility at the Bonneville Dam to SDS's existing facility in Bingen and then via specialized trucks to the project site.

Potential impacts associated with specialized trucks are discussed in this subsection of the analysis; the rail and river transport options are discussed later in this section. The specialized trucks used for transporting wind energy components could have loads as high as 17.5 feet tall measured from the ground to the highest point of the load, as wide as 14.5 feet, and/or as long as 150 feet. While most of these trucks would not exceed the WSDOT legal load limit, some trucks could have a gross vehicle weight in excess of 105,500 pounds. Trucks with loads in excess of the legal load limit could degrade the condition of the existing roadways along the proposed haul route, and may require additional axles in order to distribute the weight of the load. Permits would be required for all oversized and overweight vehicles.

Most specialized trucks delivering components directly from either of the Ports to the project site would be expected to use SR 14 to the west junction of Cook-Underwood Road with SR 14 at MP 56.28 (see Figure 3.11-2). These trucks would encounter restrictions on SR 14 that are summarized in Table 3.11-6, and could require additional traffic control measures. However, SR 14 would not require improvements to accommodate the trucks the transport of wind energy components.
Comments: These "specialized trucks" would be traveling in the National Scenic Area, on two lane roads that are used by a lot of tourists. Of course there would be impacts to local, tourist, and other truck traffic! What we don't know from this DEIS is how horrible these impacts would actually be. And, we don't know how they would degrade the roads and who would be responsible for fixing these roads.

3-223

33758687_123.cdr

Figure 3.11-3

Source: GeoDataScape. Project Site Roadway Network

Due to the road constraints discussed in Section 3.11.1.1 and identified in Table 3.11-6, the use of specialized trucks on SR 14 may not be physically possible for some extremely large or wide loads. An alternate route would be for trucks to use I-84 through Oregon to the Boardman junction, then along SR 730 to the junction of I-82 with SR 395, across the Columbia River back into Washington State and then to SR 14. Trucks traveling on SR 14 in this direction, between the junction of I-82/SR 395 and Cook-Underwood Road, would be constrained by one very narrow tunnel with a height restriction of 13 feet 3 inches measured vertically from the edge of the roadway. There also are several additional Columbia River crossings west of the I-82/SR

395 crossing, but each has weight restrictions that would prohibit the transport of wind energy components. These crossings include the Bridge of the Gods, the Hood River Bridge, SR 197, and SR 97.

Table 3.11-6 Road and Bridge Restrictions for Oversize Motor Vehicles on SR 14 (all restrictions apply in both directions)

Milepost Heighta Width Length
18.89 to 34.68
(west of project)
Loads over 10' wide require 1 front
and 1 rear pilot cars
19 to 56
(west of project)
Loads over 14' wide require 2
front and 1 rear pilot cars
19 to 83.53
(west and east of
project)
Loads over 125' –
trailer/load length
prohibited
56.28 to 63.25
(west of project)
All over-height (14') loads must
contact WSDOT Goldendale Office
Detour via Cook-Underwood Road
must be approved by Skamania
County
No loads over 12' wide allowed
Loads between 8.5 and 10'
wide require 2 front and 1 rear
pilot cars
65 to 65 Hood River
Bridge Crossing
(east of project)
No over-width loads allowed
76.77 to 76.91
(east of project)
All over-height (14') loads must
contact WSDOT Goldendale Office
Loads over 10' wide require 2
front and 1 rear pilot cars

a. Heights are measured from the ground to the highest point on the load.
For wind energy components transported either by rail or barge as discussed below, these

components would be delivered from either of the Ports to the existing SDS facility in Bingen, Washington, and then loaded onto specialized trucks at this facility. The trucks would then transport the components to the project site. The route for these trucks would include approximately 0.25 mile of Maple Street in Bingen, Washington. Maple Street was recently constructed and is in good condition. Maple Street has two 12-foot lanes, a wide concrete sidewalk on the east side, and a paved shoulder on the west side. There are currently no oversize or overweight restrictions for this road.

Specialized trucks leaving the SDS facility would then follow SR 14 to the east junction of SR 14 and Cook-Underwood Road at MP 63.32. This portion of SR 14 has a restriction on loads over 125 feet in length. Special provisions and/or permitting may be required to transport the turbine blades (the longest components) to the junction of SR 14 and Cook-Underwood Road at MP 63.32 from the junction of SR 197 (MP 83.50).

3-225

Improvements to County and private roads between SR 14 and the project site would be necessary to support the long and heavy loads that would be required for the delivery of the wind energy components. These improvements would include widening and rebuilding sections of the existing roadway network, as well as placing asphalt on some roads that would be used for hauling equipment and project components to the project site. All existing county roadways requiring improvements prior to hauling would be designed and constructed in accordance with the WSDOT Design Manual (WSDOT 2007) and A Policy on Geometric Design of Highways and Streets (AASHTO 2004).

Cook-Underwood Road contains a bridge that crosses the Little White Salmon River near its northernmost point at approximate MP 5.5. Specialized trucks would be required to meet Skamania County provisions for oversized and overweight loads. Cook-Underwood Road would require no improvements to accommodate the transport of wind energy components. However, specialized trucks transporting wind energy blades, the longest single wind energy component, eastbound on SR 14 onto Cook-Underwood Road at MP 56.28 or westbound onto Cook-Underwood Road at MP 63.32 would require a 135-foot inside turning radius, and a 20-foot allowance for "tip swing."

In addition, temporary widening of the intersection of Cook-Underwood Road and Willard Road would be required to accommodate the required truck turning radii for westbound trucks transporting wind energy blades to the project site. Widening could include removal of some trees and vegetation, and engineered fill sections and embankment cut sections. The engineered fill and embankment cut sections would not require paving, but would require an all-weather driving surface. The exact amount of right of way or easement that might be required from adjacent property owners would depend on the turbines chosen, and would be determined during final design. Following construction, the area would be re-vegetated. No other improvements would be required along Willard Road to accommodate the transport of wind energy components

A new direct connection across property owned by SDS would be required between Willard Road and West Pit Road for transport of larger project components to the project site. The

intersection of Willard Road and West Pit Road would be designed to accommodate the required truck turning radii. In addition, West Pit Road would require additional permanent widening to accommodate transport of wind energy components to the project site. West Pit Road would be improved to provide a minimum drivable section width of 25 feet (width of finished road), with an additional 5 feet of shoulder on either side, with allowance for side slope and drainage. The one existing culvert, which was upgraded during the summer of 2009, may need some additional lengthening if the roadway is widened over the culvert. Widening could include removal of trees and vegetation, and engineered fill sections and embankment cut sections. The engineered fill and embankment cut sections would not require paving, but would require an all-weather driving surface.

Roadway Construction at the Project Site

To provide access to all of the proposed wind tower locations, approximately 7.9 miles of existing roads would be improved and about 2.4 miles of new private access roads would be constructed at the project site (see Figure 3.11-3). All roadway improvements and new construction at the proposed project site would be designed and constructed in accordance with

3-226

the standards for the applicable road classifications as set forth in the Skamania County Private Road Guidelines and Development Assistance Manual, as adopted by the County Resolution in 2008.

New gravel roadways would extend toward and run along the turbine strings. Roads extending towards the turbine strings would be designed for a minimum drivable section width of 25 feet with allowance for side slope and drainage. Roads running along or between the turbine strings would be designed for a minimum drivable section width of 25 feet with an additional 5-foot section on both sides to accommodate drainage and clearance for the project crane that would be on site to assemble the tower sections, the nacelles, and blades. All newly constructed roads would be constructed with an all-weather driving surface.

During construction, parking would be located at the construction staging area and along the proposed project site access roads. Parking along turbine string roads would be primarily for those employees working on foundations, electrical infrastructure, and turbines. Vehicles would park in areas that would be already temporarily or permanently disturbed from other construction activities. No additional ground disturbance would occur solely for construction parking requirements.

Impacts to Traffic Volumes and LOS

During project construction, there would be an increase in traffic activity in and around the project site due to the construction workforce, equipment deliveries, and empty trucks returning to SR 14. Traffic delays could occur on project area roads due to the maneuvering of large vehicles carrying heavy and/or long loads. In addition, it is expected that approximately 265 personnel would be on site at the same time while multiple construction disciplines conduct work

concurrently. Between 65 and 75 percent of the construction labor force would most likely be hired from the cities of Portland and Vancouver; of these, most are expected to commute daily to and from the project site. The remaining 25 to 35 percent of the work force would most likely be residents of Skamania, Klickitat, and Hood River counties.

Traffic volumes during construction were estimated for the west and east junctions of Cook-Underwood Road with SR 14. The estimated traffic volumes assume that all construction vehicles related to project construction would travel through either the east or the west junction Cook-Underwood Road with SR 14; if other routes were used, the actual impacts to these junctions would be less.

Table 3.11-7 compares estimated traffic volumes without the proposed project to estimated traffic volumes with the proposed project during the peak construction period. As shown in this table, it is expected that at the peak of construction (a period of three to five months) during the AM peak hour, approximately 210 construction vehicles would travel through either junction of SR 14 and Cook-Underwood Road. During the PM peak hour, approximately 10 construction vehicles would be expected to travel through this same junction. Also during this construction peak, an increase of up to 275 vehicles total would be southbound on Cook-Underwood Road from the project site during the PM peak hour.

3-227

Table 3.11-7
Estimated 2011 Traffic Volumes
during Peak Construction Period

Location West Junction of Cook-Underwood Road
with SR 14
East Junction of Cook-Underwood Road
with SR 14
2011 Without Project 2011 With Project 2011 Without Project 2011 With Project
AM Peak PM Peak AM Peak PM Peak AM Peak PM Peak AM Peak PM Peak
Eastbound
SR 14 160 100 370 105 180 110 390 115
Westbound
SR 14 70 230 160 240 80 260 170 270
Southbound
Cook-
Underwood
Road
10 10 20 285 10 10 20 285

AM Peak Hour is 7:00 AM to 8:00 AM

PM Peak Hour if 4:00 PM to 5:00 PM

Peak-hour LOS analyses were completed for both the west and east junctions of SR 14 and Cook-Underwood Road using estimated 2011 traffic volumes, including non-project traffic and traffic related to construction. The analysis assumed that 65 to 75 percent of construction traffic trips would travel to and from west of the project site on SR 14, and 25 to 35 percent of construction traffic trips would travel to and from east of the project site on SR 14. Many of these trips would occur outside of the peak periods, depending on their origin location and start time. Analyses results are presented in Table 3.11-8.

Table 3.11-8
Level of Service during Construction

Location Peak Hour
Estimated 2009
LOS
Estimated 2011 LOS
Without Project With Project
Delay
(sec/veh) LOS
Delay
(sec/veh) LOS
Delay
(sec/veh) LOS
West Junction of Cook-Underwood Road
SR 14
Eastbound Left Turn
AM 7.6 A 7.6 A 8.4 A
PM 7.9 A 8.0 A 8.0 A
Cook-Underwood Road
Southbound Left/Right Turn
AM 9.4 A 9.4 A 14.7 B
PM 10.0 A 10.1 B 14.1 B
East Junction of Cook-Underwood Road
SR 14
Eastbound Left Turn
AM 7.6 A 7.6 A 8.4 A
PM 8.0 A 8.0 A 8.1 A
Cook-Underwood Road
Southbound Left/Right Turn
AM 9.4 A 9.5 A 15.1 B
PM 10.2 B 10.3 B 14.7 B

Delay = Average per vehicle

Based on this analysis, estimated 2011 traffic volumes, including construction vehicles, would have minimal impact on the LOS at either junction of SR 14, which would maintain LOS A. For vehicles turning left or right from Cook-Underwood Road at either the west or the east junctions

of Cook-Underwood Road with SR 14, delays would increase up to approximately six seconds per vehicle over estimated 2011 conditions. The southbound approach on Cook-Underwood

3-228

Road at the west junction with SR 14 would experience degradation in LOS from A to B during the AM hour over estimated 2011 operations. The southbound approach on Cook-Underwood Road at the east junction with SR 14 would experience degradation in LOS from A to B during the AM peak hour over estimated 2011 operations. LOS B operations would be maintained at both the west and east junctions of Cook-Underwood Road with SR 14 during the PM peak hour with no change in LOS over year 2011.

Traffic Hazards

Traffic hazards associated with construction projects generally relate to accidents. Construction of the project would require that many construction vehicles, including trucks with oversized and overweight loads, share the existing roadway network with the general public. As a result, some accidents could occur that would be directly attributable to construction traffic. This increase is expected to be temporary and minimal. Prior to project construction, coordination would be required between the owner, contractor, the Cities of Bingen and White Salmon, Skamania County, and WSDOT to ensure the highest level of safety possible for both the traveling public and the construction vehicles. This coordination would be particularly important during the summer months when the cities of Bingen and White Salmon experience an increase in traffic volume from recreational activities in the surrounding area.

SR 14 in the vicinity of the proposed project site is a two-lane undivided rural highway with limited access. Access points in the proposed project vicinity do not include roadway channelization for turning movements. PM peak traffic volumes at both the east and west intersections of SR 14 with Cook-Underwood Road would increase from an estimated 10 vehicles without the project to an estimated 285 vehicles with the project (see Table 3.11-7). While traffic delay would increase by approximately four seconds (see Table 3.11-8), LOS at both intersections in the PM peak would remain at LOS B. Construction worker traffic (workers travelling to and from the job site) is anticipated to have minor effects on traffic safety. Potential moderate impacts to travel safety could occur due to the turning movements of oversized and overweight trucks onto and off of Cook-Underwood Road during the peak construction period.

Impacts to Railroad Transportation

Some wind energy components also may be transported from either the Port of Longview or Port of Vancouver by rail to the existing SDS facility in Bingen, Washington. Wind energy components on rail cars can be up to 14.5 feet in width, up to approximately 15 feet in height, and as long as 150 feet. The wind energy components likely would be transported on standard or heavy-duty 89-foot long flat rail cars. These components would be off-loaded at the SDS facility to a staging location to be determined and loaded onto specialized trucks for transport to the project site.

Although the Burlington Northern Santa Fe rail line between Vancouver, Washington and the SDS facility could accommodate most wind energy components, this rail line may not be able to accommodate loads with widths in excess of 14 feet. This may preclude transport by rail of the wide bottom sections of the wind turbine towers; however, the nacelles, turbines, blades, and upper sections of the wind turbine towers still could be transported by rail. Because rail transport would only be used for components that could safely be transported by rail and would

3-229

be accomplished within existing railroad schedules, impacts to rail transportation are expected to be minimal to low.

Impacts to River Transportation

Potential impacts to river transportation would occur only if wind energy components were transported by barge from either the Port of Longview or Port of Vancouver to the SDS facility in Bingen, Washington. The wind energy components would be transported from the Ports upriver to the Bonneville Dam using by barges and tugboats. The barges and tugboats would bypass the Bonneville Dam via the lockage facility, and continue upriver to the existing SDS facility in Bingen, Washington. The wind energy components would be off-loaded at the SDS facility to a staging location to be determined and loaded onto specialized trucks for transport to the proposed project site.

Comment: What types of "specialized trucks" are we talking about here? How much do they weigh? What is this "staging location" and where is it located? Surely SDS knows where they can or cannot off-load any barged equipment!

There would be no oversized or overweight restrictions using barges at either of the Ports, on the Columbia River, or at the lockage facility at the Bonneville Dam. Coordination with the Bonneville Dam Project Office would be required to determine optimal times for lockage use. Because there would be no interference with river operations and shipping of project materials would be accomplished within existing lockage schedules, construction impacts to river transportation are expected to be minimal to low.

Impacts to Air Transportation

Temporary construction equipment such as cranes and derricks that would be used for the construction of the proposed towers could pose a hazard to aviation safety during the construction period, depending on their height. A "Determination of No Hazard to Air Navigation" likely would need to be obtained for certain taller wind energy components, such as the wind turbines, that would be constructed at the project site. It is not expected that local or regional airports would be used for transporting construction equipment or material, and no air transportation impacts would be anticipated.

Operation

Project operation would generate small volumes of additional traffic associated with workers commuting to the project and occasional service delivery trips. Project operation workers would generate approximately 30 daily trips, with service delivery trips ranging from zero to usually no more than four daily trips. Although the project will operate 24 hours a day, seven days a week, using an automated system, the operations crew would typically work eight-hour days Monday through Friday. The distribution of operational traffic trips is expected to be the same as for construction trips.

Impacts to Project Vicinity Roadways

Vehicles trips generated during project operation would consist primarily of employees commuting to and from the site in their personal vehicles. The number of additional trips, and the types of vehicles used, are not expected to exceed State or County roadway legal load limits. These vehicles would not contribute to roadway degradation.

3-230

Impacts to Traffic Volumes and LOS

Peak-hour traffic volumes were estimated for operations at both the west and east junctions of SR 14 and Cook-Underwood Road. These estimates include 2012 baseline traffic volumes and the project-generated traffic volumes. Like the analysis of traffic volumes during construction, the estimated traffic volumes assume that all vehicles during project operation would travel through either the east or the west junction Cook-Underwood Road with SR 14; if other routes were used, the actual impacts to these junctions would be less. Table 3.11-9 compares estimated traffic volumes without the proposed project to estimated traffic volumes with the proposed project during full operation of the project.

Table 3.11-9
Estimated 2012 Traffic Volumes during Operation
at Junctions of Cook-Underwood Road and SR 14

Location
West Junction of Cook-Underwood Road
with SR 14
East Junction of Cook-Underwood Road
with SR 14
2012 Without Project 2012 With Project 2012 Without Project 2012 With Project
AM Peak PM Peak AM Peak PM Peak AM Peak PM Peak AM Peak PM Peak
Eastbound
SR 14 170 100 180 100 180 110 190 110
Westbound
SR 14 70 240 75 240 80 260 85 260
Southbound
Cook-
Underwood

Road
10 10 10 25 10 10 10 25

AM Peak Hour is 7:00 AM to 8:00 AM

PM Peak Hour if 4:00 PM to 5:00 PM

Peak-hour LOS analyses were completed for both the west and east junctions of SR 14 and Cook-Underwood Road, based on the estimated 2012 traffic volumes. The results indicate that operations would have a minimal impact on the LOS for either the west or the east junctions of Cook-Underwood Road with SR 14. Delays would increase slightly—less than one second per vehicle—for vehicles turning left or right from Cook-Underwood Road at either the west or the east junctions of Cook-Underwood Road with SR 14 over estimated 2012 operations. LOS A and B operations would be maintained during the AM and PM peak hours at both the west and east junctions of Cook-Underwood Road with SR 14 with no change in LOS over year 2012. Analyses results are presented in Table 3.11-10.

3-231

Table 3.11-10
Level of Service during Operation

Location Peak Hour
Estimated 2009
LOS
Estimated 2012 LOS
Without Project With Project
Delay(sec/veh) LOS
Delay(sec/veh) LOS
Delay(sec/veh) LOS
West Junction of Cook-Underwood Road
SR 14
Eastbound Left Turn
AM 7.6 A 7.6 A 7.6 A
PM 7.9 A 8.0 A 8.0 A
Cook-Underwood Road
Southbound Left/Right Turn
AM 9.4 A 9.4 A 9.7 A
PM 10.0 A 10.2 B 10.4 B
East Junction of Cook-Underwood Road
SR 14
Eastbound Left Turn
AM 7.6 A 7.6 A 7.6 A
PM 8.0 A 8.0 A 8.0 A
Cook-Underwood Road
Southbound Left/Right Turn

AM 9.4 A 9.5 A 9.8 A
PM 10.2 B 10.3 B 10.6 B

Delay = Average per vehicle

During operations, employees would park at the Operations and Maintenance facility parking lot. There would be approximately 10 vehicles each day, including employee and delivery vehicles. A maximum of approximately 20 vehicles are expected to be parked in the Operations and Maintenance facility parking lot at any one time. A visitor kiosk is also planned at the Operations and Maintenance facility that would provide tourists with a safe place to view and learn about wind turbines. The parking lot would be sized to accommodate these uses.

Traffic Hazards

Because of the low volumes and infrequent trips, project operation is not expected to increase traffic hazards or accident occurrences.

Impacts to Railroad and River Transportation

Once construction is complete and the project is operational, it is expected that there would not be any use of railroad or river transportation for the proposed project. Because there thus would be no interference with railroad or river operations, there would be no expected impacts to railroad and river transportation during project operation.

Impacts to Air Transportation

The proposed wind turbines would not be expected to conflict with arriving or departing aircraft from either the public or private airports within the project vicinity. All towers would meet Federal Aviation Administration regulations regarding lighting. A "Determination of No Hazard to Air Navigation" would be obtained for the proposed project. The Federal Aviation Administration would need to be notified of any alterations to the wind turbine towers that could affect air space.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant will provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site

3-232

preparation. The plan will address site restoration that would occur at the conclusion of the project's operating life (estimated to be 30 years), and restoration in the event the project is suspended or terminated during construction or before it has completed its useful operating life. The plan will include or parallel a decommissioning plan for the project.

The initial site restoration plan will be prepared in sufficient detail to identify, evaluate, and

resolve all major transportation issues presently anticipated, including impacts to traffic volumes and LOS standards. If impacts to transportation are anticipated to occur as a result of site restoration and project decommissioning, mitigation measures will be proposed as part of the plan.

3.11.2.2 No Action Alternative

Under the No Action Alternative, the project would not be constructed and therefore no additional auto or truck trips would be added due to the project. No impacts upon any type of transportation (road, rail, air, or river) would occur.

3.11.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, reduce, or compensate for potential project impacts to transportation.

• Prepare and implement a Transportation Management Plan to direct and obligate the contractor to implement procedures to minimize traffic impacts in consultation with both WSDOT and Skamania County. The plan should be submitted to EFSEC for approval
and include requirements for coordination of project-related construction traffic and WSDOT planned construction projects, along with requirements for coordination of project-related construction traffic and Skamania County, City of Bingen, and City of White Salmon summer recreational traffic.
• Comply with State and County permitting requirements for over-size and over-weight vehicles.
• Notify land owners in the project vicinity prior to construction of transportation routes that would be used for construction equipment and labor.
• Place approved State and/or County advanced warning construction signs prior to and during construction.
• Use certified flaggers when necessary to direct traffic when over-size and over-weight trucks either enter or exit public roads, to minimize risk of accidents.
• Avoid restricting traffic flow for more than 20 minutes during the construction phase.
• Use pilot cars both in front of and behind all trucks transporting over-size or over-weight loads on all public roadways. For all loads over 10 feet wide traveling on SR 14 from east of the proposed project site between MP 76.77 and MP 76.91, use three pilot cars, two in

3-233

front and one in the rear. The two front pilot cars would be required to maintain a minimum 500 feet of separation. The lead pilot car would warn oncoming traffic of the over-size load, and the pilot car immediately in front of the over-size load would be responsible for stopping all oncoming traffic.
• Design and build all access road improvements or new construction according to WSDOT and Washington State access management standards.
• Conduct pre- and post-haul construction visual assessments of roadway surface conditions to identify weak or deteriorated areas along the haul route that may require repair as a result of

project-related traffic. Following the end of construction, repair all pavement sections affected by project-related traffic as needed to pre-construction
conditions or better.
• Perform all snow removal from project access roads in a safe manner that does not degrade roadway conditions.

3.11.4 UNAVOIDABLE ADVERSE IMPACTS

No major unavoidable adverse impacts to traffic and transportation have been identified. Construction of the project is anticipated to have very minor impacts to LOS standards, and to have a potential very minor impact on traffic safety. Operation of the project is anticipated to have little to no impact to transportation.

3.11.5 REFERENCES

American Association of State Highway and Transportation Officials (AASHTO). 2004. A Policy on Geometric Design of Highways and Streets.

Transportation Research Board (TRB). 2000. Highway Capacity Manual.

Southwest Washington Regional Transportation Council (SWRTC). 2009a. Skamania County Regional Transportation Plan. May. Accessed October 2009 at: http://www.rtc.wa.gov/reports/mtp/Rtp2009Skamania.pdf.

———. 2009b. Klickitat County Regional Transportation Plan. May. Accessed October 2009 at: http://www.rtc.wa.gov/reports/mtp/Rtp2009Klickitat.pdf.

Washington State Department of Transportation (WSDOT). 2007. Design Manual. Publication M 22-01.

———. 2008. 2008 Annual Traffic Report.

———. 2009a. Statewide Transportation Improvement Plan (on-line project database). Accessed October 2009 at:

http://eefmapps.wsdot.wa.gov/fmi/xsl/STIP/search_agency.xsl?-db=STIP&lay=websearch&-view.

3-234

———. 2009b. SR 14 Project Camas-Washougal Widening and Interchange Web Page. Accessed October 2009 at: http://www.wsdot.wa.gov/projects/sr14/camaswashougal/.

3.12 PUBLIC SERVICES AND UTILITIES

This section describes impacts to public services and utilities. The project area and site are served by a variety of public services and utilities. Public services discussed include fire

protection, law enforcement, emergency medical services and schools. Utilities discussed include telephone, electric, sewer, water and solid waste disposal.

3.12.1 AFFECTED ENVIRONMENT

3.12.1.1 Public Services
Fire Protection

As discussed in Section 3.6.1.2, Public Health and Safety, fire protection services are provided by two city fire departments (North Bonneville and Stevenson) and seven Skamania County fire districts provide fire protection to Skamania County residents. DNR also provides fire suppression services to forested areas in Skamania County, and would be the first responder to a fire emergency at the project site (J. Weeks, personal communication).

Law Enforcement

As discussed in Section 3.6.1.3, Public Health and Safety, the Skamania County Sheriff's Office would provide law enforcement services to the project. Sheriff's Office headquarters are located in Stevenson, approximately 15 miles southwest of the project site. The response time from Sheriff's Office headquarters to the project site is approximately 20 minutes.

Additionally, the Washington State Patrol patrols SR 14, which is south of the site. Construction and equipment delivery vehicles would travel on SR 14. Roads extending north of SR 14 are county roads, and are patrolled by the Sheriff's Office.

Emergency Medical Services

As discussed in Section 3.6.1.4, Public Health and Safety, two ambulance companies would respond to an emergency at the Project site: Skamania County Emergency Medical Service and Skyline Ambulance. Skamania County Emergency Medical Services is the functioning entity of Skamania County Hospital District No. 1, which provides ambulance service to the residents of Skamania County. Skyline Ambulance is based at Skyline Hospital in White Salmon, and is equipped with three ambulance vehicles.

The two hospitals closest to the project are Skyline Hospital in White Salmon (7 miles southeast of the project) and Providence Hood River Memorial Hospital in the City of Hood River (8 miles southeast of the project).

3-235

Schools

The public school closest to the project site is the Mill A School, which is approximately 2 miles southwest of the site. The next closest public schools are in the community of Carson, approximately 10 miles west of the site. School buses may drive through neighborhoods near the project site, including Willard and Mill A, which are located approximately 2.25 and 1.5 miles

respectively from the site.

Mill A School District No. 31 provides public educational services to the population in the district (ESD 2008). Mill A School currently enrolls 81 students in grades K through 8 in the southeastern corner of Skamania County adjacent to the project site. High school students living within the boundaries of the Mill A School District attend Stevenson High School in the Stevenson-Carson School District No. 303, which borders Mill A School District No. 31 on the west. Table 3.12-4 shows that over the last few years, enrollment in these five districts has not changed more than five percentage points, on average.

Table 3.12-1
Enrollment Trends
in the Whistling Ridge Energy Project Vicinity

Mill A School District
Mount Pleasant School District
Skamania School District
Stevenson-Carson School District
Washougal School District
Fall 2004 79 65 64 1,049 2,870
Fall 2005 76 63 72 1,069 3,015
Fall 2006 66 56 70 1,058 3,057
Fall 2007 69 56 68 1,020 3,054
Annual Average
Rate of Growth,
2004-2007
-4.4% -4.8% 2.0% -0.9% 2.1%

Source: Washington State OSPI (2008).

There are no higher education facilities near the project area. The higher education facilities closest to the site are located in Vancouver, Washington.

3.12.1.2 Utilities

The site area is served by the following utilities:

- Telephone: Embarq
- Electric: Skamania County Public Utility District (PUD)
- Sewer: Individual septic systems
- Water: Individual wells
- Solid Waste Pickup: Skamania County

3-236

Embarq provides telephone service to the area surrounding the site (D. Cox, personal communication). The Skamania County Public Utility District (PUD) is a customer-owned utility that provides electricity service to Skamania County. The PUD's primary source of power is obtained from BPA, which markets power generated by the federal hydroelectric facilities along the Columbia River. The PUD's backup power source is the Condit Dam. The PUD has expressed interest in using the project as a source of backup power when the Condit Dam is removed.

The homes and businesses in Mill A and Willard do not have sewer service or water service, and are served by individual wells and septic systems.

Skamania County provides solid waste pick-up service to residences and businesses in the County, including those near the project site (Skamania County PUD office staff, personal communication). The majority of solid waste from Skamania County is delivered to the Roosevelt Regional Landfill in Klickitat County (WSSWIC 2009). The landfill began operations in 1990, and as of 2000 had in excess of 140 million tons of remaining permitted capacity. The landfill site contains more than 2,000 acres in which additional capacity could likely be permitted (Klickitat County 2000).

3.12.2 IMPACTS

3.12.2.1 Proposed Action

The potential impacts of the proposed project on public services and utilities include those from construction and operation.

Construction

The use of construction workers from outside the immediate area could result in a minor and temporary increase in the demand for public services including police departments, providers of emergency medical services, and local fire departments.

The impact of project construction on local schools would be at most minor and temporary, as few out-of-area construction workers are likely to be accompanied by families for this temporary construction project.

Construction-related impacts to local utilities providing telephone, electric or solid waste pickup are also expected to be minor and temporary. Most workers would not be in the area for long enough to obtain these services; those who stayed in temporary housing in the area would not remain for more than a few months.

The presence of construction vehicles on area roads would not impact the response times for emergency providers. Construction trucks would represent additional volume on area roads, but transportation LOS would remain at LOS A or B (delays of less than 15 seconds), and thus would not cause substantial delays to emergency response vehicles. Construction activities themselves would take place entirely within land managed for commercial forestry by the Applicant, and would not impact local emergency providers.

3-237

Fire Protection

The project site is generally forest land. The only structures proposed on the forest lands are the towers, associated transformers and substation, and the Operations and Maintenance facility. Project construction could temporarily increase the risk of fire at the project site and in the broader project area. As the landowner, S.D.S Co., LLC has the ability to respond to fires on their forest land with dozers and water trucks.

Fire response on forest lands is provided by DNR. They have resources in the area and respond to all wildland fires. DNR would likely respond to a structure fire in the woods, as would Underwood Fire District and Mill A Volunteers. Mill A Volunteers is not a recognized fire district with a tax base but a volunteer fire company; the group has joint responder agreements with Underwood and DNR.

Underwood Fire District is the nearest local fire district and has submitted a comment (scoping comment #108) to EFSEC regarding their ability to respond to fires and provide services. The Underwood fire chief commented:

"The area designated for the energy project is outside our district; DNR is the official service provider for these areas. The Project may have a generally positive impact on the ability of our department and DNR to offer fire protection
services to the area because new roads, extensions, and improved existing roads will provide better access for all first responders. If necessary, Fire District 3 can provide service coverage to the Project area without any reduction in service capacity to our constituency. We do not have a contract to provide service to the area. The project does not present any challenges or requirements for which we are not already prepared to respond."

There are two potential locations for the Operations and Maintenance facility site, one on-site next to the substation and the alternative site along West Pit Road near the intersection with Willard Road. The alternative site would have a shorter emergency response time than the on-site option.

Law Enforcement

Construction activities associated with the project would increase traffic volume on roadways surrounding the project site, as a result of both commuting construction workers and the transportation of materials. This increased volume would likely occur in mid-summer to fall when vacationers use the roadways. It is possible that the number of accidents and calls for service along major roadways (e.g., SR 14 and I-84) would increase for approximately six months, after which most of the on-site work would be done.

The demand for traffic enforcement activities would peak when construction employment peaks at approximately 265 employees for approximately one month. Out-of-area workers are not

expected to move their families into the project area because each construction phase requiring workers with specialized skills would be completed within three and one-half months or less. They would likely either commute (from the Portland-Vancouver area) or stay in temporary housing for the period of time needed to complete their tasks. As described in Section 4.4

3-238

Socioeconomics of the Application for Site Certification, this analysis assumes that as many as 40 non-local workers could be employed at the project site during the peak construction month (this includes potential out-of-state workers) and would likely stay in temporary housing. There likely would be additional calls for response during the construction phase, primarily because of increased traffic and accident potential. However, because the construction period is short (approximately one year), the increased service calls are not anticipated to be sufficient in number to require additional law enforcement staff resources in the project area. See Section 3.11, Transportation, for further discussion of traffic safety hazards.

Comment: There is no real, data-based socio-economic analysis in the DEIS. SDS and BPA have failed to do any analysis on the socio-economic cumulative impacts to Skamania County as a result of this proposed project. During the public scoping period, SDS Lumber presented that a total of FIVE permanent jobs (some technical and others as watch personnel) would result from this project. As far as I can determine, pillaging 1000+ acres for five jobs is not a good return on our environmental investment!!

Emergency Medical Services

During project construction, the local demand for emergency medical services could increase slightly due to construction accidents that could occur at the project site or project vicinity. Project construction workers would be exposed to hazards caused by equipment failure, natural disaster, or human mistake that would require the services of local emergency response units to provide initial treatment and transportation to a local medical facility and the services of emergency rooms in the receiving facility. The specific level of demand for emergency medical service response is unknown.

With adequate safety measures in place, and considering the size of the construction workforce (which would temporarily reach a peak of 265 workers for one month) it is expected that project construction would generate few serious injury accidents requiring emergency medical services response. The two local hospitals (Skyline Hospital in White Salmon and Providence Hood River Memorial Hospital in Hood River) have capacity for additional patients and there are ambulances available to service the project site.

It is expected that an average of 31 and a peak of 40 construction workers would temporarily migrate to the local labor market from either outside the immediate tri-county area of Skamania, Klickitat and Hood River region or from out of state. However, because the duration of their stay in the project area would be short (approximately four months), it is unlikely that these temporary workers would create a noticeable increase in demand for emergency medical services during project construction.

Schools

An average of 21 (40 at peak) specialized non-local construction workers from out of the area would work on the project. However, the anticipated maximum duration of employment for each craft is three to three and one-half months, and few workers are anticipated to move their families to the area. Further, much of the construction will take place during the summer months when school is not in session. Consequently, construction is expected to cause little to no additional enrollment. The Mill A and White Salmon School Districts have the capacity to handle any influx. The White Salmon Valley School District commented during scoping:

"Economically this project has the potential to benefit the community and the school district by adding revenues without creating additional demands for services or impacts on the school system."

3-239

Construction traffic is not expected to lower transportation LOS below LOS A or B (delay less than 15 seconds), and consequently there would be little or no impact on school busses in the area.

Utilities

Water Supply. During the approximately one-year construction period, approximately 1.7 million gallons of water would be consumed for road compaction, dust control, wetting concrete, and other construction purposes. The construction contractor would supply water used during construction. Water would be delivered to the project site via water trucks and obtained from a local source with a valid water right. This impact would be negligible considering the temporary nature of the impact and the availability of adequate water supplies.

Wastewater. No impacts to community wastewater disposal systems are anticipated because the project would not be connected to a sewer system during construction. Sanitary wastes would be collected in portable toilets during construction. Disposal of sanitary wastes would be managed through a contract with a portable toilet vendor. The contractor would incorporate applicable state capacity requirements based on the construction worker population on the project site at any given time. Collected wastes would be managed and disposed of by the contracted vendor.

Solid Waste. During construction, the primary wastes generated would be solid construction debris such as scrap metal, cable, wire, wood pallets, plastic packaging materials and cardboard. The total volume of construction wastes is expected to be less than ten tons. This waste would be accumulated on site in drop boxes until hauled away to a licensed transfer station or landfill by either the construction contractor or the Skamania County Solid Waste Division.

The majority of solid waste from Skamania County is delivered to the Roosevelt Regional Landfill in Klickitat County (WSSWIC 2009). The landfill began operations in 1990, and as of 2000 had in excess of 140 million tons of remaining permitted capacity. The landfill site

contains more than 2,000 acres, in which additional capacity could likely be permitted (Klickitat County 2000).

Operation

Project operation would create a potential positive impact on public services and utilities. The project's assessed value could be as much as $87.5 million, and this would generate approximately $731,500 per year in property tax revenue and $50,000 in sales tax revenue. Assuming that an annual tax revenue of $731,500 would be distributed in the same manner as current property tax distributions, funds receiving the most revenue would be the State School Fund ($185,281), School District 405 Maintenance and Operations ($149,461), the County Road fund ($115,035), and the Current Expense fund ($111,086). The sales tax revenue would be split between Washington State (approximately $46,000) and Washington Counties, primarily Skamania and Klickitat Counties ($4,000). Section 3.13.2 Impacts provides additional information on revenue. Although impacts are expected to be minimal, a portion of these funds could nevertheless be used to upgrade existing public services and utilities in Klickitat County.

3-240

The project would have eight to nine on-site employees during operation. Given this small number, and considering the use of on-site services and emergency response plans, the project is expected to have minimal adverse impact on local public services and utilities.

Fire Protection

Fire protection would continue to be provided by S.D.S. Co., LLC, DNR, Underwood Fire District and Mill A Volunteers. Potential for fire during operations would be lower than during the construction period, and the remaining fire risk could be mitigated through appropriate operational practices. DNR has stated that resources for fire protection and suppression services are adequate to serve the project during construction and operation (J. Weeks, personal communication).

Wildfires in the project area are relatively rare, and DNR continually monitors fire conditions.

Turbine fires are possible; however, with the types of modern wind turbines proposed for the project, turbine malfunctions leading to fires in the nacelle are extremely rare. The turbine control system detects overheating in turbine machinery, and internal fires would be detected by these sensors, causing the machine to shut down immediately and send an alarm signal to the central supervisory control and data acquisition system, which would notify operators of the alarm by cell phone or pager.

Law Enforcement

The Sheriff's Office resources are generally adequate to serve the project during construction and operation, given that on-site security is provided by a separate party (D. Cox, personal communication). Whistling Ridge Energy LLC would likely contract locally for private security.

Emergency Services

The project would not result in a decrease in response times for area service providers during operation. The project's eight to nine permanent employees would not represent a substantial increase in traffic volumes on area roads that would impact emergency response, nor would project facilities result in additional traffic controls.

Schools

The addition of eight to nine employees, even if all were from outside the local area and had families, would represent a minimal impact to local schools, especially since they would likely live in more than one school district.

Utilities

Upon completion, the project and either of the proposed sites for the Operations and Maintenance Facility would be served by the following utility systems:

• Telephone. Embarq and Sprint. Both providers have adequate capacity to serve the site.
• Electric service. Skamania County PUD/BPA connection. Electricity would be used at the Operations and Maintenance building. The PUD has adequate capacity to serve the site. The impact would be the same at either alternative location for the facility;

3-241

however, the alternative site at West Pit Road would be closer to existing PUD lines. No new BPA infrastructure would be needed for the electrical transmission interconnection system beyond the proposed interconnection and substation.
• Drinking water. Estimated water use during operation would be less than 5,000 gallons per day, primarily for showers, kitchen, and bathroom for Operations and Maintenance staff. Since the staff would work eight-hour shifts Monday through Friday, total water use is likely to be equivalent or less than a single-family home. Water would be supplied by an on-site well. A well using less than 5,000 gallons of water a day would be exempt from permit requirements in RCW 90.44.040. The well would be installed by a well contractor licensed pursuant to Chapter 173-162 WAC, and in compliance with the requirements and standards of Chapter 173-160 WAC. The well would be installed consistent with Skamania County Community Development Department and Ecology requirements for the new wells.
• Wastewater. Sewer service would be provided through an on-site septic system. The Operations and Maintenance facility would use less than 5,000 gallons per day of water, and since sewer flows are determined by indoor water use, total sewer flow is also likely to be equivalent or less than a single-family home. There is adequate space on either the project site or the alternative Operations and Maintenance site for construction of a septic field of sufficient size to serve this demand. The septic system would be built by a septic tank installer licensed by Skamania County, in accordance with all requirements of the

Washington Department of Health and the Skamania County Community Development Department Environmental Health Division.
• Non-hazardous waste. Solid waste pickup would be provided by Skamania County through Allied Waste, which has one of three garbage collection franchises for the County. The Roosevelt Regional Land Fill has adequate space for any routine nonhazardous waste from the project. .

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant will provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan will address site restoration that would occur at the conclusion of the project's operating life (estimated to be 30 years), and restoration in the event the project is suspended or terminated during construction or before it has completed its useful operating life. The plan will include or parallel a decommissioning plan for the project.

The initial site restoration plan will be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential impacts on public services and utilities. If impacts to public services or utilities are anticipated to occur as a result of site restoration and project decommissioning, mitigation measures will be proposed as part of the plan.

3-242

3.12.2.2 No Action Alternative

Under the No Action Alternative the project would not be built. There would be no impacts to public services and utilities.

3.12.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, reduce, or compensate for potential project impacts to public services and utilities during construction or operation of the proposed project.

• Mitigate potential impacts to public services and utilities by using tax revenues generated by the project.
• Provide all local police, fire, and emergency medical agencies with emergency response information for the project, including employee contact information, procedures for rescue operations to the nacelles, and location of rescue basket. The Applicant would provide applicable emergency response information to local agencies prior to project construction and would review and update employee contact information annually and provide any changes to the appropriate agencies.
• Utilize fire precautions for staying abreast of fire conditions in the project area by contacting DNR. A Fire Protection and Prevention Plan would be developed for EFSEC approval and implemented, in coordination with the Skamania County Fire Marshall and

appropriate agencies. Both the wind turbine generators and the substation would be equipped with lightning protection systems. As seen in Table 3.6-5, Public Health and Safety, sources for potential fire and explosion along with measures to mitigate the risk of either occurring, are outlined.
• Maintain the use of a full-time security plan during project construction to reduce the potential need for increased police services to the project site. These law enforcement mitigation measures are outlined in Section 3.6.3, Public Health and Safety.
• Prepare emergency plans to protect the public health, safety, and environment on and off the project site in the case of a major natural disaster or industrial accident relating to or affecting the project. The construction specifications would require that the contractors prepare and implement a Construction Health and Safety Program that included an emergency plan. The Construction Health and Safety Program would include the following provisions:
- Construction Injury and Illness Prevention Plan
- Construction Written Safety Program
- Construction Personnel Protective Devices
- Construction On-Site Fire Suppression Prevention

3-243

- Construction Off-Site Fire Suppression Support
• Install the well supplying the Operations and Maintenance facility, at either of the two sites under consideration, by a well contractor licensed pursuant to Chapter 173-162 WAC, and in compliance with the requirements and standards of Chapter 173-160 WAC. The well would be installed consistent with Skamania County Community Development Department and Ecology requirements for the new wells.
• Coordinate and comply with the Skamania County Community Development Department Environmental Health Division, and would comply with all County and State septic tank and subsurface disposal field design, installation, and maintenance requirements

3.12.4 UNAVOIDABLE ADVERSE IMPACTS

The project would have no unavoidable adverse impacts to public services and utilities. The small amount of additional services and utilities that would be needed would be offset by the increased tax revenue.

Comment: When SDS first proposed this project, Mr. Jason Spadaro, SDS's president held a couple of community meetings in the area. I attended one of these meetings and took notes. These are my notes from the Mill-A meeting held on Aug. 11th, 2007: **My notes from the SDS August 11th, 2007 presentation on the Mill-A Wind Generation project called "Saddleback":** ***Audience questions are italicized.***

Jason Spadaro, SDS president gave the presentation and he had a representative from Puget Sound Energy, Brian Lentz (sp?) their partner in this project.

Jason/Skamania County has too much federal land base so it won't benefit from wind energy as much as other counties. [Why can't wind turbines be on Federal lands? There are cattle, sheep, miners, etc., using Federal lands! Why not wind turbines?]

Some questions that came to my mind as he spoke:

? What about migration routes for animals? Danger from blades? (Wasco just this week, of 27 August, had a fatality from a broken blade.)

? View shed? Visibility?

? Water issues?

? Transmission lines—how will the generated electricity get to market? Power stations?

Jamie Tolfree, Skamania County Commission for District 3, said that the county will get less timber dollars in the next 5 years; down by 30% by 2011.

Jason/We want to keep the power local. But he makes no promises. Jason said that tax rates for Mill-A residents could be lower. Jobs would be produced.

? But, would tax rates actually go down for Mill-A residents only? Or would the tax rate decline (if there is one) be spread out over the whole county and its residents?

? Costs to public?

? Are there any EPA regs for wind turbine noise?

? Are there tax credits given to start up wind energy companies?

Jason spoke of "turbine flicker" where sunlight flickers as it the sun shines through the blades. [It can be very annoying as anyone who has ever had outside branches "flickering" in the afternoon sun, can attest to!]

? FAA requirements?

? Affect on bats, owls, night-flying animals?

Jason has 4 years of data on sensitive, threatened, or endangered species for the project area. According to him, this is not an area where they would be in great numbers. [I think the Jason's survey may not be accurate!] The turbines are 80 meters tall (approx. 240 feet.)

Jason stated that BPA's transmission lines go through the property and that they would hook up with those lines. There are two types of transmission lines up there, 115 KV and 230 KV. Clyde Leach, one of three Skamania County Public Utility District

Commissioners, said that he would like to see SDS's project connect to the 115 KV line in order to improve PUD's service. [There are, apparently, transmission problems on the 115 KV line and there are power fluctuations.] Leach also said that the demand for turbines for wind energy production has created a backlog of in turbine production. Jason said that they are working on a 2010 timeline.

Roads/Jason—will necessitate year-round roads. Some will have to be upgraded. County roads may require upgrades and "we've talked to the county about this." (Too bad the county hasn't talked to the rest of us!)

? Who would pay for these upgrades? Environmental reviews? SEPA?

***Johanna asked about lightning strikes and possible fires.* Jason/The towers are grounded and there is a 50 foot radius gravel area around each tower. [The fire issue is a very big concern for residents in Mill-A.]**

***Mildred Boucher asked if the view shed from I-84 would be affected.* Jason/The turbines could possibly be seen from Mosier.**

***LeeLynn asked how much would the local schools get. What would be the benefit to the county?* Jason/State schools would get $171,000. We want economic benefit for Willard and Mill-A, but there's no tax mechanism to benefit these schools directly. The project area is actually in the White Salmon school district.**

? How are utilities taxed? What basis?

One member of the public suggested that SDS subdivide their land around Mill-A and Underwood so people could build more houses. Lots of loud disagreement from the group!!

Jason/We could help you form a fire district and then we could pay into your fire district. BUT everybody else would also have to pay into the fire district—which they don't do now. *A fireman in the audience spoke up: Could expand Underwood fire district except that Underwood has hit their levy limit.*

***Johanna/What kind of people are you going to need to upkeep the towers?* Jason/This is specialized work. A concrete 50 - 60 jobs during construction and 5 – 10 people to keep things going once the project is done. In Dayton, there are 83 towers and it takes 15 people to upkeep them. The technicians have to have knowledge about hydraulics and not be afraid of heights, etc.**

? Can SDS provide scholarships for trainees? Apparently there is a college program in The Dalles specifically geared toward wind power work.

? What is the guarantee that those 50 – 60 jobs will be local?

? How much of your project is being subsidized? **Jason/We would get a production credit of 1.98 cents/kwh for ten years. [This is a pretty good subsidy considering we pay less than 5 cents/kwh!]**

Jason/The substation and a maintenance building would be within a fenced area and would not be visible.

Neal/What type of permitting process do you have to do? **Jason/We have a pre-application conference with the county at the end of this month and next month. This project may require an EIS. May have to have scoping meetings. We estimate that the talks with the county could last 2 – 3 months. We're looking at 6 – 8 months on the low end and at least two public meetings. There might already be a record of certain environmental studies and we might not need to do a SEPA or NEPA.**

Jason is delusional if he thinks that this project would not require a SEPA or an EIS! It is interesting that Jason has been talking to Skamania county but there has been no public record of any meetings and this subject has not been on the commissioners' agendas.

Comment continued: There are no indications in this presentation that Skamania schools would get any benefits from this proposal. The $171,000 that Jason Spadaro talks about would go to the STATE school system to be distributed to all the school systems; the project area is actually in the White Salmon-Bingen, WA school district. There would not be, apparently, any benefits for the local fire district, either. Also, Jason did not speak to the amount of tax revenue that Skamania County would actually get from this proposal. The county's yearly budget is approximately $50,000,000, with less than $3,000,000 coming from property taxes. Since we don't have the data as to how much property tax this proposed wind farm would generate, there can really be no data-based cost-benefit analysis done on this proposal and any assumed benefits to Skamania County.

3.12.5 REFERENCES

Carlson, John. Skamania County Emergency Management. Phone conversation with Katie Carroz, Carroz Consulting LLC. December 30, 2008.

Cox, Dave. Undersheriff, Skamania County Sheriff's Office. Phone conversation with Katie Carroz, Carroz Consulting LLC. December 17, 2008.

Educational Service District 112 (ESD). 2008. School Districts, Skamania County. Accessed December 15 and 17, 2008 at
http://www.esd112.org/schooldistricts/skamania_county.html.

Fullerton, Gail A. and Ole Helgerson. 2008. Underwood Community Wildfire Protection Plan. Accessed December 12, 2008 at:

http://www.skamaniacounty.org/Wildfire/UnderwoodCWPP/Underwood%20CWPP%20 Draft.pdf.

Hovey, Russ. Department of Natural Resources. Phone conversation with Katie Carroz, Carroz Consulting LLC. January 13, 2009.

Klickitat County. 2000. 2000 Klickitat County Comprehensive Solid Waste Management Plan Update. Section 10.2.2. Accessed October 2009 at: http://www.klickitatcounty.org/SolidWaste/FilesHtml/SWMP/10-0.pdf.

Municipal Research and Services Center of Washington (MRSC). 2008. MRSC Website. Accessed December 17, 2008 at http://www.mrsc.org/Subjects/PubSafe/Fire/fireservice.aspx#Skamania.

Skamania County Public Utility District Office Staff. Phone conversation with Katie Carroz, Carroz Consulting LLC. December 30, 2008.

3-244

Skinner, Tracy. Washington Survey and Ratings Bureau. Email communications with Katie Carroz, Carroz Consulting LLC, December 12 through December 23, 2008.

Skyline Hospital. 2008. Skyline Hospital Website. Accessed December 19, 2008 at http://www.skylinehospital.com/index.html.

Washington Association of Sheriffs and Police Chiefs (WASPC). 2008. Criminal Justice Information: Crime in Washington. Accessed December 19, 2008 at http://www.waspc.org/index.php?c=Criminal%20Justice%20Information%20Support.

Washington State Office of the Superintendent of Public Instruction (OSPI). 2008. Data and Reports. Accessed December 15, 2008 at http://www.k12.wa.us/dataadmin/default.aspx.

Washington State Patrol. District 5 Public Information Contact, Phone conversation with Katie Carroz, Carroz Consulting LLC. January 26, 2009.

Washington State Solid Waste Information Clearinghouse (WSSWIC). 2009. Solid Waste Facilities for County. Accessed October 2009 at: https://fortress.wa.gov/ecy/swicpublic/UIProfiles/Profile.aspx?profileID=30#haulers.

Weeks, Joe. Southeast (Ellensburg) Region of the Washington State Department of Natural Resources Fire Service. Phone conversation and email with Katie Carroz, Carroz Consulting LLC. February 5, 2009

3.13 SOCIOECONOMICS

This section describes the potential impact of the proposed project on local socioeconomic resources. For the purpose of this analysis, the region is defined as the tri-county area that includes Skamania and Klickitat Counties in Washington State and Hood River County in Oregon State. The project area is defined as the area within approximately three miles of the

project site.

3.13.1 AFFECTED ENVIRONMENT
3.13.1.1 Demographics
Region

Table 3.13-1 shows the April 1, 2009 population for Skamania and Klickitat Counties, and the July 1, 2008 population for Hood River, Oregon. A greater percentage of all three counties live outside of incorporated areas. The incorporated cities closest to the project site are White Salmon, Washington, with 2,200 residents, and Hood River, Oregon, with 6,865 residents. The metropolitan area closest to the project site is the Portland-Vancouver-Beaverton metropolitan area, with a population of 2.2 million people. Table 3.13-1 also shows the population distribution for the region and the surrounding communities.

Minority residents represent 23 percent of the White Salmon population and 31 percent of the Hood River population. The minority population is primarily Hispanic/Latino. The tri-county

3-245

area including Skamania, Klickitat, and Hood River Counties is predominantly white, non-Hispanic. Hood River County has the highest minority percentage (31 percent) of population, followed by Klickitat County (16 percent) and Skamania County (11 percent). The State of Washington population includes 24 percent minority residents. Oregon's population includes 20 percent minority.

In 2000, 17 percent of the population of White Salmon and Hood River were living below the poverty22 level. This same measure was 13 percent for Skamania County, 17 percent for Klickitat County, and 14 percent for Hood River County the same year. These percentages are higher than statewide averages for Washington and Oregon.

Comment: This information on minority populations shows a need for a full Environmental Justice portion to this DEIS. BPA, as a Federal agency is certainly required to prepare a environmental justice analysis for this DEIS. Why hasn't it been done? Just talking about environmental justice is not doing the research to see how rural communities and residents are being impacted by the proliferation of wind farms in the West; it is not analyzing the cumulative impacts of transmission lines and other energy production facilities on the health and welfare of these rural communities. Environmental justice must also apply to the environment and the flora and fauna that occupy it. What are the environmental cumulative impacts to flora and fauna? This is another fatal flaw of this inadequate DEIS. I will address Environmental Justice in a separate comment memo.

Table 3-13-1 Population Distribution in the Project Vicinity

Jurisdiction Population, April 1, 2000 Population, 2009
Skamania County 9,872 10,800
Unincorporated 8,079 8,465

Incorporated 1,793 2,335
North Bonneville 593 880
Stevenson 1,200 1,455
Klickitat County 19,161 20,200
Unincorporated 12,536 13,550
Incorporated 6,625 6,650
Bingen 672 685
Goldendale 3,760 3,745
White Salmon 2,193 2,200
Hood River County (Oregon) 20,411 21,725
Unincorporated 13,465 13,745
Incorporated 6,946 7,980
Cascade Locks 1,115 1,055
Hood River 5,831 6,925
Washington State 5,894,143 6,668,200
Unincorporated 2,374,593 2,552,500
Incorporated 3,519,550 4,115,700
Oregon State 3,421,399 3,823,465
Unincorporated 1,141,038 1,158,198
Incorporated 2,280,361 2,665,267

Notes: 2000 estimates are April 1 estimates; 2009 estimates are April 1 for Washington State and counties, and July
1 for Oregon state and Hood River County.
Sources: WOFM (2009), PSUPRC (2009).

Skamania County's population is expected to grow from 10,800 in 2009 to 11,720 in 2015, an annual average growth rate of 1.4 percent. Klickitat County's population is expected to grow from 20,200 in 2009 to 23,049 in 2015, an annual average growth rate of 2.2 percent. The

22 The Census Bureau uses a set of income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, then that family and every individual in it is considered in poverty. The official poverty thresholds do not vary geographically, but are updated annually for inflation. The poverty threshold in 2000 for a family of four with two related children under age 18 was $17,463 (US Census 2009).

3-246

growth rates for both Skamania County and Washington State are expected to slow by 0.3–0.4 percentage points during 2015 to 2025. The population growth rate for Klickitat County is expected to slow from 2.2 to 1.1 percent for 2015 to 2025. Skamania County is expected to have 12,915 residents by 2025 and Klickitat County is expected to have 25,831 residents by 2025. Hood River County is expected to grow 1.3 percent annually on average, during 2009–2015 and 2015–2025.

Project Area

In 2008 the three census block groups within 3 miles of the project site had 3,347 residents. Approximately 12 percent were minority. Nine percent lived below the poverty level in 2000; fewer than for the region generally.

3.13.1.2 Housing
Region

In 2008 there were 5,409 housing units in Skamania County, 9,985 housing units in Klickitat County and 3,050 housing units in Hood River County. Occupancy rates in 2008 were 83 percent in Skamania County, 89 percent in Klickitat County and 90 percent in Hood River County, representing 909 vacant units in Skamania County, 1,078 vacant units in Klickitat County and 892 vacant units in Hood River County. In 2000, median gross rents were 13 percent lower in Skamania County and 25 percent lower in Klickitat County than for Washington as a whole. Median gross rent in Hood River County was 13 percent lower than in Oregon as a whole in 2000.

Project Area

The existing residences closest to the project site are approximately 0.48 mile and 0.8 mile from the proposed turbine locations. A new homesite location has been applied for, which would be located approximately 2,000 feet (0.38 mile) from the site's south property line. It is unknown if the applicant for this permit has secured all approvals or has proceeded with construction plans. One of two alternative Operations and Maintenance facility sites is located approximately 0.9 mile west of the project site on West Pit Road. The nearest residence to this potential site is approximately 0.25 mile away. The other alternative Operations and Maintenance facility site is located on the project site adjacent to and north of the substation, farther from residential areas.

The unincorporated community of Willard is located approximately 2.25 miles northwest of the project site. The unincorporated community of Mill A also is located near the project site, approximately 1.5 miles west of the site. The homes near the project site are in a rural setting, primarily single family and between 30 and 50 years old.

Temporary Housing

Over 1,000 hotel rooms and 39 recreational vehicle (RV) or tent campsites exist within 25 miles of the project site (Table 3.13-2). Assuming an average occupancy rates of 70 percent, a minimum of 325 hotels rooms or RV/tent campsites are available at any one time.

3-247

Table 3.13-2
Temporary Lodging Units

Type of Lodging Units within 25 Miles of Project Site
Hotel or Motel 1,043

RV Camping 21
Tent Camping 16
Cabin or RV 2
Total Units 1,082
Units Available Assuming 70% Occupancy 325

Source: Woodall (2008), TravelWashington (2008).

3.13.1.3 Employment
Region

In Skamania County, there were approximately 3,254 jobs in 2007 (BEA 2009), representing a gain of 138 jobs over 2006 levels. The principal sources of employment in Skamania County were local government, accommodation and food services, federal government, and manufacturing (Golubcow 2006a and 2006b). "Place of work earnings" (wages, salaries and proprietors' earnings) accounted for only one-quarter of total personal income in the county, with income from property (dividends, interest and rent) and transfer payments (mainly Social Security) making up the balance. The annual unemployment rate in Skamania County was 6.6 percent in 2007 and 8.4 percent in 2008, higher than for Washington State (4.5 percent in 2007 and 5.5 percent in 2008).

In Klickitat County, there were approximately 9,839 jobs in 2007 (BEA 2009). Of these jobs, SDS and Broughton Lumber Company employ a work force of up to 325 employees during their busiest production times, which is equivalent to three percent of total jobs in Klickitat County.23 The principal sources of employment were local government, retail trade, and professional and technical services. Place of work earnings accounted for about 46 percent of total personal income in the county, with income from property and transfer payments making up the balance. The unemployment rate in 2007 was 6.7 percent, and in 2008 was 8.2 percent. These unemployment rates were higher than for Washington State as a whole.

There were 15,787 jobs in Hood River County in 2007 (BEA 2009), representing the highest employment of the three counties in the region. Place of work earnings accounted for 59 percent of total personal income in the county, with income from property and transfer payments making up the balance. The principal sources of employment were manufacturing, health care and social assistance, local government, and retail trade. The unemployment rate in Hood River County was 4.6 percent in 2007. In comparison, the annual unemployment rate for Oregon as a whole was 5.1 percent in 2000 and 5.2 percent in 2007.

Table 3.13-3 shows unemployment rates in the region for 2000, 2007 and 2008. Hood River County has the lowest unemployment rate of the three counties in the region. The most recent

23 Located in Bingen, SDS jobs are reported as part of Klickitat County statistics even though logging operations occur in both Skamania and Klickitat Counties.

available annual unemployment rate in Hood River County (2007) is roughly two percentage points lower than the same measures for Klickitat and Skamania Counties and 0.6 percentage point lower than for Oregon as a whole.

Table 3.13-3
Unemployment Trends

Geographic Area
Unemployed
2000 Annual 2007 Annual
Annual 2008 (Washington
areas) and December 2008
(Oregon Areasa
No. Percent No. Percent No. Percent
Skamania County 290 6.0 340 6.6 450 8.4
Klickitat County 700 7.5 650 6.7 820 8.2
Hood River County 757 6.6 592 4.6 712 5.7
Washington State 151,340 5.0 154,720 4.5 192,000 5.5
Oregon State 93,196 5.1 100,517 5.2 158,369 8.0

Sources: WESD (2008), OED (2009).

a. The most recent annual statistics for Washington are for 2008 and are shown in this column. The most recent annual statistics for Oregon are for 2007. This column shows (for the Oregon areas) the most recent unemployment rate available for both Oregon and Hood River County, which is the December 2008 monthly unemployment rate. The annual rates, however, do not show the impact of the economic recession, which began to be felt at the end of 2008. These effects can be partially seen by comparing monthly unemployment rates between 2008 and 2009 (through August, the latest month available) which are shown in Table 3.13-4. Table 3.13-4 shows that in August 2009, Skamania County's unemployment rate was 3.1 percentage points higher than for the same month in 2008. The comparable figures are 2.9 percentage points for Klickitat County and 3.3 percent for Hood River County.

Table 3.13-4 Monthly Unemployment Rates, 2008 and 2009

Skamania County Klickitat County Hood River County
Month 2008 2009 2008 2009 2008 2009
January 8.9 14.5 9.2 12.7 5.5 8.5
February 9.5 14.2 8.9 12.3 5.2 8.9
March 8.5 15.1 7.0 12.9 5.0 9.6
April 7.8 14.2 7.3 12.1 4.6 9.6
May 7.1 11.9 7.2 9.9 5.1 10.6
June 7.8 12.0 6.5 10.3 5.6 9.2
July 7.4 11.7 7.2 8.2 5.4 7.9
August 8.3 11.4 6.2 9.1 6.2 9.5
September 6.2 N/A 5.4 N/A 4.7 N/A

October 7.0 N/A 5.9 N/A 4.2 N/A
November 9.0 N/A 7.3 N/A 5.4 N/A
December 11.7 N/A 9.6 N/A 6.3 N/A

Source: BLS (2009).

3-249

Project Area

The project site is used for long-term timber production. Although the number of jobs in the project area is unknown, approximately 400 homes or businesses exist within three miles of the project site, and approximately one-third of these homes or businesses are located in Willard.

Minority and Low-Income Populations

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states that each federal agency shall identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low income populations. The Order further stipulates that the agencies conduct their programs and activities in a manner that does not have the effect of excluding persons from participation in, denying persons the benefits of, or subjecting persons to discrimination because of their race, color, or national origin.

As stated above, the 2000 Census indicated that Skamania County had a minority population that consisted primarily of Hispanic/Latino persons which accounted for only 11 percent of the total population in that county. Additionally, of the total population make-up for Skamania County, 13 percent were living below the poverty level as indicated by the 2000 Census.

Comment: So, where is the Environmental Justice analysis for the region and the cumulative impacts to the region from the energy production activities of BPA and SDS Lumber and all the other energy producers in the region? Environmental Justice not only addresses impacts to populations but it addresses environmental impacts. Why are wind farms being located in low population, rural areas when the energy they produce mainly benefits large, urban areas that are not even located in the region? Where is the environmental justice in using and abusing rural areas that produce food, clean water, and other resources for energy production for urban areas? There is no environmental justice in this!

3.13.1.4 Public Finance and Fiscal Conditions

Due to the location of the proposed project within Skamania County and Washington State, these two jurisdictions would be the primary beneficiaries of tax revenues related to project construction and operation. Washington State and Skamania County collect several types of taxes:

• Payroll taxes. Washington State collects payroll taxes for workers' industrial insurance,

unemployment compensation, and other purposes. While Counties do not directly benefit from payroll taxes, these revenues have a direct beneficial impact to Skamania County residents.

• Business and occupation taxes. Business and occupation taxes, which are paid on the gross receipts of business activities, are the second-largest revenue source for Washington State. Skamania County does not levy a business tax, so although it does not benefit directly from Business and occupation taxes paid by businesses within Skamania County, the state as a whole would benefit.

• Retail sales and use tax. In Washington State, the first 0.5 percent of retail sales tax goes to the local county.

• Property tax. Skamania County collects property taxes for taxing districts within the County. The project site is within Taxing District 109, for which the total assessment rate is $8.026839/$1,000 assessed value. This revenue is split between the County, Washington State, and the local taxing district.

3-250

In 2008, Skamania County started with a beginning fund balance of $25.6 million, and accrued revenues of $13.7 million that year. The largest revenue fund categories were intergovernmental revenues (43 percent), general property taxes (21 percent) and charges and fees for services (10 percent). Expenditures in 2008 were $19.4 million. The largest expenditure categories were law and justice services (26 percent), general government (20 percent), transportation (19 percent) and natural resource (10 percent) (Table 3.13-5).

Dollars in each of the revenue and expenditure categories are distributed among the General Fund, Special Revenue Fund, Debt Service Fund, Capital Project Fund and Enterprise Fund. Approximately 54 percent of all revenue dollars are in the General Fund, and 39 percent of the revenue dollars are in the Special Revenue Fund. Most of the expenditure dollars were in the General Fund (57 percent) and the Special Revenue Fund (37 percent).

The project site is within Taxing District 109, for which the total millage rate24 is $8.026839/$1,000 assessed value. The millage rate is broken down in Table 3.13-6.

Table 3.13-5 Skamania County Revenues and Expenditures, 2008

Category	Amount
General Property Taxes	2,814,374
Sales & Use Taxes	362,938
Other Local Taxes	614,543
Licenses & Permits	182,553
Charges & Fees for Services	1,331,765
Interest & Investment Earnings	1,228,335
Fines & Forfeits	478,440
Rents, Insurance Premium, Internal Contributions, Miscellaneous	840,764
Intergovernmental Revenues	5,855,309
Total Revenues	13,709,021

Beginning Fund Balance 25,623,475
Law & Justice Services 5,081,012
Fire & Emergency Services 764,603
Health & Human Services 1,649,067
Transportation 3,612,827
Natural Resources 1,858,521
General Government 3,933,882
Utilities 744,672
Capital 1,744,959
Debt Service-Interest 25,000
Total Expenditures 19,414,543

Source: WSA (2009).

24The millage rate is the amount per $1,000 of property assessed value that is used to calculate taxes on
property.

3-251

Table 3.13-6
Breakdown of Taxing District No. 109 Millage Rate

Category Amount
Current Expense 1.218965
Mental Health 0.012500
Developmental 0.012500
Veteran's Relief 0.011250
County Road 1.262288
Hospital and EMS District 0.643625
State Treasurer (State School Fund) 2.033112
Cemetery District 0.074757
Library District 0.338660
Excess Levy: School District 405 (Klickitat County), Maintenance and Operations 1.640058
Excess Levy: School District 405 (Klickitat County), Capital Projects 0.163270
Excess Levy: School District 405 (Klickitat County), Bond 0.281641
Public Utility District 0.334213
Total 8.026839

Source: L. Moore (personal communication).

3.13.2 IMPACTS
3.13.2.1 Proposed Action
Impacts of the proposed project are divided between construction and operation.

Construction

Business and Economic Impacts

Design and construction of the proposed project is expected to begin in 2011. Operation is expected to commence by 2012. During the estimated one-year construction period (excluding engineering, design, specifications, and survey), approximately 330 full-time and part-time workers would be employed at some point during construction. Some of these jobs would not last the entire construction period. The on-site construction work force would peak at approximately 265 workers over the construction period and average 143 workers over the 12 months (Table 3.13-7).

3-252

Table 3.13-7
Estimated Quarterly Construction Personnel

Month Before Commercial Operation
Estimated Number of
Construction Personnel On Site
14 15
13 15
12 90
11 90
10 190
9 190
8 265
7 215
6 165
5 190
4 100
3 100
2 100
1 25
0 25
Cleanup 25
Average (months 1 – 12) 143
Peak (months 1 – 12) 265

Source: A. Barkley (personal communication)

An estimated 65 to 75 percent of the construction labor force would likely be hired from outside the tri-county area, and 25 to 35 percent would be residents of the tri-county area including Skamania, Klickitat, and Hood River counties (A. Barkley, personal communication).25 (This estimate is based on the relative size of the labor force in the tri-county area compared to larger labor forces in metropolitan areas that are farther away.) This would translate to 66 to 93 (peak) and 36 to 50 (average) workers from the tri-county area and 172 to 199 (peak) and 93 to 107

(average) workers from outside the tri-county area, primarily the Portland-Vancouver metropolitan area. At peak, the construction workforce would represent 32 to 45 percent of the estimate size of the construction workforce in Skamania County in 2007 (BEA 2009).

The total cost of construction is $150 million. Total payroll costs, including fringe benefits and other labor overhead costs, are projected to be approximately $18 million, of which approximately $4.5 million (25 percent) is expected to be earned in the tri-county area (A. Barkley, personal communication), based on the assumption by the Applicant that approximately one-quarter of the construction workforce would already live in the tri-county area.

Non-labor costs are estimated to be $132 million. Construction materials, services and equipment leasing associated with construction are projected to total approximately $13.2 million (10 percent of total non-labor costs) (A. Barkley, personal communication). The Applicant estimates that most of this spending would take place in the tri-county area.

25This information, along with estimated average and peak workforce size and number of full-time and part-time jobs related directly to project construction, are project-specific estimates provided by the Applicant.

3-253

Spending by suppliers, local project workers and households would benefit the retail trade and services sector, as well as other sectors of the local economy. To estimate the value of these indirect and induced impacts, assumptions specific to project construction were provided by the proposed project owner (A. Barkley, personal communication), and were used as inputs to the IMPLAN regional input/output model. These assumptions are as follows and were also mentioned above:

• Local non-labor construction expenditures would be approximately $13.2 million
• Labor income earned by local residents would be approximately $4.5 million
• Approximately one-quarter of the workforce (36 workers, taken as a percentage of the average workforce size of 143 workers) would be current residents of the local area

Based on these assumptions and using IMPLAN modeling software, indirect and induced value added from construction is estimated to be approximately $3.9 million.26 Project construction would result in 71 indirect and induced jobs (Table 3.13-8). Total direct, indirect and induced value added would be an estimated $8.5 million. Total employment (direct, indirect and induced) would be an estimated 107 full-time and part-time jobs. These effects would continue throughout the construction period.

Table 3.13-8
Employment Impacts of Construction

Sector
Number of
Direct Jobs

Number of
Indirect
Jobs
Number of
Induced
Jobs
Total Number
of Jobs
Agriculture, Forestry, Fish & Hunting 0 1 0 2
Mining 0 0 0 0
Utilities 0 0 0 0
Construction 35 1 0 36
Manufacturing 0 35 11 46
Wholesale Trade 0 0 0 0
Transportation & Warehousing 0 0 6 6
Retail trade 0 1 2 3
Information 0 5 5 10
Finance & insurance 0 1 2 3
Real estate & rental 0 1 0 1
Totala 35 45 26 107

Source: IMPLAN (2008).
North American Industry Classification System categories that are 0 are not shown.

a. Totals may not add due to rounding.
26 Value added is the difference between the proposed project's total output and the cost of the proposed
project's inputs. For the construction industry in the tri-county area, value added is comprised primarily of
employee compensation (IMPLAN 2008). Value added is a measure of the contribution to output in the
tri-county area made by project construction.

3-254

Economic effects would occur beyond the tri-county area in the form of jobs, income and spending. These effects would occur due to spending (attributable to project construction) that would occur outside the tri-county area. Although these effects were not quantified as part of this analysis, 65 percent to 75 percent of the construction workforce would live in areas outside the tri-county area; therefore, spending would likely increase in the areas where these employees reside. Also, non-labor construction procurements that occur in areas outside the tri-county area (estimated to be approximately $119 million) would result in economic benefits. Areas that benefit could include the metropolitan area closest to the proposed project (Portland-Vancouver) as well as other areas in the Northwest and the nation as a whole.

Comment: So, Skamania County wouldn't really benefit. It's the metro areas that would get the lions share of benefit. What are these "other areas in the Northwest"? How would the nation benefit from wind turbines scattered along the NSA? SDS cannot make such a blanket statement about the nation benefiting, without a lot of supporting environmental and economic data—data that is not included in the DEIS.

Population and Housing Impacts

Up to an estimated 15 percent of the construction workforce would be specialized craftsmen originating outside of Washington and Oregon (A. Barkley, personal communication). These workers would likely have relatively short assignments, and few would be expected to bring their families to the area. The remaining 85 percent of non-local workers would likely come from the Portland-Vancouver area. Assuming as a worst-case scenario that one-third of the workers from the Portland-Vancouver metropolitan area would stay in temporary lodging near the project site Monday through Friday, and the specialized, temporary staff also would require lodging, the population that would require housing in the tri-county area is expected to range from 75 workers to 85 workers during peak construction. These construction workers would be expected to seek temporary accommodation in the general vicinity of the project site, and to use motels, trailers, campers, and other forms of transient housing. Given that 325 of the approximately 1,082 hotel rooms or RV campsites within 25 miles of the project site would be available at any one time, the out-of-area workers would not cause a substantial impact to the availability of transient accommodation in the project vicinity. The construction phase of the proposed project is not expected to affect median housing values, median gross rents, or new housing construction.

Fiscal Impacts

Overall fiscal impacts of project construction are expected to be positive, based primarily on increased employment and spending in the local economy.

Sales Tax Revenue. The total cost of construction is estimated to be approximately $150 million. Non-local procurements would include wind power generation equipment purchased from various domestic and foreign suppliers. Depending on legislation currently under consideration in the state legislature, state sales and use tax may be levied only on procurements that are not directly related to electricity generation. Should the state sales tax exemption for wind power be extended, capital equipment such as turbines, transformers, transmission cables, and substation equipment would not be taxable.

Local procurements are estimated to be 10 percent of total procurements ($13.2 million) (A. Barkley, personal communication). An estimated 90 percent of local procurements would be directly related to electricity generation, and would not be subject to sales tax should the state sales tax exemption for wind power be extended. Taxable sales due to project construction is therefore estimated to be approximately $1.32 million, resulting in $92,400 in sales and use tax

revenue using the sales tax rate (7.0 percent) for the project site, which is located in unincorporated Skamania County.

Most of the sales tax revenue due to project construction would accrue to Skamania County because the project site is located in Skamania County. However, if taxable construction supplies are purchased in another Washington State county (Klickitat County, for example), and not shipped to the project site, the county in which the purchase occurred would receive the county portion of the sales tax revenue on that purchase. Of the total estimated $92,400 in sales tax revenue, Washington State would receive $85,800 and Skamania County (or the counties where materials or supplies are purchased and not shipped to the site) would receive $6,600.

If a portion of taxable construction materials or supplies are purchased in Hood River County, the owner must pay use tax to Washington State, in which case the tax would go to Washington State (6.5 percent) and Skamania County (0.5 percent). Sales tax revenue would not accrue to Hood River County. Klickitat County could receive a portion of the sales tax revenue, but as stated above, the majority of the county portion is expected to go to Skamania County.

In addition to the $92,400, the proposed project would result in modest increases in sales tax revenues due to local purchases by construction workers.

Property Values and Property Tax Revenue. Construction activities are not likely to adversely affect property values in residential and commercial areas near the project site because the construction period would be relatively short. Construction of the proposed project would not affect property tax revenues.

County Expenditures. Construction of the proposed project would require that many construction vehicles, including trucks with over-size and over-weight loads, share the existing roadway network with the general public. Skamania County could experience a small increase in traffic-related costs due to the need for permitting and control measures related to these vehicles, particularly for the over-size loads. Some accidents could occur that would be directly attributable to construction traffic, but any increase is expected to be minimal.

The County could experience minor to negligible increases in the cost of public services such as fire suppression, law enforcement, governmental services, parks and recreation, and hospital costs during construction due to the additional traffic and the temporary population. These are not expected to be significant in the context of the County as a whole.

Operation

Business and Economic Impacts

Operation of the proposed project would result in a positive economic impact to Skamania County, the tri-county area, and the State of Washington due to increased tax revenues, employment, and local expenditures.

Project operation would require eight to nine full-time or part-time Operations and Maintenance

employees. Approximately 75 percent of employees (7 employees) would originate from the tricounty area (A. Barkley, personal communication). An additional temporary workforce with

3-256

appropriate skills would be utilized during major maintenance or other non-routine operational work. Efforts would be made to hire local individuals to staff the proposed project as much as practicable.

The estimated gross payroll, including fringe benefits and other payroll overhead for the operational workforce would be $1.5 million, or an average annual labor cost of $167,000 to $188,000 per employee. Subtracting approximately 25 percent to estimate benefits and overhead, the implicit wage would be within 10 percentage points of the 2007 standard industrial wage for construction workers in Skamania County (IMPLAN 2009).

In addition to the direct employees, project operation would result in indirect and induced employment, for an estimated total of 12 permanent jobs resulting from the proposed project (Table 3.13-9).

Table 3.13-9
Employment Impacts of Operation

Sector	Number of Jobs			
	Direct	Indirect	Induced	Total
Ag, Forestry, Fish & Hunting	0	0	0	0
Mining	0	0	0	0
Utilities	7	0	0	7
Construction	0	0	0	0
Manufacturing	0	0	2	2
Wholesale Trade	0	0	0	0
Transportation & Warehousing	0	0	1	1
Retail trade	0	0	0	0
Information	0	0	1	1
Finance & insurance	0	0	0	0
Real estate & rental	0	0	0	0
Totala	7	1	4	11

Source: IMPLAN (2009).
North American Industry Classification System categories that are 0 are not shown.

a. Totals may not add due to rounding
Using IMPLAN regional economic modeling software for the power generation and supply industry in Skamania, Klickitat, and Hood River Counties, a wind power facility employing nine

full-time workers would have a gross annual operating cost valued at approximately $3.75 million. This would include direct purchases from suppliers (including fuels, maintenance supplies and services, retail goods and professional services).

An alternative methodology for calculating job impacts is used by the Renewable Energy Policy Project, which estimates that every megawatt of installed wind capacity creates about 4.8 job-years of employment, including both direct and indirect jobs (REPP 2009). Using this methodology, the proposed project, which would produce approximately 75 MW of electricity, would result in 360 job-years or 12 jobs per year for the 30 year life of the proposed project.

3-257

As stated in Chapter 1, the purpose of the Project is to help meet the future need for energy resources while at the same time enabling SDS to further diversify its business through a technically and economically feasible project. When SDS started in 1946, there were 26 employees in its original crew. This number grew to a high of 450 employees during the 1970s when logging and lumber production were at a peak. Production has since slowed tremendously, as the supply of timber from national forests has sharply declined due to environmental legislation. For this reason, many of the mills in Skamania County have closed down. SDS was able to survive the crises and changes of the last 30 years and no longer relies on timber from national forests. SDS has scaled back operations, yet today SDS is one of the largest employers in Klickitat County, employing 325 people during busiest production times.

SDS has remained viable during changes in the market through expanding and diversifying its enterprises to include marine in 1984 and power produced in its steam-operated power plant, which creates energy from wood waste, a renewable, organic resource. The the Project is intended to provide another means of diversifying the holdings of SDS to ensure a continuation of a resource-based work force in Skamania County, and to create new construction and operation jobs at a time when jobs in Washington State are being lost. As shown in Table 3.139, the proposed project would create twelve new full-time jobs in Skamania County,

Comment: It is not EFSEC's job to "provide another means of diversifying the holdings of SDS" by condoning or approving this proposed wind farm! Throughout this DEIS, SDS has inserted the economic benefits to itself and its business model. There is very short shrift given to the environmental impacts and cumulative impacts from this proposal and all the other energy production actions that are ongoing in the region. This does not make for an adequate DEIS!

Population and Housing Effects

Of the nine permanent employees for the proposed project, seven are assumed to originate from the tri-county area, and two would be assumed to migrate to the area from other locations. Assuming an average household size of 2.6 persons, the population in the area could increase by approximately five people, and two households. At the most recent average housing vacancy rate available for Skamania County (16.8 percent), more than 900 housing units would be available in Skamania County alone. Thus operation of the proposed project would not impact

housing availability or cost.

The proposed project would not displace any minority or low-income populations. The proposed project would be constructed on private land currently used for forest production, and no residents would be displaced.

Fiscal Impacts

Property Values. Local communities near proposed wind turbine locations have expressed concern that constructing wind turbines would detract from views, which would in turn decrease their property values. A number of studies have been performed to determine the impact of wind power projects on property values. These include the following:

• The Lawrence Berkeley National Laboratory prepared The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis in December 2009 (Hoen et al. 2009). Researchers collected data on almost 7,500 sales of single-family homes within 10 miles of 24 existing wind facilities in nine different US states. None of the models uncovered conclusive evidence of the existence of any widespread property value effects that might be present in communities surrounding wind energy facilities. Neither the view of the wind facilities nor the

3-258

distance of homes to those facilities was found to have any consistent, measurable, and

significant effect on the selling prices of those homes (Hoen et al. 2009).
• In 2006, ECONorthwest prepared Economic Impacts of the Kittitas Valley Wind Project (the Kittitas Study) for the Economic Development Group of Kittitas County, Washington. This report involved a survey of tax assessors in counties (other than Kittitas County) with wind projects to determine the potential effects of wind farms on property values. The Kittitas Study also conducted a review of the available academic literature for additional information on property value effects. The finding was that views of wind turbines will not negatively impact property values (ECONorthwest 2006).
• The Renewable Energy Policy Project prepared The Effect of Wind Development on Local Properties (REPP 2003). For this study, the project compiled a database that included every wind development that came on-line after 1998 with 10 MW installed capacity or greater. For all projects for which sufficient data was available, REPP conducted a statistical analysis to determine how property values changed over time in the viewshed and in the comparable community. The statistical analysis provided no evidence that wind development has harmed property values within the viewshed (REPP 2003).
• Responses to comments published as part of the 2009 Desert Claim Wind Power Project Final Supplemental Environmental Impact Statement state "the Final EIS referenced a 2003 report published by Kittitas County that summarized the existing literature on the effect of wind power projects on property values." The response states that the study, which was prepared by Huckell/Weinman Associates, concluded that wind power facilities have not diminished the value of surrounding properties (EFSEC 2009).

• A literature review to assess the question of whether wind turbines in rural communities have the potential to affect residential property values was completed as part of the Lower Snake River Wind Energy Project Draft EIS (Ecology & Environment 2009). The Draft EIS reported that in 2008 Hoen and Wiser found (1) no statistical evidence that homes near wind facilities are stigmatized by those facilities, (2) no statistical evidence that homes with a view of wind turbines have different values than homes without such views, and (3) no statistical evidence that homes within 0.25, 0.5 and 1 mile of the turbines sell for different values than those located further away. In 2006, while assessing the impacts of a 20 turbine, 30 MW windfarm's visibility on residential property values in Madison County, New York, Hoen found no statistically significant relationship between either proximity to or visibility of the windfarm and the sale price of homes (Ecology & Environment 2009, Hoen 2006).

In summary, the results of these studies and literature reviews are that no statistical evidence exists that wind development has a harmful effect on property values within the viewshed. Therefore, property value impacts are not expected as a result of the proposed project.

Sales Tax Revenues. Sales, use and other indirect business taxes to state and local governments attributable to project operation are estimated at approximately $50,000 per year. This estimate

3-259

is the sum of the estimated sales and use tax revenue from (1) the procurement of supplies and materials for the purpose of project operations, and (2) new employee spending in the area. The sales tax revenue would be split between Washington State (approximately $46,000) and Washington counties, primarily Skamania and Klickitat counties ($4,000).

The portion of non-labor annual operating cost that is not directly related to electricity production (10 percent of $2.3 million, or approximately $230,000) would be taxable (A. Barkley, personal communication). Applying the Skamania County sales and use tax rate (7.0 percent) to this amount results in an estimated $15,800 in tax revenue.

New employee spending is estimating by taking the total labor income (direct, indirect and induced) from the IMPLAN operations model (approximately $977,000 per year) and assuming that 70 percent of this amount is disposable income and 70 percent of disposable income is spent in local Washington counties. Based on these assumptions, related sales and use tax revenue would be approximately $34,000.

With the proposed project, the project site would continue to be managed as commercial forest, excluding the area containing the turbine strings and roads. The project site covers 1,152 acres. Table 1-1 shows that the maximum area developed for the wind turbine foundations, connecting roadways and transmission lines would be 384 acres (approximately 33 percent of the 1,152-acre site). As specific locations are determined for turbines and other project components, the 384acre area would be reduced. The areas that would experience permanent impacts and temporary construction impacts of the proposed project total approximately 108 acres (approximately nine percent of the 1,152-acre site). The 56-acre area that would be removed from timber production for the life of the proposed project is approximately five percent of the total project site. The

opportunity cost of taking this land out of timber production would include tax revenues for Skamania County and Washington State, and would be countered by the sales tax revenues resulting from wind energy sales.

Property Tax Revenue. The proposed project would have an estimated value of $87.5 million, which would represent an increase of 6.5 percent in assessed value in the County. Using the average 2008 property tax rate for Skamania County of $8.36/$1,000 assessed value (WDOR 2009), the increase in property tax revenue to the County would be $731,500. This would represent an annual revenue increase of 7.6 percent compared to the $9.6 million in property tax collected in calendar year 2007. Although Washington State limits property tax increases to one percent of the previous year's levy, new construction does not apply, and would be added on after the one percent is added, using the previous year's property tax rate (V. Torres, personal communication). The increase in property tax revenue would begin one year after construction is complete, and continue for the life of the proposed project. However, to the extent the wind turbines depreciate over time, the assessed value of the turbines and therefore the property tax revenue also would decrease.

Comment: Skamania County collects less than $3,000,000 per year in property tax. What does the $9.6 million in property tax, above, refer to? What is the turbine depreciation over time? How much would the property tax revenue decrease over the 30 year predicted lifespan of the turbines and the project?

Additional property tax revenue would be distributed to a variety of County departments. Assuming that annual tax revenues of $731,500 would be distributed in the same manner as current property tax distributions, funds receiving the most revenue would be the State School Fund ($185,281), School District 405 Maintenance and Operations ($149,461), the County Road

3-260

Comment: Skamania County's school districts are #2 and 303. Whose district are they talking about when they talk about School District 405? Is that White Salmon and Binger, in Klickitat?

fund ($115,035), and the Current Expense fund ($111,086). A portion of the State School Fund would be returned to Skamania County for Skamania County schools.

Property tax revenues would be higher to the extent that increased wages and economic activity in the County resulted in higher valued properties.

A different methodology was used by the National Wind Coordinating Committee, which estimates an increase of $10 to $14 in property taxes for each $1,000 investment (NWCC 2009). Using this approach, the $17.7 million dollars spent locally (labor and non-labor cost) would result in approximately $177,000 to $250,000 in additional property taxes. This estimate is lower than the forecast given above; however, the NWCC estimate is based on industry averages, while the first estimate is based on project-specific data.

County Services. The addition of five residents would cause a negligible increase in demand for and cost of public services. These would also be outweighed by the substantial economic benefits of the proposed project to the County.

Comment: Although a previous table purports to show 12 permanent jobs resulting from this proposed wind farm, in the statement above "the addition of five residents" would appear to support the number of permanent jobs as just FIVE, as stated by Mr. Spadaro, SDS's president and chief proponer for this project, in several meetings. Which number is correct? Why the discrepancy?

Minority and Low-Income Populations. Environmental justice addresses whether the Proposed Action would disproportionately impact disadvantaged populations such as low-income and minority residents. The population in the study area (Skamania and Klickitat Counties, Washington; and Hood River County, Oregon) is predominantly white (non-Hispanic/Latino) and a review of data from the 2000 Census did not identify any specific geographic concentrations of minority groups. The Proposed Action would not be expected to disproportionately affect any low-income populations, based on per capita income information at the Census Tract level. Therefore, there would be no disproportionately high or adverse effects to minority or low income groups.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant will provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan will address site restoration that would occur at the conclusion of the proposed project's operating life (estimated to be 30 years), and restoration in the event the proposed project is suspended or terminated during construction or before it has completed its useful operating life. The plan will include or parallel a decommissioning plan for the proposed project.

The initial site restoration plan will be prepared in sufficient detail to identify, evaluate, and resolve all major socioeconomic issues presently anticipated, including potential impacts to population, housing and employment. If socioeconomic impacts are anticipated to occur as a result of site restoration and project decommissioning, mitigation measures will be proposed as part of the plan.

3.13.2.2 No Action Alternative
Under the No Action Alternative, the wind power project would not be built. Socioeconomic conditions in the area would continue in their present condition.

3-261

3.13.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, reduce, or compensate for potential project impacts to any socioeconomic factors during construction or operation of the proposed

project.

• Impact to the local economy and social structure of the proposed project is expected to be beneficial, in the form of additional jobs, increased sales, and increased tax revenues. Temporary increases in population during construction are likely to be minor in view of the availability of housing, transient accommodations, and other public services in the region.
• Ensure that the applicant uses the local labor pool to the greatest extent possible; construction contractors would be required to advertise positions locally and to employ local workers to the greatest extent possible.

3.13.4 UNAVOIDABLE ADVERSE IMPACTS

The proposed project would result in beneficial impacts, primarily from employment during construction and operation. Minimal adverse impacts are expected.

3.13.5 REFERENCES

Barkley, Allen. Project Owner Representative. Email communication with Katie Carroz, Carroz Consulting LLC. December 8, 2008 and December 14, 2009.

Bureau of Economic Analysis (BEA). 2009. Regional Economic Information System Table CA05 Personal income and detailed earnings by industry; Table CA25 Total employment by industry; Table CA1-3 Personal income, population, per capita personal income; Tables SA51-52 and SA1-3, Disposable personal income and personal income. Accessed December 3, 2009 at: http://www.bea.gov/regional/reis/default.cfm#step3. Accessed December 22, 2009 at: http://www.bea.gov/regional/spi/.

Bureau of Labor Statistics (BLS). 2009. Unemployment rates by county, not seasonally adjusted. Accessed 2009 at:

http://data.bls.gov/map/servlet/map.servlet.MapToolServlet?state=41&datatype=unemployment&year=2006&period=M13&survey=la&map=county&seasonal=u.

Ecology & Environment, Inc. 2009. Socioeconomic Report for the Lower Snake River Wind Energy Project, prepared for Renewable Energy Systems Americas Inc. July 23.

ECONorthwest. 2006. Economic Impacts of the Kittitas Valley Wind Project. http://www.econw.com/consulting/subtopics?topic=energy&subtopic=renewable_energy.

Energy Facility Site Evaluation Council (EFSEC). 2009. Desert Claim Wind Power Project Final Supplemental Environmental Impact Statement Comments and Responses, Chapter

4. November 6. http://www.efsec.wa.gov/Desert%20Claim/FSEIS/4.0%20Comments.pdf.

Golubcow, Molly. 2006a. "Tourism That Blows." Atlantic City Weekly. August 9.

———. 2006b. "Manitoba's First Wind Farm a Tourism Hotspot." July 24. Accessed at: www.mb.gov.ca.

Hoen, B., R. Wiser, P. Cappers, M. Thayer, and G. Sethi. 2009. The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis. December. http://eetd.lbl.gov/ea/ems/re-pubs.html.

Hoen, Ben. 2006. Impacts of Windmill Visibility on Property Values in Madison County, New York. April 30.

IMPLAN. 2008. Regional economic impact model specific to the three-county area. Modeled by Carroz Consulting LLC.

———. 2009. Regional economic impact model specific to the three-county area. Modeled by Carroz Consulting LLC.

Moore, Leslie. Skamania County Assessor's Office. Personal communication with Katie Carroz, Carroz Consulting LLC. February 5, 2009.

National Wind Coordinating Committee (NWCC). 2009. Wind Energy Series, January 1997. Accessed January 25, 2009 at: http://www.nationalwind.org/publications/wes/wes05.htm.

Oregon Employment Department (OED). 2009. Oregon Labor Market Information Service (OLMIS). Unemployment Rates. Accessed January 25, 2009 at: http://www.qualityinfo.org/olmisj/AllRates.

Portland State University Population Research Center (PSUPRC). 2009. Preliminary 2009 Population Estimates as of July 1, 2008 and 2008 Oregon Population Report (2000 estimates). Accessed December 2, 2009 at: http://www.pdx.edu/prc/.

Renewable Energy Policy Project (REPP). 2003. The Effect of Wind Development on Local Property Values. May. Accessed December 28, 2008 at: http://www.repp.org/articles/static/1/binaries/wind_online_final.pdf.

———. 2009. Website: Wind Energy and the Economy. Accessed February 3, 2009 at http://www.awea.org/faq/wwt_economy.html.

Torres, Valerie. Property Tax Specialist, Washington State Department of Revenue. Personal communication with Katie Carroz, Carroz Consulting LLC. December 10, 2009.

TravelWashington. 2008. Travel Resource for Washington State. Accessed December 12, 2008 at: http://www.travel-in-wa.com/.

US Census. 2009. Poverty Thresholds 2000. Accessed December 2, 2009 at:

http://www.census.gov/hhes/www/poverty/threshld/thresh00.html.

3-263

Washington Employment Security Department (WESD). 2008. Labor Market and Economic Analysis. Resident Labor Force and Employment in Washington State and Labor Market Areas. Accessed January 25, 2009 at: http://www.workforceexplorer.com/cgi/dataanalysis/?PAGEID=94&SUBID=149.

Washington State Auditor (WSA). 2009. Washington State Auditor, Local Government Financial Reporting System. Accessed February 3, 2009 and December 8, 2009 at: http://www.sao.wa.gov/applications/lgfrs/.

Washington State Department of Revenue (WDOR). 2009. Tax incentives for renewable energy. Accessed January 25, 2009 at: http://gis.dor.wa.gov/docs/pubs/incentives/renewableenergy.pdf.

Washington State Office of Financial Management (WOFM). 2009. Washington State Office of Financial Management. Official April 1, 2008 Population Estimates. April 1, 2009 Population of Cities, Towns, and Counties Used for the Allocation of Selected State Revenues. Accessed December 2, 2009 at: http://www.ofm.wa.gov/pop/april1/default.asp.

Woodall. 2008. Woodall's Camping Directory Website. Accessed December 12, 2008 at http://www.woodalls.com/.

3.14 CUMULATIVE IMPACT ANALYSIS

"Cumulative impacts" are the impacts on the environment which result from the incremental impact of an action, such as this Proposed Action, when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 C.F.R. 1508.7).

This section describes existing development in the vicinity of the proposed project, as well as current and reasonably foreseeable future development planned for the area, and analyzes and describes potential cumulative impacts. The past, present, and reasonably foreseeable future actions provide the context to assess the cumulative impacts of these actions in combination with the Proposed Action.

Comment: Cumulative impacts analyses are not done on a project by project basis. They are done on a regional basis, especially when there are regional impacts from these types of proposals! BPA is a regional provider of energy and therefore must do a regional cumulative impacts report detailing the cumulative environmental impacts of all its activities! Certainly SDS Lumber is also obliged to do a cumulative impacts and effects analysis of ALL its regional activities, too. SDS has a quarry in White Bingen that recently had some environmental issues. SDS is proposing a huge condo development on the shores of the

Columbia River, in the National Scenic Area, that would result, if it comes to pass, in a large increase in population and a commensurate increase in local resources depletion. SDS has stated that it wants to also build a resort in Cascade Locks, OR, in the heart of the NSA. Another impact on local resources such as water and air quality, the Columbia River, quality of life, transportation, etc. SDS and BPA have failed to follow the CEQ's Considering Cumulative Effects : Under the National Environmental Policy Act Handbook in analyzing cumulative regional impacts and this is a very disastrous fatal flaw in this increasingly inadequate DEIS.

3.14.1 EXISTING DEVELOPMENT

The nature and extent of existing development in the vicinity of the proposed project is largely described earlier in this chapter in the sections for each environmental resource. The general project area is characterized by agriculture, commercial forestry, rural residential development, and a small number of commercial enterprises.

The proposed project site is located approximately two miles north of the Columbia River and directly north of the Columbia River Gorge National Scenic Area. The National Scenic Area extends along the Columbia River for about 85 miles and includes 292,500 acres in parts of three Oregon and three Washington counties. Although both the project site and the proposed access road are located completely outside the Scenic Area, the proposed project area does extend south

3-264

to the northern boundary of the Scenic Area. The Gifford Pinchot National Forest is located north of the project site.

On the Washington side of the Columbia River, land use is predominantly commercial forestry and residential in numerous small, unincorporated communities. There are approximately 400 residences and businesses within three miles of the project site (Figure 3.8-1). There is some limited agriculture, mostly pear and apple orchards recently augmented with some wine grape vineyards, located within the Columbia River Gorge National Scenic Area. On the Oregon side of the Columbia River, land use within the Scenic Area is predominantly commercial timber production and residential. South of the Scenic Area, land uses include commercial forestry, agriculture, and some residential. The primary Oregon orchard crops are pears, apples, and cherries.

Portions of the Project would be visible to drivers along I-84, which is located on the Oregon side of the Columbia River. For the purpose of assessing cumulative impacts to visual resources, views of other wind projects from I-84 were considered. I-84 extends for a distance of approximately 127 miles from Cascade Locks, Oregon (southwest of the project site on the Oregon side of the Columbia River) to the intersection with I-82, which leads north to the Tri-Cities. There are ten existing wind projects along this segment, all located within a distance of approximately 70 miles east of the Project site (to approximately Arlington, Oregon).27 These ten projects could potentially be viewed by drivers along I-84 within a driving time of approximately one to 1.5 hours.

From Arlington, I-84 continues on in an easterly and the southeasterly direction, terminating at Pendleton, Oregon. There are no existing wind energy projects in this area. Farther east, there are wind energy generation projects southeast of the Tri-Cities, and west and southwest of Walla Walla (in both Washington and Oregon), more than 80 additional miles east-northeast. These were considered too remote for this analysis.

All of the ten existing wind energy projects are located east of the Columbia River Gorge National Scenic Area (Figure 3.14-1). Four are located north of the Columbia River in Washington, and six are located south of the river in Oregon. In contrast to the steep terrain and forested vegetation of the Project site, the ten operating wind projects located to the east are on lands with rolling hills, open vistas, and little or no vegetation. The projects that were considered include:

• Windy Point, 137 MW wind project west of Maryhill, Washington
• Biglow Canyon I, 125 MW wind project in Sherman County, Oregon
• Klondike (I – IIIA), 499-MW wind project in Sherman County, Oregon
• Hay Canyon, 101-MW wind project in Sherman County, Oregon
27 See map at http://www.nwcouncil.org/maps/power/Default.asp.

3-265

• Goodnoe Hills, 94-MW wind project north of the Columbia River between Goldendale and Roosevelt, Washington
• Big Horn, 199-MW wind project in Klickitat County, Washington
• White Creek, 205-MW wind project near Roosevelt, Washington
• Leaning Juniper, 101-MW wind project near Arlington, Oregon
• Rattlesnake Road, 103-MW wind project near Arlington, Oregon
• Wheat Field, 97-MW wind project near Arlington, Oregon

3.14.2 REASONABLY FORSEEABLE FUTURE DEVELOPMENT

Reasonably foreseeable future development generally includes those actions currently underway, formally proposed or planned, or highly likely to occur based on available information. Various sources, including searches in the fall of 2009 of the web sites of the surrounding Skamania, Klickitat and Hood River Counties, Columbia River Gorge Commission, WSDOT, Oregon Department of Transportation, EFSEC, the Oregon Department of Energy, and the Ports of Skamania County, Klickitat County, The Dalles, and Cascade Locks, were made to obtain information about any current and potential future development in the project vicinity. Reasonably foreseeable development that may occur in the vicinity of the Proposed Action could include both other wind projects and roadway projects. (See Figure 3.14-1 for the general locations of this potential development.)

3-266

33758687_174.cdr

Columbia River Gorge National Scenic Area
Figure 3.14-1
Job No. 33758687 Existing and Proposed Development

In addition to the potential for cumulative visual impacts, two proposed projects in the project vicinity were identified as having a potential for other cumulative impacts with the Project. These projects are:

• Middle Mountain Wind Project. Hood River County is proposing this 9-MW project, which would be located approximately 10 miles south of Hood River28. Six wind turbines are proposed in a single line on Middle Mountain. The project would be located approximately 15 miles south of the Project. The County has completed visual simulations, and a project informational meeting is scheduled for January 12, 2010. The County plans to continue its feasibility analysis in the coming months. Studies of impacts to biological resources have not been conducted.
• I-84 Bridge Replacements. Oregon Department of Transportation is repairing or replacing 21 bridges on I-84 through the Columbia River Gorge with new bridges29. Several of these projects are located near Hood River and these improvements are grouped as follows:
-I-84 Cascade Locks to Hood River. The bridges in this bundle span the junction of the Hood and Columbia rivers. Construction began in July 2008 and will be completed in fall 201030.
-I-84 Exit 64 (Hood River). This bundle includes replacing the overpass bridge on Interstate 84 at exit 64 in Hood River and improving the interchange and Button Bridge Road beneath the overpass. Design work started in fall 2008 and will be completed by fall 2009. Construction is scheduled from early 2010 to late 201131.
-I-84 Hood River to The Dalles. These five bridges are located at the east end of the Columbia River Gorge. Construction on the Mosier Creek bridge replacement began in August 2008 and will be completed in fall 201032. Design work on the remaining bridges is complete and construction is scheduled from spring 2009 until early 2012. Repairs to the I-84 bridges at Hostetler Way in The Dalles and over Rock Creek in Mosier were completed in summer 2007.

28 See: http://www.co.hood-river.or.us/vertical/Sites/%7B4BB5BFDA-3709-449E-9B16B62A0A0DD6E4%
7D/uploads/%7B909769CE-99F0-47B5-9CAF-77015BF9D737%7D.PDF, and
http://www.co.hood-river.or.us/index.asp?Type=B_BASIC&SEC={2AE779FB-D681-4AA8-8835B50BBAA8252D}.

29 See: http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/

30 See:
http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/CascadeLocksto2ndStreetHoodRiver.pdf.

31 See:
http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/B224_PIP_90109_ODOT.pdf.

32 See:

http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/CascadeLocksto2ndStreetHoodRiver.pdf.

3-268

3.14.3 CUMULATIVE IMPACTS

The following subsections describe the cumulative effects that the Proposed Action, in combination with the past, present, and reasonably foreseeable future actions identified above, would have on the various environmental resources discussed in this EIS. Cumulative impacts from the combination of these actions could occur for each of the environmental resources. However, the contribution of the Proposed Action to these cumulative impacts would vary, with the greatest contribution occurring in cumulative impacts on visual resources as constructing and operating the Project would add a view of an additional wind power project to travelers in the Gorge. In addition to the existing projects east of the project area, long-distance travelers in either direction along I-84 could see some elements of the Project, for approximately 12.5 miles traveling west and 6.5 miles traveling east. Travelers along SR 14 would not see the Proposed Action, which would be blocked by the bluff to the north of the road. As discussed in more depth below in Section 3.14.3.10, the visual impact of the Project along I-84 would be variable, with the number of turbine strings visible changing with topography. In many places only a few turbines would be visible, and the area where the most turbines would be visible (directly across the Columbia River from White Salmon and Bingen) would also be the area where the viewer would be the farthest from the project area (Figure 3.9-1). This would constitute a small cumulative impact when considered in combination with views of other wind projects located from 35 to 70 miles to the east.

Low levels of adverse cumulative impacts have been identified for energy and natural resources from the use of steel, concrete and vehicle fuel for construction, and for transportation (traffic safety and increased risk of accidents during construction periods of the Project and the I-84 bridge replacement projects, if they should overlap). Simultaneous construction projects may create a beneficial cumulative socioeconomic impact to local communities. Finally, by introducing up to 75 MW of clean renewable energy into the regional electrical grid, the project will positively contribute to efforts to combat the cumulative impacts of climate change, and also contribute to efforts to improve air quality in the Columbia River Gorge vicinity.

Comments: This is not cumulative impacts analysis, folks. Table 5-3, Primary and special methods for analyzing cumulative impacts, in the CEQ NEPA <u>Considering Cumulative Impacts</u> Handbook (and I have provided EFSEC with a copy of this handbook in my previous testimony), lists these primary methods as follows: Questionnaires, interviews, and panels; checklists; matrices; networks and system diagrams; modeling; trends analysis [my comment: this is a very important part of any cumulative impacts analysis]; overlay mapping and GIS; carrying capacity analysis [my comment: this is a crucial and extremely important analysis and SDS and BPA have failed to do this analysis and it is a FATAL FLAW of the DEIS]; ecosystem analysis [my comment: VERY IMPORTANT and has not been done in this DEIS]; economic impact analysis [my comment: this has not been done. It involves establishing the region of influence, modeling the economic effects, and determining the

significance of the effects.]; social impact analysis [my comment: Social impact analysis addresses cumulative effects related to the sustainability of human communities by (1) focusing on key social variables such as population characteristics, community and institutional structures, political and social resources, individual and family changes, and community resources, and (2) projecting future effects using social analysis techniques such as linear trend projections, population multiplier methods, scenarios, expert testimony, and simulation modeling. SDS and BPA have not done these analyses for this proposal and this is yet another instance of a fatal flaw in this DEIS. BPA at least should know better than to try to avoid these types of analyses!

All potential cumulative impacts are discussed below.

3.14.3.1 Earth

Past and present commercial logging of the site and surrounding area, agriculture, and construction of rural residences have resulted in cumulative impacts to geology and soils, primarily through increased erosion and soil disturbance and compaction. As the reasonably foreseeable future actions are developed, these actions likely would contribute to cumulative impacts. Reasonably foreseeable use of the Project site for both the proposed the Project and for a continuation of commercial forestry could increase the potential for soil erosion, and contribute to these cumulative impacts for the life of the project.

3.14.3.2 Air Quality

While past and present development and activities have resulted in some deterioration of air quality in the project vicinity, the cumulative effect of these activities on air quality has been fairly negligible. Overall, the air quality in the region is considered good, as evidenced by

3-269

Oregon Department of Environmental Quality (ODEQ) reports on air quality for The Dalles, Oregon, the closest city with an air monitoring station. ODEQ reports air quality data using an air quality index based on particulate matter 2.5 micrometers diameter and smaller (PM2.5). ODEQ's 2008 report for The Dalles shows 339 days with good air quality, 25 days with moderate air quality, and no days with unhealthy air quality (ODEQ 2009).

While air quality in the project area is generally good, haze is a well-documented problem in the Columbia Gorge and the causes are being studied by the Southwest Clean Air Agency. In a 2008 Report, the agency found that haze was largely caused by winter stagnations that trap pollutants and fog (SWCAA 2008). In the summer, winds flow predominantly from the west, transporting emissions from the Portland metropolitan area into the Gorge. Wildfires also contribute to the haze when smoke is blown into the Gorge. There is no single source that is primarily responsible for haze; however, man-made sources are important contributors (ODEQ 2008). The most significant man-made sources contributing to haze in the Gorge include: power plant emissions; woodstoves; motor vehicles; non-road emissions (e.g. ships, trains, trucks); and agricultural sources of ammonia.

Construction of reasonably foreseeable future actions would be expected to generate dust and emissions during construction activities that could cumulatively contribute to air quality degradation. Construction of the terrestrial portions of the Proposed Action also would generate dust and emissions that likely would incrementally contribute, though slightly and only for a short time, to cumulative air quality impacts in the general project vicinity.

Climate Change. Past and present actions in the project vicinity, the region and across the globe have contributed to climate change and global warming. The past and present actions include, without limitation, the post-settlement conversion of native landscapes to residential, commercial and forestry uses, the introduction of carbon dioxide and other greenhouse gases from fossil fuel emission sources, particularly from automobiles and fossil fuel electrical generation sources, and in general, post-industrial manufacturing processes and land uses. Locally, residential, agricultural and commercial development is expected to continue a trend that permanently removes forests and replaces them with land uses that contribute to climate change.

"Climate change" refers to changes in the Earth's global climate, including the rise in average surface temperature known as global warming. At this time, while there is nearly complete scientific consensus concerning the anthropogenic causes of global climate change, and also consensus on its deleterious impacts on the natural and human environment, there is uncertainty regarding the specific, localized effects of projected global warming upon regional temperature, precipitation and ocean conditions. The Federal Environmental Protection Agency (EPA) recently acknowledged that due to its impacts on climate change and related human health effects, carbon dioxide is considered an air quality pollutant requiring a regulatory response.33

Footnote 33: In December, 2009, Environmental Protection Agency (EPA) Administrator Lisa Jackson announced that the agency had finalized its finding that greenhouse gases, including carbon dioxide, pose a threat to human health and welfare. The ruling allows the EPA to begin regulating greenhouse-gas emissions from power plants, factories and major industrial polluters, although the precise details of that regulation have yet to be worked out. "The threat is real," said Jackson. "If we don't act to reduce greenhouse-gas emissions, the planet we will leave to the future will be very different than the one we know today."

3-270

The effects of global warming on the overall hydrology of the Columbia River Basin are difficult to separate from the natural variability resulting from cycles such as El Niño and the Pacific Decadal Oscillation. Further, forecasted changes to water supply or runoff volumes for the key Columbia River Basin drainages are more susceptible to shorter climatic cycles, such as El Niño and the Pacific Decadal Oscillation, than longer-term trends attributable to global warming. The variability seen in the Columbia River Basin over the last 80 years is greater than the variability experienced in the last 10–15 years. Therefore, even though the precise effects of global warming on the Columbia River Basin cannot be accurately determined at this time, estimated changes are within historic variations. Although precise forecasting of the future effects of global warming on the Columbia River Basin may not be possible at this time, it is possible to consider how the development of the Project will affect emissions of greenhouse gases such as

carbon dioxide.

Comment: The U.S. Forest Service's Pacific NW Experimental Station, located in our own Skamania County, at the old Wind River Nursery site (the oldest nursery in the Pacific NW, dating back to 1909), has put together a CD set on global climate change and its effects on the Pacific NW. One of their conclusions is that we will get more rain and less snow pack, something which will definitely affect BPA's energy production and local quality of life. There will be impacts on fish and other wildlife. One of the things that their research did not address was any changes in wind patterns resulting from global climate change. This is the FUTURE part of cumulative impacts analysis and should be done for this DEIS!

Reasonably foreseeable future actions, including continued use of fossil-fuel-burning automobiles, industrial processes, and electrical power generation are likely to continue, with cumulative impacts to air quality and acceleration of climate change through the continuing introduction of greenhouse gas emissions into the atmosphere. Power generated from wind displaces power generated by carbon dioxide emitting sources. In addition to wind energy generation being a non-emitting source, wind energy also is integrated into the hydropower system to reduce reliance on other thermal energy sources (i.e., coal, natural gas, or nuclear). Because the current mix of power sources in the Northwest relies heavily on thermal sources, electricity sourced from the wholesale market would likely have a significant greenhouse gas component, with attendant deleterious cumulative impacts. Integrating power generated by wind turbines into the hydropower system reduces reliance on other energy alternatives and avoids the need to procure 75 MW of electric power with a significant greenhouse gas component. Consequently, the Proposed Action will have a positive cumulative impact on efforts to combat air quality deterioration and climate change.

Comment: Although BPA states that it does not own any gas plants, it will need to rely on backups, perhaps even natural gas-powered plants, to back up its energy production. The more energy BPA is asked to produce the more power plants (or other types of machinery that will produce on-demand, quick backup) will have to be online to ensure flexibility and capability in the power grid. This is NOT a "positive cumulative impact" that would "combat air quality deterioration and climate change"! Cumulative impacts are not done on a project by project basis. They must be on a regional basis, especially when there is a regional energy producer, BPA, involved. Also, BPA is in the process of trying to build bigger and bigger transmission lines in order to produce and carry more energy production. These transmission lines have environmental effects and cumulative effects. There is nothing in the DEIS that addresses the environmental impacts and effects of past, present, and future transmission lines.

3.14.3.3 Water Resources
Creeks and Streams

Past and present development and activities have cumulatively caused various adverse impacts to creeks and streams in the general project vicinity. Portions of some of these water bodies have been channelized or filled. Others have been affected by pollutants from stormwater runoff, wastewater discharges, and other sources. Reasonably foreseeable future actions, including

continued commercial forestry practices and the additional development of rural residences could also contribute to these cumulative impacts.

Roadway construction and maintenance in the project area and vicinity could increase stormwater runoff, and increase sedimentation and turbidity if construction equipment crosses drainage ways. The Proposed Action would incrementally contribute to adverse cumulative impacts to creeks and streams in the general project vicinity. In particular, the Proposed Action

3-271

would potentially add to cumulative impacts to Little Buck Creek on the east side of the project and possibly to Lapham Creek near the proposed site of the Operations and Maintenance Facility during project construction from construction site stormwater runoff that would result in temporarily increased sedimentation and turbidity. The Proposed Action and other cumulative projects also would have a longer-term adverse cumulative impact to these creeks through the addition of increased impervious areas, which would increase the amount of stormwater runoff to these creeks, however the increase in impervious surfaces for the Proposed Action are expected to be minimal and largely limited to the wind turbine foundations and the Operations and Maintenance building. Lapham Creek drains into the Little White Salmon River, which drains into the Columbia River. Implementation of stormwater detention and other stormwater management practices for the Proposed Action would serve to minimize and possibly avoid project contributions to these cumulative impacts, including contributions to cumulative impacts to other water bodies in the area, such as the Columbia River.

Groundwater Resources

Cumulative impacts to groundwater from past and present development and activities in the general project vicinity have included groundwater withdrawals for wells. The reasonably foreseeable future actions would cumulatively affect groundwater for additional wells, including the proposed groundwater use of up to 5,000 gallons per day for the Operations and Maintenance Facility. The Proposed Action could contribute to the cumulative effect of potential groundwater contamination; however the potential for spills or contamination would be no larger than existing commercial forestry or agricultural operations.

3.14.3.4 Vegetation and Wetlands
Vegetation and Habitat

Past and present land development, timber harvest, and agricultural uses have resulted in a cumulatively significant change in the composition of vegetation and habitat types in the project vicinity. In general, land development and agricultural uses have resulted in conversion of forested areas to non-forested areas, and timber harvests have resulted in a mosaic of forest ages, with average stand age declining over time from relatively short stand rotations. Changes in stand structure and complexity, patch size, and species distribution also have occurred. Few large, old-growth conifers or late-successional stands exist in the general project vicinity. Accordingly, past and present uses have resulted in cumulative habitat conversion and an

ongoing pattern of habitat fragmentation. Reasonably foreseeable future actions, such as ongoing land development and timber harvests, would continue this trend.

Project construction would take place in the context of the existing use of the project vicinity generally for commercial forestry, which includes regular cycles of clearcutting and reforestation. Nonetheless, by removing trees and other vegetation in the wind project area for the life of the project, development of the Proposed Action would contribute incrementally, though in a relatively minor way, to these cumulative impacts.

3-272

Special-Status Plant Species

Plant species listed as threatened or endangered and other special-status plant species have been cumulatively affected by past and present development and activities through habitat loss and direct effects to individual species. This trend will likely continue as future development occurs in areas where these species are present. However, the Proposed Action would not contribute to this adverse cumulative impact because, as described in Section 3.4.1.4, the Proposed Action would not affect any threatened or endangered or other special-status plant species.

Comment: I feel like I'm banging my head against a brick wall... One more time: Cumulative impacts are not analyzed on a project by project basis, especially when cumulative impacts are regional. And, just because "threatened or endangered and other special-status species have been cumulatively impacted by past and present development" does not mean that we should continue practices that will impact them in the FUTURE! Cumulative impacts analyses measure past, present, and future direct and indirect impacts and their CUMULATIVE IMPACTS.

Wetlands

Incremental losses and degradation of wetlands over time have cumulatively depleted wetland resources in the United States. In the project vicinity, wetlands likely were previously impacted by construction of a variety of activities, including development of roads and railroads, agricultural activities, and past timber harvests. Reasonably foreseeable future actions may also affect wetlands in the project vicinity, but it is expected that these future projects would be required to avoid, minimize, and compensate for any potential impacts to wetlands from filling or other activities as part of project Section 404 permitting requirements. Regardless, because construction and operation of the proposed wind project would not impact wetlands, implementation of the Proposed Action would not contribute to cumulative impacts to wetlands.

Noxious Weeds

Past and present activities in the project vicinity have led to a cumulatively significant spread of noxious weeds in the vicinity, and noxious weed spread could continue with reasonably foreseeable future actions. Although mitigation measures have been identified to minimize the spread of noxious weeds by the Proposed Action, it is likely that noxious weed impacts would

nonetheless still occur under the Proposed Action. The Proposed Action thus would contribute incrementally, though in a relatively minor way, to this cumulative impact.

3.14.3.5 Habitat and Wildlife
Terrestrial Wildlife Species

Past and present development and other activities have had a cumulative adverse impact on terrestrial wildlife species and their habitat in the general project vicinity. The clearing and conversion of land for home sites, utility infrastructure, and other uses since approximately the 19th century has resulted in the cumulative loss of wildlife habitat. Wildlife habitat also has been cumulatively modified through activities such as logging and other silvicultural activities, which have altered and fragmented habitat. This habitat loss and modification has resulted in the displacement of wildlife species. While these changes to existing habitat have been cumulatively detrimental to some species of wildlife, some changes that have resulted in conversion from one habitat type to another (as opposed to conversion to human uses) have been cumulatively beneficial to other wildlife species. Wildlife species also have been directly affected by hunting and trapping activities, as well as incidental harm and killing from other human activities in the area. Reasonably foreseeable future actions involving highway improvements, residential,

3-273

commercial, agricultural and other development and logging would be expected to incrementally add to these cumulative impacts.

The Proposed Action would impact terrestrial wildlife habitat through permanent improvement of approximately 56 acres now in grass/forb, field/shrub, managed coniferous or mixed deciduous-coniferous forest from within the wind project area (See Table 1-3 and Section 3.3). Some terrestrial wildlife species may also be disturbed by project construction activities or avoid the project area temporarily during construction. The Proposed Action thus would contribute incrementally, though in a relatively minor way, to the cumulative impact on terrestrial wildlife species and their habitat.

Comment: What does "permanent improvement mean, exactly?!? What is the factual basis for this statement? Where is the cumulative impact analysis supporting the statement that "The proposed actions thus would contribute INCREMENTALLY, THOUGH IN A RELATIVELY MINOR WAY, to the cumulative impact on terrestrial wildlife species and their habitat"?!? Again, cumulative analysis is NOT done on a project by project basis when there are regional impacts to be considered. It is these types of statements that litter this very inadequate DEIS throughout its many pages. There is no cumulative data or cumulative impacts effects analyses that have been done to support these flagrantly unfounded statements yet they are included in this data-deficient, weak, meager DEIS as if they are factual statements. FATAL FLAW.

Bird and Bat Species

Past and present development and other activities have had a cumulative adverse impact on

wildlife species, including birds and bats, with permanent alteration and loss of their habitat in the general project vicinity. The clearing and conversion of land for home sites, utility infrastructure, and other uses since approximately the 19th century has resulted in the cumulative loss of habitat for birds and bats. Habitat for birds and bats has also been cumulatively modified through activities such as logging and other silvicultural activities, which have altered and fragmented habitat. This habitat loss and modification has resulted in the displacement and mortality of these wildlife species. Further, as discussed below, past and present residential and other development has a continuing impact on these species, through building, window, transmission line and telecommunication facility strikes, vehicular strikes, and the predation of these species by domestic cats. Reasonably foreseeable future actions, including non-wind energy generation uses, are expected to have a continuing negative impact on these species.

As documented elsewhere in this DEIS in Section 3.4 Biology, the Proposed Action would impact bird and bat species. Because of the variability in species, habitat, and flight patterns on a regional basis, it is difficult to assess potential cumulative impacts of "full build-out" development of wind power on birds and bats over a large geographic area. However, the National Academy of Sciences National Research Council estimated the best and worse case fatality estimates for birds and bats based on a regional "full-build" scenario in 2020 for the Mid-Atlantic Highlands (NRC 2007). This study is considered the most thorough, objective and "best available science" on the topic of cumulative impacts from wind energy projects, and made use of a real world example (although from a different region of the country from Whistling Ridge). This study concluded that it is unlikely that the predicted level of fatalities would result in measurable impacts to migratory populations of most species, although for rare and local populations, the cumulative impacts when combined with all other man-made sources of mortality could affect population viability.

The reference in this study to "all other man-made sources of mortality" in the National Research Council study highlights one of the numerous caveats and difficulties inherent to such a study: collisions with turbines are only one element of man-made cumulative effects on bird and bat populations in a given region. Examples of other man-made impacts include collisions with buildings, transmission lines and vehicles, habitat loss, and predation by domestic cats. Erickson et. al. (2005) concluded that these sources of mortality are likely much larger than the potential impacts of wind power development. Other uncertainties included:

Comment: There comes a point when the carrying capacity of a region is met and the cumulative impacts threshold is met. When that time comes, and it should be determined through thorough cumulative impacts and effects analyses, then it is time to say "NO" to further cumulative impacts on the region. When all the cumulative impacts are taken into account there might come a point when no further development can take place because the cumulative impact threshold has been reached and further development would detrimentally and permanently affect the environment.

3-274

• While estimation of bird fatalities caused by wind energy projects is possible, data on bat fatalities is currently sparse, and typically is not species-specific.

• Estimates of turbine fatalities from past projects, especially those from the 1980s through the 1990s, are based on a variety of methodologies and do not include corrections for observer bias and potential removal of carcasses by scavengers.
• Factors such as the turbine height and design, rotor velocity, number and dispersion of turbines, location of turbines in the landscape, and operational schedule of turbines may influence fatalities. Turbine technology is continually changing and it cannot be predicted what technology will be available in the future.

A similar cumulative impact study on avian and bats was performed by West, Inc. for the Klickitat County Planning Department (West, Inc. 2008). West's study reviewed 17 wind-energy facilities totaling 2,464 MW that were in operation in the CPE of Eastern Washington and Oregon, and an additional 30 potential wind-energy facilities that were planned or being constructed within the CPE as of mid-2008. At the time of their study, West found that there was approximately 6,665 MW of existing or proposed wind-energy facilities in the CPE. For the purpose of their analysis, West assumed that 6,700 MW of wind power would be present in the CPE. However, past experience indicates that not all permitted projects are built, so these figures likely overestimate what will actually be constructed. Klickitat County added this study to the Klickitat County energy Overlay Zone Environmental Impact Statement originally issued in September 2004. This study is included in this EIS as Appendix C-11.34

Like the National Research Council study, for the purpose of their cumulative analysis, West assumed that for cumulative impacts to occur, there must be a potential for a long-term reduction in the size of a population of birds or bats.

West's general approach to the cumulative effects analysis was to summarize results of fatality monitoring studies at operational wind-energy facilities within the CPE, and then use those results to estimate impacts for all constructed and proposed wind-energy facilities within the same ecoregion. At the time of the West study, most wind energy development in northern Oregon and southern Washington had been within an area historically characterized by open, arid shrub-steppe and grassland-steppe habitats. West found that the current predominant land use of the CPE is dryland agriculture and rangeland, with low precipitation (6 to 12 inches per year). Habitat and land use throughout the entire CPE are similar.

West's cumulative effects analysis relies heavily on data from 11 wind-energy facilities in the CPE where fatality monitoring has occurred. Most of the operating facilities have had or will have some sort of avian and bat post-construction casualty monitoring associated with them, and post-construction fatality monitoring data are available from 11 operational wind energy facilities in the CPE. For each of the individual study areas from which fatality results are

34 A similar, but somewhat more limited cumulative impact study was prepared for the Shepherd's Flat
Wind Energy Facility in 2007. (Included in this EIS as Appendix C-12)

3-275

available, the predominant land use was a mosaic of agriculture (mainly dryland wheat farming)

and grassland or shrub-steppe rangeland used for livestock grazing.

West estimated the population losses for birds (excluding raptors), raptors, upland game birds, waterfowl, waterbirds, and shorebirds, passerines, sensitive bird species, and bats. Their study estimated 69.5 percent of losses would be to passerines, of which horned lark fatalities made up nearly half. Fatalities to other avian and bat populations were estimated to be substantially less. None of the estimated fatalities were anticipated to cause a significant loss in population, and no cumulative impacts were anticipated.

In comparison to the CPE, the site proposed for the Project is more mountainous, receives more precipitation (an average of 84.06 inches per year as measured at the Skamania fish Hatchery), and is more forested than the CPE. Due to the difference in habitat types between the Project site and the CPE, the results of the direct impact analysis for the Project cannot be directly applied to the results of West's cumulative effects analysis for the CPE. However, West's cumulative effects analysis is relevant in considering the added impacts of the Proposed Action to the overall cumulative biological impacts of all wind energy projects in the region.

As described in Section 3.4 Biological Resources, operation of the Project would result in unavoidable mortality to birds and bats through turbine collisions, but there likely would not be enough mortality to negatively affect the population viability of any single species. Operation of the Middle Mountain wind project also would presumably cause some mortality to birds and bats. Raptors, including bald eagles, golden eagles, northern goshawks and others could travel the 12 air miles between the two wind projects, and the two projects would be considered part of the same regional population of raptors. The Proposed Action thus would contribute incrementally, though in a relatively minor way, to the cumulative impact on bird and bat species in the region.

Finally, the evaluation of cumulative impacts for wind energy generation facilities should be considered in the context of other mortality threats to these species, which have been estimated in recent research as many times larger than those from wind energy generation (Erickson et al. 2005; 2008). Moreover, the cumulative impacts analysis for wind energy generation facilities does not account for potential mortality to birds and bats caused by climate change, and the beneficial biological impact of renewable energy in avoiding these impacts. For example, one study from 2009 estimated that, based on performance in the United States and Europe, wind farms and nuclear power stations are responsible each for between 0.3 and 0.4 bird fatalities per gigawatt-hour (GWh) of electricity while fossil-fueled power stations are responsible for about 5.2 fatalities per GWh (Sovacool 2009).

Comment: Ok. So, cumulatively, all of these activities actually kill how many birds in total? What is the cumulative impact of all this killing on bird populations? Many birds are pollinators. Eighty percent of our agriculture (FOOD!) is dependent on pollinators, birds and bees, etc. What effects do wind farms have on pollinator mortality? How does any killing of pollinators by wind farms affect agriculture and our food supply? The cumulative effects of any pollinator mortalities are not addressed in the DEIS and should be.

Fish Species

Past and present development and other activities have had an adverse impact on fish species, including the alteration and loss of their habitat in the general project vicinity. Negative impacts to fish and other aquatic resources from past and present, as well as reasonably foreseeable future development in the region include the alteration of streams and rivers by the introduction of hydroelectric generation dams, loss of riparian habitat, increased sediment loading, increased stream temperatures, pollution from herbicide and insecticide use, changes in peak and low

3-276

stream flows, fragmentation of fish habitat, decreases in streambank stability, altered nutrient supply, and stormwater runoff from roads and bridges. The proposed work on the I-84 bridges may cause temporary increases in impacts from construction activities. These impacts are anticipated to continue into the foreseeable future.

Typically, wind energy generation projects in the region tend to be located in upland areas and generally well away from fish habitat, which is also true of the proposed project. Therefore, wind energy projects in the region in general, and the proposed project in particular, would not contribute to direct cumulative impacts to fish species.

Comment: This statement "wind energy projects in the region in general, and the proposed project in particular, would not contribute to direct cumulative impacts to fish species" is an unsupported over-generalization with no science or common sense applied. The DEIS has no collective science data to support this assertion. However, there are most probably direct cumulative impacts [BPA's own fish projects show this] to fish species caused by BPA's energy production activities and the wind farm projects along the Columbia River, since they do contribute to BPA's energy production activities, must also contribute to the direct cumulative adverse impacts on fish species. Where is the cumulative impacts analysis on direct and <u>indirect</u> cumulative impacts to fish species in the region?

Potential indirect cumulative impacts to fish species can occur through a somewhat complex relationship among wind projects interconnected to BPA transmission system, Columbia River hydro operations, and operation of this hydroelectric generation system to meet Clean Water Act (CWA) and ESA requirements for listed fish species. There are currently over 2,000 MW of wind energy connected to the transmission grid within BPA's Balancing Area, and several thousand more MW of wind power are expected to be developed and connected to the grid in the next few years.35 The majority of these projects are concentrated in the geographic area east of the Columbia River Gorge, and the overall amount of wind power on BPA's transmission system largely depends on wind velocities in this particular area. Accordingly, the amount of wind power on BPA's system can fluctuate widely and relatively quickly, depending on whether wind speeds in this area are low (meaning very little wind power is being generated in this area) or high (meaning wind projects in this area are generating close to or at full capacity).

Within BPA's Balancing Area, there must be a match between generation and loads at all times. BPA has historically reserved capability in the hydroelectric system to provide balancing services for wind power output swings when needed. However, the increasingly large

proportional share of wind power on BPA's system and the natural fluctuation of this power have combined to result in large, unscheduled swings in wind generation of up to several hundred megawatts within a single hour that cannot be handled by reserved capability alone. 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. Using the hydroelectric system to decrease generation in these situations is often not available because:

(1) reservoir space at the hydro projects is being maintained for required flood protection (meaning that additional water cannot be stored); and/or (2) additional water cannot be spilled, rather than run through turbines, at the hydro projects due to CWA limits on the level of total dissolved gases in the river and potential impacts on ESA-listed fish species from higher levels of total dissolved gases. For these reasons, BPA currently is working with wind project developers and operators to develop measures for temporarily reducing sources of wind generation within the BPA Balancing Area when necessary. As part of a comprehensive review of wind project interconnections and their effects that was conducted in winter 2008, BPA has established 35 BPA. Factsheet: How BPA Supports Wind Power in the Pacific Northwest. DOE/BP 4002. March 2009.

3-277

transmission operation protocols under which BPA's dispatch system automatically instructs wind project operators to reduce their generation to specified levels if necessary for reliability and ESA or CWA compliance. BPA has issued Dispatcher Standing Order (DSO) 216 to document these protocols, and is continuing to refine and clarify this DSO as more is learned about wind project operations relative to BPA's transmission system (visit http://www.transmission.bpa.gov/wind/op_controls/default.cfm for more information). These measures ensure that wind power on BPA's transmission system does not cumulatively impact Columbia River hydro operations necessary for listed fish species.

The proposed project would be subject to DSO 216, which would avoid any contribution from the proposed project to indirect cumulative impacts to fish species. In addition, because the proposed project is located at the west end of the Columbia River Gorge rather than the east end (i.e., approximately 60 miles to the west of the Columbia Plateau wind generation vicinity), wind patterns in the project vicinity can vary significantly at any given point in time from those in the area where the majority of existing and proposed wind projects are located. This difference adds diversity in wind energy production and further reduces the potential for any contribution of the proposed project to indirect cumulative impacts to fish species during periods of time when generation needs to be decreased to maintain transmission system stability. The added diversity should assist BPA in implementing regulation requirements on the hydro system. Overall, the proposed project would not be expected to contribute, either directly or indirectly, to cumulative impacts to fish species.

Comment: There is no way that the proponent can know that since the proposed wind farm would be subject to DSO 216 and that this authority would "avoid any contribution from the proposed project to indirect cumulative impacts to fish species"!! In the NEPA booklet, Considering Cumulative Impacts, p. 8, Table 1.2, Principles of cumulative effects analysis, the

#2 statement states "Cumulative effects are the total effect, including both direct and indirect effects [my underline emphasis], on a given resource, ecosystem, and human community of all actions taken [my underline emphasis], no matter who (federal, nonfederal, or private) has taken the actions. Individual effects from disparate activities [my underline emphasis] may add up or interact to cause additional effects not apparent when looking at the individual effects one at a time [my underline emphasis]. ***The additional effects contributed by actions unrelated to the proposed action must be included in analysis of cumulative effects." Not only do all the current and future wind farms have to be included in the cumulative impacts analysis, but also to be included are any other development proposals in the affected region. For example, the proposed Cascade Locks, OR off-reservation casino that would contribute cumulative impacts on the Columbia River and the human and wildlife habitats. For example, the proposed SDS Lumber Broughton(WA) condominium development that would potentially introduce 1000-1500 new inhabitants on the shores of the Columbia River, inhabitants who would most certainly impact the Columbia River, for as we all know all treated sewage [this is not drinking water, folks!] goes into the Columbia River, as does everything that comes from our septic fields. For example, SDS has proposed a resort in Cascade Locks, OR, contributing more sewage water and resource depletion into the Columbia River waters, a river that is already considered one of the most toxic and needs to be cleaned up, not dirtied up some more. For example, SDS has a 50 lot subdivision proposal in Carson, WA, a unincorporated area which has no sewage treatment plant, and has approximately 2600 residents who all use septic fields. Everything flows downhill, as we all know, and it all ends up in the poor Columbia River. So, I would say that the wind farm proponent has failed, miserably, to do any cumulative impacts analyses that take into account direct and indirect impacts from a variety of activities that MUST be considered for this DEIS.***

Certainly, and I consider a fatal flaw of the DEIS, neither BPA or SDS Lumber have defined a BASELINE CONDITION for the resources, ecosystems, and human communities that would be impacted by the proposed project and all other projects that contribute to cumulative impacts.

3.14.3.6 Energy and Natural Resources

Past and present land development, timber harvest, and agricultural uses have resulted in a cumulative use of energy and depletion of energy resources in the project vicinity. The the Project would have a positive effect on energy, in that it would produce more energy than that used to build and operate the facility. The project would consume a limited amount of natural resources for construction, including steel, concrete, and fuel for machinery. The amount of these resources used would be insignificant compared to available supply. The Middle Mountain

wind project would be similar in the balance between consumption of energy and generation of renewable energy to the Project although both the energy payback and the amount of resources consumed would be smaller, since the Middle Mountain project would have only six turbines, and is anticipated at 9 MW to be approximately 12 percent of the size of the Project. The I-84 bridge improvements would consume steel, concrete and fuel. The combined consumption of these natural resources is small compared to available supply. The Proposed Action thus would contribute incrementally, though in a relatively minor way, to the cumulative impact on use of natural resources in the region.

3.14.3.7 Public Health and Safety

Past development of high voltage transmission lines across the project site has created a low level of EMF exposure. The project will include 34.5-kV collector lines and systems, primarily located underground. There will be a new substation located adjacent to BPA's existing North Bonneville to Midway 230-kV transmission line, and a new interconnection from the substation to the 230-kV transmission line. Adding additional overhead and underground cables would cumulatively increase the overall level of EMF exposure. The electric and magnetic fields

3-278

generated by the collector lines and underground systems under the Proposed Action, which are described in Section 3.6, Environmental Health, would contribute to the cumulative levels of EMF in the project vicinity, though only slightly because of cable shielding and undergrounding, the minor nature of these project elements, and the distance to existing residences.

During construction of the Project, there would be a slight increase in risk of traffic or worker accidents during the construction period. This impact would take place in the background of existing land use patterns based on commercial forestry, agriculture, and residential development. Effects of construction of the Middle Mountain wind project and I-84 bridge replacements would most likely be similar, though the impact of the Middle Mountain project would be smaller, given the smaller size of the project. Given the anticipated low number of incidents and the available capacity of the local emergency responders and hospitals to respond to those incidents, the cumulative impact would be relatively minor, and would be reduced once construction is completed.

3.14.3.8 Noise

Past and present development activities have introduced noise sources to the vicinity, including residential construction and development, commercial forestry operations, motor vehicles, machinery and domestic livestock and pets. Implementation of the cumulative actions identified in Sections 3.14.1 and 3.14.2 would be expected to generate various levels of noise through the project vicinity, as would the Proposed Action. Depending on the proximity and timing of these actions, there could be cumulative noise impacts if actions are undertaken simultaneously and in relative close relation to each other. For most of the cumulative actions, it is expected that they would not result in cumulative noise impacts due to temporal or spatial separation. However, given the expected timing of the I-84 bridge improvement projects in the vicinity of the proposed

project, it is possible, however not expected, that receptors in the area could be exposed to cumulative noise impacts during the construction of these roadway projects in combination with the Proposed Action.

Operation of the Proposed Action would result in elevated noise levels from the movement of the turbines, maintenance activities, and operation related traffic. The operation noise levels would vary with the speed of the turbines. While the noise levels are not predicted to exceed regulated noise levels, the Proposed Action would contribute in minor ways to cumulative increases in noise levels in the project vicinity. These contributions would be lessened through the application of mitigation measures described in Section 3.7 Noise.

3.14.3.9 Land Use and Recreation

The cumulative past, present and reasonably foreseeable actions identified in Sections 3.14.1 and 3.14.2 have resulted in changes to land use and would be expected to continue the incremental growth of developed land uses in the project vicinity. The Proposed Action would be consistent with existing land use planning and zoning designations for project facilities, and would not result in any inconsistencies with existing or planned adjacent land uses. The Proposed Action also would have little or no effect on existing land use patterns. The land use impact of the Middle Mountain wind project has not been studied but is unlikely to be inconsistent with local land use codes, to cause changes to local land use patterns, or to create cumulative impacts.

3-279

The the Project would have little to no impact on recreation resources, and this is most likely the case for the Middle Mountain wind project as well. The I-84 bridge replacements may have a beneficial impact to recreation users, as roadway improvements may improve access to recreational resources in the area. Given the abundant recreational resources in the area and the low level of impacts, the Proposed Action's contribution to cumulative impacts to recreation would be minor.

3.14.3.10 Visual Resources

While parts of the Gifford Pinchot National Forest near the project area remain undeveloped, past and present development activities have changed the visual landscape in the immediate project vicinity by introducing manmade features and altering natural forms. These uses include residential, commercial and agricultural development, the construction of highways, bridges and roads, electrical transmission towers and hydroelectric dams, and telecommunication facilities. Ongoing human activities in the vicinity also contribute to continuing cumulative visual impacts, primarily views of clear-cutting and agricultural openings in natural vegetation patterns. Reasonably foreseeable future actions would be expected to continue this trend, as the past and present patterns of land use are expected to continue.

During project construction, the Project would contribute to cumulative visual impacts through visible construction activities, although some viewers interested in viewing project construction may consider the project's contribution to be a positive impact. After construction is complete,

the presence of the proposed wind turbines would contribute to cumulative visual impacts on nearby residents and motorists passing by on county roads, SR 14 and I-84.

The visual impacts of the Project would not be higher than low to moderate at any of the viewpoints examined. In considering the two specific reasonably foreseeable future projects, Hood River County estimated that the proposed Middle Mountain project would be visible as far away as 9.32 miles from that project36. The two projects are approximately 12 air miles apart, and there may therefore be a few locations where both projects would be visible, though these would be background views at the limit of visibility. The visual impact of the I-84 bridge improvements would be limited to the period of construction. Oregon Department of Transportation states that "New bridge designs will complement the aesthetic appeal of the Gorge and reflect the allure of the adjacent Historic Columbia River Highway." Thus, these new bridges may result in a positive impact to visual resources37.

Past and present development of wind energy projects has also taken place at other locations in the Columbia River Gorge. The visual effect of these projects on the regional landscape and the experience of viewers is also a consideration, since long-distance drivers passing through the Gorge would recall seeing wind energy development in the Columbia Gorge. To assess this impact, the visibility of the ten wind projects east of the project area was modeled, using the following assumptions:

36 See: http://www.co.hood-river.or.us/vertical/Sites/%7B4BB5BFDA-3709-449E-9B16B62A0A0DD6E4%7D/uploads/%7B909769CE-99F0-47B5-9CAF-77015BF9D737%7D.PDF.

37 See:http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/.

3-280

• Visibility was modeled to 20 miles. This distance is considered very conservative and was chosen to accommodate recreation users with binoculars
• Visibility was modeled using bare-earth surfaces without vegetation. In reality, many views will be blocked by trees, particularly in the project vicinity.
• Visibility was modeled from single points representing the approximate location of each project taken from the Northwest Power and Conservation Council's on-line Northwest Power Generation Map38.
• This visibility analysis documents visibility of even single elements of wind energy facilities, such as distant and fleeting views of wind energy nacelles and/or turbine blade tips, and does not differentiate these sightings from a more prominent view of entire turbines or generation facilities.
• The visibility analysis also does not account for the overall visual or aesthetic context of landscapes that are not in a pristine condition, most particularly the presence of existing electrical transmission lines which dominate the viewscape in many areas analyzed. Overall, these assumptions almost certainly represent a significant overstatement of the visibility of these facilities, and their cumulative impacts to the landscape.

For a motorist driving east on I-84, wind energy projects first become visible near Wishram, approximately 35 miles to the east of the Project area. From the point, wind projects are visible (using the assumptions stated) for approximately 52 of the following 64 miles (Figure 3.14-2).

Construction of the Project would add some additional views of wind turbines in addition to the past and present wind power development projects and existing electrical transmission facilities. Travelers on I-84 through the Gorge would be able to see the Project for a time while traveling near Hood River. Travelers along I-84 could each see at least some part or elements of the project, for approximately 12.5 miles traveling west and 6.5 miles traveling east39. At normal highway speeds this would result in an additional visual impact for between 7 and 12 minutes. Travelers along SR 14 would not see the Proposed Action, which would be blocked by the bluff to the north of the road.

The visual impact of the Project along I-84 would be variable, with the number of turbine strings and turbine equipment elements visible changing with topography. In many places only a few turbines would be visible, and the area where the most turbines would be visible (directly across the Columbia River from White Salmon and Bingen) would also be the area where the viewer would be the farthest from the project area (See Figure 3.9-1).

38 See: http://www.nwcouncil.org/maps/power/Default.asp

39 The project area is within view for approximately 17 miles, however in each direction the curvature of
the road and the location of the project mean that the project would be behind drivers and passengers for some of that distance.

3-281

The maximum impact of the Project along I-84 can be pictured by referring to Figures 3.9-10 (Viewpoint 13) or 3.9-8 (Viewpoint 11), which show viewpoints located on I-84. From Viewpoint 11, for instance, a traveler proceeding west would see a maximum of 25 turbine hubs and 70 blade tips, all at a distance of 14 kilometers (8.9 miles), or far background distance. From Viewpoint 13, a traveler proceeding east would see a maximum of 12 turbine hubs and 25 blade tips, at a distance of around 5.5 kilometers (3.4 miles) or middle-ground distance. As discussed in Section 3.9, however, these numbers overstate the visual impact, for the following reasons:

• The number of hubs and blade tips visible is calculated using bare-earth surface models. In reality, views of many turbines will be blocked by trees.
• All turbine blades will not be visible when the blades are rotating.
• Atmospheric haze, when present, will reduce the visibility of the turbines, especially at background distances. For westbound travelers, the Project would be the last wind power project visible, and for eastbound travelers it would be the first. Building the project would therefore add a small cumulative visual impact for long-distance travelers.

3-282

33758687_175.cdr

Figure 3.14-2
Job No. 33758687 Existing Wind Projects Visibility from I-84

A similar cumulative impact could occur, probably on a more consistent basis, for residents of and frequent visitors to the local area. While residents of White Salmon, for example, might not see turbines from both Whistling Ridge and Middle Mountain on a daily basis, they would likely experience repetitive views of wind turbines (or portions of wind turbines) through their local travels over a period of weeks, months or years. The "significance" of these perceptions would be individual in nature and inherently subjective, and is considered in the context of an altered landscape that includes hydroelectric generation facilities, transmission towers and lines, roads, bridges, highways and other land uses. Consequently, some local residents and frequent visitors might perceive what they individually consider to be a substantial change to the overall character of the local landscape. Although the geographical and topographical setting of the Project (including north-south trending ridge lines) limits its regional visibility, such a response would be more likely with the development of multiple wind projects.

3.14.3.11 Historic and Cultural Resources

Cultural and historic resources in the project vicinity have been and are being affected because of past, present, and current development and activities. These cumulative impacts include the redevelopment of land used for pioneer settlements, such as the Underwood town site north of the project area, and natural degradation of wooden flumes that were used in the late 1800s and early 1900s to transport logs to the Columbia River. Although the Proposed Action would not affect any known upland archaeological or historic resources, there is the potential for the Proposed Action to impact previously undiscovered cultural resources or artifacts. Mitigation measures are identified in Section 3.10, Historic and Cultural Resources, to lessen or avoid the potential for this impact. However, if the Proposed Action does impact previously undiscovered cultural resources or artifacts, it would contribute incrementally to the adverse cumulative impact to cultural resources in the area.

3.14.3.12 Transportation

The cumulative actions identified in Sections 3.14.1 and 3.14.2 have resulted in increases in traffic and would be expected to continue the incremental growth of traffic in the project vicinity. The Proposed Action would contribute to cumulative traffic levels in the project vicinity, but generally only during the construction phase of the Proposed Action. Construction of the Project is scheduled for a one-year period beginning in 2011. Construction of the I-84 bridges would take place in 2009, 2010 and 201140, with the majority of construction taking place in 2010. There could be some potential cumulative traffic congestion for travelers along I-84 during periods when both construction projects were active. However, workers traveling to the Whistling Ridge site could use SR 14 as an alternative route.

40 See:
http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/May2009GorgewideNewsletter.pdf, especially the construction schedule snapshot on page 2.

3-284

3.14.3.13 Public Services and Utilities

Past and present development and activities have resulted in an incremental increase in demand for public services and utilities. The Proposed Action would not be expected to adversely affect the overall capacity or ability to serve of any utility in the area, and thus would not contribute to cumulative impacts to utilities. By providing a potential backup or alternative power source for the Skamania County Public Utility District (PUD), the Proposed Action may contribute to a positive impact on utilities.

Construction of the Project, and the use of construction workers from outside the immediate area, could result in a minor and temporary increase in the demand for public services including police departments, providers of emergency medical services, and local fire departments, and would contribute to a cumulative increase in demand when added to the construction of the Middle Mountain wind project and I-84 bridge improvement projects. The temporary increased demand for services during the construction period caused by the average of 143 workers (265 during the peak month) would be substantially reduced during operation for the permanent workforce of nine full-time workers.

3.14.3.14 Socioeconomics

During construction, the Proposed Action would contribute incrementally to a positive cumulative impact on the economy of the local community by providing additional employment and increased need for goods and services. While the Proposed Action and other cumulative actions would increase the number of construction workers in the project vicinity, there appears to be sufficient vacant rental dwellings and available temporary housing, hotel/motel, camping, and RV units in the general project vicinity to accommodate the potentially overlapping construction schedules of the Proposed Action and some of the possibly concurrent cumulative actions such as the construction of the Middle Mountain wind project and the I-84 bridge improvement projects.

During operation, the Proposed Action would employ nine full-time workers. The operational workforce would have a minor cumulative affect on population, employment, and housing in the project vicinity. The fiscal impact of the project would be highly positive, as the project's assessed value of up to $87.5 million would generate approximately $800,000 per year in tax distributions to municipal, county, and other local jurisdictions. Operation of the Proposed Action would be expected to have a major contribution to cumulative financial benefits to Klickitat and Skamania counties.

3.14.4 REFERENCES

Erickson, Wallace P., Gregory D. Johnson, and David P. Young Jr. 2005. A Summary and Comparison of Bird Mortality from Anthropogenic Causes with an Emphasis on Collisions. USDA Forest Service General Technical Report PSW-GTR-191.

National Research Council (NRC). 2007. Environmental Impacts of Wind-Energy Projects. National Academies Press.

3-285

Sovacool, Benjamin K. 2009. Contextualizing avian mortality: A preliminary appraisal of bird and bat fatalities from wind, fossil fuel, and nuclear electricity. Energy Policy 37 No. 6:2241-2248. June.

West, Inc. 2008. Final Report, Avian and Bat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon. Prepared for Klickitat County Planning Department. October 30.

Young, David P., Jr. and Victoria K. Poulton. 2007. Avian and Bat Cumulative Impacts Analysis, Shepherd's Flat Wind Project, Gillam and Morrow Counties, Oregon. Prepared for Lifeline Renewable Energy, Inc. March.

3.15 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

The Proposed Action under consideration does not pose short-term impacts that would significantly alter the long-term productivity of the affected environment. The turbines and associated facilities would take less than 5 percent of the arable land in the 1,152-acre study area out of production, and the remainder of the land could still be used for commercial forestry. After decommissioning of the project, all of the land could revert to its previous uses. Little change in the long-term environmental productivity of the land would have been caused.

3.16 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible commitments of resources occur when a non-renewable resource such as minerals or petroleum-based fuels is used for the construction or operation of a Proposed Action. An irretrievable commitment of resources occurs when a federal agency gives up all rights or protections for a particular resource that it has ownership of or jurisdiction over, whether it be land, trees, water, animal or plant species, or some other resource.

The Proposed Action would include the use of steel, gravel, wood, and other non-renewable material to construct the wind turbines, access roads, electrical power line, operations and maintenance facilities, and substations. Materials would come from outside sources or from local borrow pits. Petroleum-based fuels for vehicles and equipment would also be required. Development of the proposed action would result in the irretrievable commitment of a small amount of commercial forestry land. These commitments are irretrievable rather than

irreversible because the project could be decommissioned in the future and previous land uses restored. In addition, many materials used to construct and operate the project could be recycled upon decommissioning.

3.17 INTENTIONAL DESTRUCTIVE ACTS

BPA, like other utilities and government agencies, experiences incidents of criminal activity such as vandalism, theft and burglary. Some of these incidents cause significant operational and

3-286

financial impacts to the agency. Between 2007 and 2009, BPA experienced approximately 128 incidents of burglary, theft and vandalism. These incidents cost the agency approximately $1,624,110. The BPA Security and Emergency Response Office works closely with Federal Law Enforcement Agencies and, local and state police to ensure all incidents are appropriately reported, investigated and prosecuted. This effort has resulted in the return of BPA property and in court ordered restitution to be paid by the convicted parties.

Issues concerning international terrorist activity, domestic terrorism and sabotage remain a significant concern for BPA and other critical infrastructure operators. BPA maintains close liaison with Federal Law Enforcement Agencies, Department of Homeland Security, and Local jurisdictions to ensure effective communication of information and intelligence.

The impacts from vandalism and theft, though expensive, do not generally cause a disruption of service to the area. Stealing equipment from electrical substations, however, can be extremely dangerous. In fact, nationwide, many would-be thieves have been electrocuted while attempting to steal equipment from energized facilities. On Oct. 11, 2006, a man in La Center, Washington, was electrocuted while apparently attempting to steal copper from an electrical substation.

Federal and other utilities use physical deterrents such as fencing, cameras, and warning signs to help prevent theft, vandalism and unauthorized access to facilities. In addition, through its Crime Witness Program, BPA offers up to $25,000 for information that leads to the arrest and conviction of individuals committing crimes against BPA facilities. Anyone having such information can call BPA's Crime Witness Hotline at (800) 437-2744. The line is confidential, and rewards are issued in such a way that the caller's identity remains confidential.

Acts of sabotage or terrorism on electrical facilities in the Pacific Northwest are rare, though some have occurred. These acts generally focused on attempts to destroy large transmission line steel towers. For example, in 1999, a large transmission line steel tower in Bend, Oregon was toppled.

Depending on the size and voltage of the line, destroying towers or other equipment could cause electrical service to be disrupted to utility customers and end users. The effects of these acts would be as varied as those from the occasional sudden storm, accident or blackout and would depend on the particular configuration of the transmission system in the area. While in some situations these acts would have no noticeable effect on electrical service, in other situations,

service could be disrupted in the local area, or if the damaged equipment was part of the main transmission system, a much larger area could be left without power.

When a loss of electricity occurs, all services provided by electrical energy cease. Illumination is lost. Lighting used by residential, commercial, industrial and municipal customers for safe movement and security is affected. Residential consumers lose heat. Electricity for cooking and refrigeration is also lost, so residential, commercial, and industrial customers cannot prepare or preserve food and perishables. Residential, commercial, and industrial customers experience comfort/safety and temperature impacts, increases in smoke and pollen, and changes in humidity, due to loss of ventilation. Mechanical drives stop, causing impacts as elevators, food preparation machines, and appliances for cleaning, hygiene, and grooming are unavailable to residential

3-287

customers. Commercial and industrial customers also lose service for elevators, food preparation, cleaning, office equipment, heavy equipment, and fuel pumps.

In addition, roadways experience gridlock where traffic signals fail to operate. Mass transit that depends on electricity, such as light rail systems, can be impacted. Sewage transportation and treatment can be disrupted.

A special problem is the loss of industrial continuous process heat. Electricity loss also affects alarm systems, communication systems, cash registers, and equipment for fire and police departments. Loss of power to hospitals and people on life-support systems can be life-threatening.

Overhead transmission conductors and the structures that carry them are mostly on unfenced utility rights-of-way. The conductors use the air as insulation. The structures and tension between conductors make sure they are high enough above ground to meet safety standards. Structures are constructed on footings in the ground and are difficult to dislodge.

While the likelihood for sabotage or terrorist acts on the Proposed Action or alternatives is difficult to predict given the characteristics of the project, it is unlikely that such acts would occur. If such an act did occur, it could have a significant impact on the transmission system or electrical service because the North Bonneville-Midway 230-kV transmission line is an integral part of BPA's transmission system; however, any impacts from sabotage or terrorist acts likely could be quickly isolated. The Department of Energy, public and private utilities, and energy resource developers include the security measures mentioned above and others to help prevent such acts and to respond quickly if human or natural disasters occur.

3.18 ADVERSE EFFECTS THAT CANNOT BE AVOIDED

Implementation of the Proposed Action would result in some adverse impacts that cannot fully be avoided even with implementation of mitigation measures. However, most of these impacts would occur during the construction phase of the Proposed Action and thus would be temporary. For the proposed wind project, the unavoidable adverse impacts include:

• Short-term earth-disturbing activities of 108 acres during construction (56 acres of permanent disturbance and 52 acres of temporary disturbance). These impacts, while unavoidable, would take place in landscape of managed timber lands which has for many years and will continue to be a fragmented environment with ongoing disturbance. During construction, direct mortality to birds could occur through nest disturbance.
• Short-term potential for landslide and erosion during construction and operations.
• Short-term impacts to air quality similar to that of existing logging operations during construction.
• Short-term and localized impacts to water resources during construction and operation of the project.

3-288

• Short-term and minimal risk of unintentional or accidental fire or explosion or discharge to the environment during both construction and operations.
• Short-term and minimal delays in traffic in some areas during construction.
• Short-term and minimal risk of accident during construction.
• Short-term accidental fire, release of hazardous materials, or injury could occur during construction, operation, or decommissioning of the project.
• Short-term noise impacts during construction is exempt so long as it occurs during daytime hours, and operation noise is predicted to be less than the nighttime threshold of 50 dBA Leq per Washington State and Skamania County regulations.
• Long-term visual impact to surrounding areas where turbines were visible, including some areas inside the Columbia River Gorge National Scenic Area.
• Long-term mortality to birds and bats through turbine collisions.
• Long-term yet minor unavoidable adverse impacts to energy or natural resources through the consumption of fossil fuels for construction and maintenance of the Proposed Action.
• Long-term socioeconomic impacts are considered to be beneficial as The Project would provide employment during construction and operation. Additionally, increased tax revenues would offset the impacts to public services and utilities.
• Permanent loss, temporary disturbance and fragmentation of existing habitat for a number of wildlife species.

Comment: Without a socio-economic impacts analysis, the statement "Long-term socioeconomic impacts are considered to be beneficial" is baseless and not supported by any data or analysis. There is nothing in the DEIS to show just how much Skamania County would benefit, or not, from this proposed wind farm. What is clear, from previous statements, is that Klickitat County stands to reap most of the benefits for their school district.

Under the No Action alternative, although many of the potential impacts of the Proposed Action would not occur, the existing project area would continue to be utilized for commercial forestry operations. Additionally, BPA's North Bonneville-Midway 230-kV and the Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines would continue to remain in place and would be subject to impacts related to the need for ongoing repairs and maintenance of these existing transmission lines.

3-289

Comment: The proponent for this project is being very truthful here. There are "many…potential impacts of the Proposed Action…" that would "not occur" if this wind farm proposal was denied by EFSEC!! This would be a good thing for the environment and for our community. BPA has failed to do a cumulative impact analysis of the existing transmission lines for the DEIS and this is a fatal flaw. BPA has also failed to do a cumulative impact analysis of their FUTURE actions in regard to these existing transmission lines and BPA's proposals to put in NEW, and BIGGER transmission lines. [I will address this in another document.] This is just one very important reason why this Whistling Ridge wind farm proposal should be denied. BPA is a federal agency and is subject to NEPA and its cumulative impacts analyses. BPA has, fatally for the DEIS, not done its job. This DEIS should be sent back to BPA and SDS for further analysis and data-gathering.

CUMULATIVE IMPACT ANALYSES MATTER!

/e-signature/Mary J. Repar
27 August 2010

RECEIVED
SKAMANIA COUNTY
FEB 19 2009
COMMUNITY DEVELOPMENT
DEPARTMENT

BEFORE THE HEARING EXAMINER
FOR SKAMANIA COUNTY

In the Matter of the Appeals of	)	NO. SEP-08-35
Friends of the Columbia Gorge, Save our Scenic Area, Gifford Pinchot Task Force, and Columbia Riverkeeper	)	FINDINGS, CONCLUSIONS, AND DECISION
Of a SEPA DNS.	)	

SUMMARY OF DECISION

The appeals of the October 8, 2008 Determination of Nonsignificance issued for the County's proposed zoning text and map amendments are **GRANTED**.

SUMMARY OF RECORD

Background

Skamania County seeks to amend the text and maps of its zoning code (Title 21 Skamania County Code) consistent with its adopted Comprehensive Plan and subarea plans. The County issued a Determination of Nonsignificance for the proposed amendments (known as the Planning Commission Recommended Draft) on October 8, 2008. Save our Scenic Area, and a group of organizations including Friends of the Columbia Gorge, Gifford Pinchot Task Force, and Columbia Riverkeeper filed appeals of the Determination of Nonsignificance on October 22, 2008.

Hearing Date

The Hearing Examiner for Skamania County held an open record hearing on the appeals on January 21 and 22, 2009.

Testimony

The following individuals presented testimony under oath at the open record appeal hearing:

1. Karen Witherspoon, Director of Community Development, Skamania County
2. Heather Watson, Assistant Planner, Skamania County
3. Dean Apostol, Landscape Architect[1]
4. K. Shawn Smallwood, Ph.D., Ecologist[2]
5. Richard James, E-Coustic Solutions, Acoustical Engineer[3]
6. Nina Pierpont, M.D., Ph.D., Physician[4]
7. Nathan Baker, Staff Attorney, Friends of the Columbia Gorge

[1] Please refer to Exhibit G.1 for Mr. Apostol's qualifications.
[2] Please refer to Exhibits G.4 and C.21 for Mr. Smallwood's qualifications.
[3] Please refer to Exhibit 7.1 for Mr. James' qualifications.
[4] Please refer to Exhibit 1.1 for Dr. Pierpont's qualifications.

Legal Counsel

- Attorney J. Richard Aramburu represented Appellant Save our Scenic Area
- Attorney Richard A. Poulin represented Appellants Friends of the Columbia Gorge, Gifford Pinchot Task Force, and Columbia Riverkeeper
- Attorney Peter Banks, Skamania County Prosecutor, represented Skamania County

Exhibits

The documents listed on Appendix A to this Decision (Exhibit List) were admitted into the record. Additional documents were filed on January 26, 2009, after the Hearing Examiner had closed the record to new evidence. The Hearing Examiner did not consider the January 26 documents and they are not admitted into the record.

In addition to the documents identified in Appendix A, the Hearing Examiner considered the following legal memoranda:

- Pre-Hearing Brief of Appellants Friends of the Columbia Gorge, Inc.; Gifford Pinchot Task Force; and Columbia Riverkeeper (December 9, 2008)
- Opening Brief of Save our Scenic Area (December 9, 2008)
- Response Brief of Skamania County (January 2, 2009)
- Reply Brief of Appellants Friends of the Columbia Gorge, Inc.; Gifford Pinchot Task Force; and Columbia Riverkeeper (January 15, 2009)
- Citations to Exhibits of Appellants Friends of the Columbia Gorge, Inc.; Gifford Pinchot Task Force; and Columbia Riverkeeper (January 29, 2009)
- SOSA's Exhibits Citations and References (January 29, 2009)

The Hearing Examiner also considered the 2007 Comprehensive Plan, the Carson Community Subarea Plan, the Swift Subarea Plan, the West End Community Comprehensive Subarea Plan, and the Skamania County Code.

Upon consideration of the testimony and exhibits admitted at the open record hearing, the Hearing Examiner enters the following Findings and Conclusions:

FINDINGS

General

1. Skamania County seeks to amend the text and maps of its zoning code (Title 21 Skamania County Code) consistent with its adopted Comprehensive Plan and subarea plans. The amendments would apply to all lands within unincorporated Skamania County that are not designated as Columbia River Gorge National Scenic Area (hereafter, "National Scenic Area" or "Scenic Area").[5] The Scenic Area generally includes the southern portion of Skamania County, although there are "islands" of urban area (including unincorporated land) that are not within the Scenic Area. Thus, the proposed

[5] Land uses within the National Scenic Area are governed by Title 22 of the Skamania County Code (Columbia River Gorge National Scenic Area Ordinance).

amendments would apply to some parcels that, while not designated as Scenic Area, are surrounded by Scenic Area lands. *AR-50; Testimony of Ms. Witherspoon; County Exhibit 2.*

2. In the testimony and written materials there are references to two proposed drafts of Title 21 – the (1) Board-Initiated Draft and the (2) Planning Commission Recommended Draft. The Board-Initiated Draft was the first draft of the proposed amendments. The Planning Commission Recommended Draft contains the changes to the first draft that were recommended by the Planning Commission after considering public comment. The changes are substantial. The draft of Title 21 that is under review is the Planning Commission Recommended Draft, found in the record at AR-72 to 226.[6] *AR-51.*

3. According to the 2007 Comprehensive Plan, Skamania County is approximately 1,070,080 acres in area. It is the only county in Washington State that spans the crest of the Cascade Mountains. Approximately 80 percent of the County (855,000 acres) is within the Gifford Pinchot National Forest. Approximately five percent of the County (59,876 acres) is owned by the State of Washington.[7] Approximately 85,000 acres of the remaining land is within the National Scenic Area. *2007 Comprehensive Plan, pages 17-18.*

4. The planning documents in effect for the portions of Skamania County outside of the National Scenic Area include the 2007 Comprehensive Plan, the Swift Subarea Plan, the West End Community Subarea Plan, and the Carson Community Subarea Plan. With respect to those lands governed only by the 2007 Comprehensive Plan (i.e., not within a subarea), there are three land use designations: Rural I (2,758 acres), Rural II (13,440 acres), and Conservancy (817,826 acres). *AR-57.* The zoning classifications currently in effect for those designations include the following: Residential 1, 2, 5, and 10, Rural Estate, Community Commercial, Commercial Recreation, Industrial, Resource Production 10 and 20, Natural, and Unmapped. *SCC 21.24.021.* In addition, there are two zoning classifications applicable to the Northwestern Lake area – Residential 2 and Residential 5. *SCC 21.55.*

5. The Swift Subarea includes approximately 92,191 acres, and the Comprehensive Plan indicates that approximately 34,000 of the acres are privately owned.[8] There are six land use designations within the Swift Subarea, including Swift Recreational, Swift Commercial Resource Lands, Swift Forest Lands 20, Mountain Recreational 20,

---

[6] The proposed zoning map is found at AR-232.

[7] The County provided slightly different numbers in its brief – a total land area of 1,073,370 acres, with 932,034 acres consisting of state or federal public lands and the remaining 141,336 acres (13 percent) privately owned. *Response Brief of Skamania County, page 1.* These numbers do not affect the outcome of the decision.

[8] There is some discrepancy between the total acreage reported in the Environmental Checklist and the total acreage reported in the Comprehensive Plan. The total acreage in this finding is based on the Environmental Checklist. It is not clear whether the acreage of privately owned land has also changed from what is reported in the Comprehensive Plan.

Mountain Recreational 10, and Mountain Recreational 5. *2007 Comprehensive Plan, page 18; Swift Subarea Plan, pages 14 – 21; AR-57.*

6. The West End Subarea includes approximately 60,000 acres, and the Comprehensive Plan indicates that approximately 31,000 of the acres are privately owned.[9] There are seven land use designations within the West End Subarea, including Rural Lands 2, Rural Lands 5, Rural Lands 10, Forest Lands 20, Commercial Resource Lands, Neighborhood Commercial, and Community Commercial. *2007 Comprehensive Plan, page 18; West End Subarea Plan, Figure 3-1; AR-57.*

7. The Carson Subarea includes approximately 2,000 acres. There are four land use designations within the Carson Subarea, including High Density Residential, Rural Residential, Rural Estate, and Business Center. *AR-57; Carson Subarea Plan, pages 2 – 5.*

8. Much of Skamania County is classified as "Unmapped", meaning that no zoning has been assigned.[10] Within unmapped areas, "all uses which have not been declared a nuisance by statute, resolution, ordinance, or court of jurisdiction are allowable." *SCC 21.64.020.* Land uses within unmapped areas are not subject to the standards or conditions of the zoning code. *Id.*

9. The unmapped lands in Skamania County are mostly commercial forestland or Gifford Pinchot National Forest. According to County Ordinance No. 2008-01, at least 15,000 acres of the unmapped lands are privately owned. *Exhibit H.4; Testimony of Ms. Witherspoon.*

10. Skamania County has had a moratorium in effect since July 10, 2007 (date of adoption of most recent Comprehensive Plan) on the following development activities on unmapped lands:

    - The acceptance and processing of any building, mechanical or plumbing permits on any parcel of land that is 20 acres or larger that was created by deed since January 1, 2006
    - The acceptance and processing of land divisions
    - The acceptance and processing of SEPA checklists related to forest practice conversions

[9] There is some discrepancy between the total acreage reported in the Environmental Checklist and the total acreage reported in the Comprehensive Plan. The total acreage in this finding is based on the Environmental Checklist. It is not clear whether the acreage of privately owned land has also changed from what is reported in the Comprehensive Plan.

[10] Prior to 2007, the County's Comprehensive Plan only addressed the southern portion of Skamania County. *2007 Comprehensive Plan, pages 10 and 21.*

Exhibit H.4. The reasons for the moratorium include that much of the unmapped land is on rugged terrain that is not served by County roads or electricity, and that many areas are prime habitat for federal or state listed species of fish and wildlife. *Exhibit H.4.*

11. The Planning Commission Recommended Draft (and associated zoning map) would accomplish the following:

- Zone all previously unmapped land, including the land under federal ownership.
- For the land outside of the subareas, eliminate the Resource Production 10 and 20 zones and add Business Park, Forest Lands 20, and Commercial Resource Lands 40 zones.
- Zone the Swift Subarea consistent with the Swift Subarea Plan (zoning designations: Mountain Recreational 5, 10, and 10, Swift Forest Lands 20, Swift Commercial Resource Lands 40, and Swift Recreation).
- Zone the West End Subarea consistent with the West End Subarea Plan (zoning designations: Rural Lands 2, 5, and 10, West End Forest Lands 20, West End Commercial Resource Lands 40, and Neighborhood Commercial).
- Add a new section to the zoning code (SCC 21.70.170) on alternate energy systems, which would apply to the installation of any alternate energy facility located within unincorporated Skamania County, except for the General and Special Management Areas of the National Scenic Area (*AR-203*).

A list of all of the proposed zoning designations and the acreage allocated to each is set forth in the Environmental Checklist at AR-56 to 57. *AR-50, 51, 56, and 57; County Exhibit 2.*

12. The proposed Alternate Energy Systems section contains standards relating to the following facilities:

- Rooftop Wind Energy Systems[11]
  Key provisions:
  - One per structure
  - Maximum height: 15 feet above maximum for structure
- Small-Scale Wind Energy Facilities[12]
  Key provisions:
  - No limit on number
  - Maximum height: 65 to 80 feet
  - Minimum property line setback: 1.1 times the height
- Large-Scale Wind Energy Facilities[13]

[11] The proposed definition for rooftop wind energy system is "a small wind energy system that is installed onto a structure supplying power directly to that structure." *AR-82.*
[12] The proposed definition for small-scale wind energy facilities is "Wind turbines which will be used primarily to reduce on-site consumption of utility power to farms, homes, or businesses." *AR-83 (SCC 21.08.010).*

Key provisions:

- No limit on number
- Maximum height: 500 feet
- Minimum property line setback (exterior): 50 feet plus height of structure
- Minimum setback from residential structures or zones: one-half mile

- Large-Scale Solar Facilities[14]
- Geothermal Resources[15]
- Bio-Energy Facilities[16]

  Key provision:

  - Minimum setback from residential structures or zones: one-half mile

AR-203 to 214 (SCC 21.70.170).

13. The current zoning ordinance does not contain any standards relating to alternate energy systems, although geothermal energy facilities are identified as conditional uses in the R-1, R-2, R-5, R-10, Rural Estate, and Resource Production zones. *SCC 21.28.030, 21.32.031, 21.36.031, 21.40.030, 21.44.030, and 21.56.030.* The County would regulate wind power facilities as "utilities" under the existing code. *Testimony of Ms. Witherspoon.* Public Facilities and Utilities[17] are allowed in the residential and Rural Estate zones. Semi-Public Facilities[18] are conditionally allowed in the residential and Rural Estate zones, and Semi-Public Facilities and Utilities are conditionally allowed in the Resource Production zones. *SCC 21.28.020 and -.030, 21.32.020 and -.031, 21.36.020 and -.031, 21.40.020 and .030, 21.44.020 and -.030, and 21.56.030.* The Hearing Examiner was not able to locate any use classification relating to private utility systems.

14. Under the Planning Commission Recommended Draft, rooftop wind turbines would be allowed outright in the residential zones, and small-scale wind energy facilities would be

---

[13] The proposed definition for large-scale wind energy facility is "An electricity-generating facility consisting of wind turbines or other such devices and their related or supporting facilities that produce electric power from wind to be sold and used off-site." *AR-79 (SCC 21.08.010).*

[14] The proposed definition for large-scale solar facilities is "photovoltaic energy systems and/or solar thermal technology energy systems that use reflective materials that concentrate the sun's heat energy to drive a generator that produces electricity." *AR-79 (SCC 21.08.010).*

[15] The proposed definition of geothermal energy facilities is "A facility used to produce electricity by extracting and converting the natural thermal energy from the earth." *AR-78 (SCC 21.08.010).* There are no standards for Geothermal Resources other than compliance with RCW 78.60.

[16] The proposed definition for bio-energy is "Includes a range of biomass feedstock and technologies for conversion of these materials into useful energy." *AR-76 (SCC 21.08.010).*

[17] "Facilities which are owned, operated, and maintained by public entities which provide a public service required by local governing bodies and state laws." *SCC 21.08.010 (70).*

[18] "Facilities intended for public use which may be owned and operated by a private entity." *SCC 21.08.010 (73).*

allowed in the residential zones with administrative review.[19] In addition, "public, semi-public and/or private facilities and/or utility systems" would be allowed outright in the residential zones. Although the proposed definitions for "public facilities and utility systems" and "semi-public facilities and utility systems" include "electrical transmission, distribution and generation facilities", the electrical generation facilities that fall under more restrictive definitions (such as wind turbines) would not be regulated as a "public, semi-public and/or private facilities and/or utility systems." Thus, a large-scale wind energy facility would *not* be allowed outright in a residential zone.[20] *AR-81, 82, 99, 100, 102, 103, 105, 106, 108, 109; Testimony of Ms. Witherspoon.*

15. Although alternative energy systems would be regulated under the Alternative Energy Systems section of the zoning code, it is not clear how certain traditional electricity generating facilities, such as coal-fired plants, would be regulated. The Planning Commission Recommended Draft does not contain use categories or specific standards for such facilities. If categorized as "public, semi-public and/or private facilities and/or utilities" they would be allowed outright in most zones. *See generally AR-76-84; Opening Brief of Save our Scenic Area, page 10.*

16. Under the Planning Commission Recommended Draft, large-scale wind energy facilities and bio-energy facilities (the most controversial uses) would not be allowed outright in any zone.[21] Instead, they would be conditional uses in the following zones:

- Industrial
- Forest Lands 20 (large-scale wind energy only)
- Commercial Resource Lands 40
- Carson Industrial Zone (large-scale wind energy only)
- West End Forest Lands 20 (large-scale wind energy only)
- West End Commercial Resource Lands 40
- Swift Forest Lands 20 (large-scale wind energy only)
- Swift Commercial Resource Lands 40

[19] Small-scale wind energy facilities would not be allowed within the High Density Residential Zone of the Carson subarea. *AR-139.*

[20] To avoid confusion, the Hearing Examiner urges the County to clarify this issue in the final version of the zoning code. Appellant SOSA made much of the fact that the language "electrical transmission, distribution and generation facilities" could be read as including wind-energy and other alternative energy facilities. However, the Hearing Examiner considers this to be a language problem (albeit a significant language problem) rather than an environmental review problem. It is clear that the County intends to regulate wind-energy and other alternative energy facilities in accordance with the stricter standards established for those facilities, and it is the Hearing Examiner's opinion that no reviewing official looking at the larger statutory scheme could reasonably interpret otherwise. Consequently, the Hearing Examiner will not evaluate the environmental impacts of the proposed zoning code on the false assumption that large-scale wind energy facilities would be allowed outright in the residential zones.

[21] Under the prior Board-Initiated Draft, large-scale wind energy facilities would have been administrative review uses in some zones, and allowed outright in others. *See e.g., AR-121, 128, and 148.*

AR-122, 125, 128, 148, 161, 163, 179, 182. None of the zones identified above would allow residential uses.

17. Although the 2007 Comprehensive Plan specifies that the Hearing Examiner "may deny a conditional use permit if he or she finds the use is inappropriate for the area" (2007 Comprehensive Plan, Policy LU.6.1, page 31), the proposed criteria for conditional use permit approval do not appear to give the Hearing Examiner discretion to deny a conditional use permit. Proposed SCC 21.16.070(A) states, "If the Hearing Examiner determines that the use is *not compatible* with permitted or existing uses in the specific area of the proposed use then the proposed use may be approved or approved with conditions to make it compatible with the area." *AR-88 (emphasis added).* The quoted language is a change from the current SCC 21.16.070, which states, "If the Hearing Examiner determines that the use is not compatible with permitted or existing uses in the specific area of the proposed use then the proposed use shall be denied." *SCC 21.16.070(A).*

18. The 2007 Comprehensive Plan does not contemplate the type of energy facilities described in the Planning Commission Recommended Draft. With respect to the Conservancy designation, which includes the majority of the County and which could be implemented by the Residential 10, Forest Lands 20, Commercial Resource Lands 40, and Natural zones (see 2007 Comprehensive Plan, Figure 2-2, and AR-97 to 98), the Comprehensive Plan lists only the following utility uses as being appropriate within the designation: "Public facilities and utilities, such as parks, public water access, libraries, schools, utility substations, and telecommunication facilities." *2007 Comprehensive Plan, page 26.*

19. Ms. Karen Witherspoon, Director of Community Development for Skamania County, was the Responsible Official for State Environmental Policy Act (SEPA) review of the code amendments. Ms. Witherspoon issued a Determination of Nonsignificance (DNS) for the Planning Commission Recommended Draft on October 8, 2008.[22] *AR 47-48.*

20. On October 7, 2008, the County mailed notice of the DNS to numerous agencies, tribes, and interested parties, including the Washington Department of Fish and Wildlife, the Washington Department of Natural Resources, the United States Forest Service, the Washington Department of Ecology, and the Columbia River Gorge Commission. *AR-64-68.* The County published the DNS in the Skamania County Pioneer on October 8, 2008. *AR-69-70.*

21. No agency submitted comments directly in response to the October 8, 2008 DNS. *Testimony of Ms. Witherspoon.* However, on June 5, 2008 the Washington Department of

[22] Ms. Witherspoon had issued a DNS for the Board-Initiated Draft also, and the DNS was appealed by some of the Appellants in this case. Ms. Witherspoon withdrew the DNS in response to the changes recommended by the Planning Commission. *See AR-50.*

Fish and Wildlife (WDFW) submitted a comment letter on the original Board-Initiated Draft that contained the following language:

> WDFW would like to re-iterate our calls for a cumulative effects analysis of regional wind power development in the Columbia River Gorge. Such an analysis is typically not possible or required during permitting and siting of an individual wind power development. The County zoning update process is the best opportunity we have to conduct this analysis of potential adverse environmental impacts from development of wind power sites, as well as associated power lines, roads, and other infrastructure. Such an analysis would evaluate the number, location, and type of turbines; the number and type of species in an area; species behavior; topography; and weather factors influencing direct and indirect mortality factors.

Exhibit C.12. No cumulative effects analysis has been conducted for the proposed zoning code amendments, although some of the specific language changes requested by WDFW (i.e., not allowing large-scale energy uses outright on commercial resource lands) have been incorporated into the Planning Commission Recommended Draft. *Exhibit C.12; AR-128.*

22. The County did not consider the June 5, 2008 WDFW letter in the environmental review of the Planning Commission Recommended Draft because of the timing of the submittal. In compiling its environmental review record the County made a distinction between those comments submitted in response to the October 8, 2008 DNS, the comments submitted in response to the DNS for the prior Board-Initiated Draft, and the comments submitted to the Planning Commission on the ordinance itself. Ms. Witherspoon testified that WDFW submitted a later letter (also not included in the environmental review record) that did not include a request for a cumulative effects analysis. *Testimony of Ms. Witherspoon.*

23. Save our Scenic Area filed an appeal of the DNS on October 22, 2008. *AR-30 through 40.* The appeal was timely under the 14-day deadline specified in the DNS. *AR-47 to 48.* The appeal alleged that the proposal (mainly, the portions relating to wind turbines) would have probable, significant, adverse impacts on the following:

- Birds and animals,
- Noise,
- Geology, soils, and topography,
- Fire and hazard,
- Relationship to existing land use plans,
- Land use and housing,
- Light and glare,
- Aesthetics and scenic resources,
- Special areas (i.e., Columbia Gorge National Scenic Area),

- Recreation,
- Transportation,
- Water Supply and Aquifers, and
- Human health.

In addition, Save our Scenic Area alleged that the County did not actually consider environmental factors prior to issuing the DNS, that the proposal would result in cumulative impacts, and that the proposal would set a precedent for further actions with significant environmental effects. Save our Scenic Area requested that the Hearing Examiner reverse the issuance of the DNS and order the County to prepare an Environmental Impact Statement (EIS). *AR-35 through 40.*

24. The organizations Friends of the Columbia Gorge, Gifford Pinchot Task Force, and Columbia Riverkeeper jointly filed an appeal of the Determination of Nonsignificance on October 22, 2008. *AR-3 through 24.* The appeal was timely under the 14-day deadline specified in the DNS. *AR-47 to 48.* The appeal alleged the following (paraphrased):

    - An EIS must be prepared for non-project actions that may lead to significant adverse impacts.
    - The County improperly relied on the Klickitat County FEIS.
    - The County failed to consider cumulative impacts, and the precedent set by the proposal.
    - The County failed to consult with other agencies.
    - The County failed to consider impacts to special and sensitive areas, wildlife, rare plants, native plant communities, and water resources.
    - The County failed to ensure consistency with the Comprehensive Plan, Critical Areas Ordinance, and federal wildlife laws.
    - The County did not analyze the impacts of the Northwestern Lake Recreational zones, or the impacts of increased residential development.
    - The County did not consider or adequately protect against impacts to cultural resources and recreation, noise impacts, fire risk, transportation impacts, and impacts associated with new energy transmission infrastructure.

    AR-6 through 23.

25. The County stipulated to all Appellants' standing to challenge the DNS. There are declarations in the record from members and/or staff of Friends of the Columbia Gorge, Columbia Riverkeeper, and Gifford Pinchot Task Force, some of whom reside in Skamania County, that their interests would be adversely affected by the proposed zoning code amendments. According to the declarations, members of the Appellant organizations pursue recreational and wildlife viewing activities in or near the areas that would be affected by the zoning ordinance. *Argument of Mr. Banks; Exhibits F.4 through F.9.*

26. In response to the appeals, the County argued that the scope and impact of the zoning amendments is smaller than argued by the Appellants because most of Skamania County consists of public land, that the court decision *King County v. Boundary Review Board,* 122 Wn.2d 648 (1993) is not applicable, that the State of Washington has preempted local control over wind power projects, and that the proposed amendments would be an improvement over the existing regulatory scheme. *Response Brief of Skamania County.*

27. In the Environmental Checklist for the Planning Commission Recommended Draft, the County discloses, in general terms, the presence of mountainous terrain, water features, threatened and endangered species, bird migration routes, and unstable soils within the County, but claims that the proposal would have no impact on those and other elements of the environment because it is a non-project action. In the supplemental sheet for non-project actions, the County does not identify or analyze the impacts associated with the type of development that might result from the proposed amendments, but indicates that the impacts of future development would be determined and mitigated on a project-specific basis based on County regulations. *AR-50 to 62.*

28. Assistant Planner Heather Watson prepared the September 30, 2008 Environmental Checklist, in consultation with Ms. Witherspoon and other County staff. As background research, Ms. Watson reviewed the Planning Commission Recommended Draft of the zoning code amendments, a Final Environmental Impact Statement (FEIS) issued by Klickitat County for its Energy Overlay Zone (AR-71),[23] the August 2003 Wind Power Guidelines promulgated by the Washington Department of Fish and Wildlife (AR 351-359), and some SEPA checklists and threshold determinations issued by other jurisdictions for legislative actions. Although Ms. Watson was aware that the County had been approached regarding a possible wind energy development, she did not consider the project in preparing the Environmental Checklist because no application had been filed. *Testimony of Ms. Watson.*

29. Although both Ms. Witherspoon and Ms. Watson reviewed the Klickitat County FEIS prior to issuance of the DNS, neither provided testimony or other evidence identifying which specific portions of the FEIS or supporting studies were persuasive in making the determination. In addition, neither provided evidence suggesting that Skamania County and Klickitat County have similar environmental conditions. *See generally, Testimony of Ms. Witherspoon and Ms. Watson.* Although the checklist notes, "The Eastern portion of Skamania County that abuts Klickitat County was included in studies prepared for this [the Klickitat County] EIS" (*AR-50*), no specific references to the studies, or conclusions drawn from the studies, were provided.[24] In addition, the assumptions used by Klickitat

[23] Klickitat County is immediately east of Skamania County.

[24] By chance, the Hearing Examiner found a reference to eastern Skamania County in the Avian Study Report attached to the Klickitat County FEIS (AR-71, Appendix B). The study indicates that two avian sampling points were in southeast Skamania County, in the general vicinity of the panhandle that extends south of the Klickitat County line. The area represented by the sampling points is an extremely small fraction of Skamania County as a whole. *AR-71, Appendix B, Figure 1.*

County in evaluating the environmental impacts of the Energy Overlay Zone are not reflected in the proposed zoning text. For example, the Planning Commission Recommended Draft would allow a maximum wind turbine height of 500 feet, whereas the visual impact analysis conducted by Klickitat County was based on a height of 100 feet. *AR-205; AR-71, page 3-108.* The 500-foot height limit was not based on environmental factors; its purpose was to ensure that the type of turbines currently in existence would be conforming. *Testimony of Ms. Witherspoon.*

30. Prior to adoption of its Energy Overlay Zone, Klickitat County, like Skamania County, did not have ordinances that specifically addressed energy development. Energy facilities were reviewed on a case-by-case basis through the conditional use permit process, which, the FEIS notes, "has led to a lack of consistent policy for energy facility siting." *AR-71, page 1-3 to 1-4.* Klickitat County issued a Determination of Significance (DS) for the non-project action on June 6, 2002, and issued the FEIS in September of 2004. *Exhibit H.2; AR-71.*

31. In the FEIS, Klickitat County predicted that the Energy Overlay Zone might encourage greater energy development within the Overlay boundaries, and discourage energy development outside of the Overlay boundaries "because of the greater uncertainty in the permitting process". *AR-71, page 1-6.* The prediction turned out to be accurate. The development of wind power facilities in Klickitat County has far exceeded the projections contained in the FEIS. Whereas the FEIS assumed that four wind power projects (1,000 MW generating capacity total) would be developed in Klickitat County between 2004 and 2024, as of January 30, 2008 there were 12 wind power facilities in Klickitat County (1500+ MW) that were permitted and/or constructed or had permits pending.[25] These facilities are depicted on a Klickitat County Wind Projects Map. *Exhibit E.2.* During the past year, applications for two wind facilities in addition to those depicted on the map have been filed.[26] *Exhibits E.3, E.4, and E.5; AR-71, page 1-2.*

32. Skamania County is a member of the Mid-Columbia Economic Development District (MCEDD), and Skamania County Commissioner Paul Pearce serves on the MCEDD Board of Directors as the Chair of the Executive Committee. The counties that constitute MCEDD, in addition to Skamania County, include Klickitat County (WA), Sherman County (OR), Wasco County (OR), and Hood River County (OR). *Exhibit H.10, page 1; Exhibit H.13.*

33. The mission of MCEDD is "to promote the creation of family-wage jobs, the diversification of the economic base, and the growth, development and retention of business and industry within the five-county district." *Exhibit H.10, page 2.* One of

---

County line. The area represented by the sampling points is an extremely small fraction of Skamania County as a whole. *AR-71, Appendix B, Figure 1.*

[25] Although the map depicting the wind power facilities is dated January 30, 2008, it includes some projects that did not receive SEPA threshold determinations until April of 2008. *Exhibit E.2, Exhibit 6.3, Exhibit 6.4.*

[26] It should be noted that one of those projects – the Goodnoe II Project – included approximately 320 acres of land owned by the Washington Department of Natural Resources. *Exhibit E.5.*

MCEDD's projects has been to establish the Columbia Gorge Bi-State Renewable Energy Zone (CGBREZ). "This self-declared zone was created to reduce the region's dependency on federal subsidies, bring economic vitality to the region, establish a national model for energy self-sufficiency, and provide a model of self-reliance for other rural economies in the 21st Century. *Exhibit H.10, page 9; see also Exhibit D.6.*

34. Skamania County has demonstrated its support of the CGBREZ, and its interest in wind power in particular, in several ways. On December 18, 2007, the Skamania County Board of Commissioners passed Resolution 2007-59, which "endorses the creation of the Columbia Gorge Bi-State Renewable Energy Zone." *Exhibit H.9.* In the preamble to the resolution, the Commissioners identify the counties within the zone as possessing "world class renewable energy assets including wind, sun, biomass, water and geothermal" and as desiring to develop renewable energy projects. *Exhibit H.9.* On September 30, 2008, the Skamania County Board of Commissioners passed Resolution 2008-51, which endorses several policies and actions relating to the CGBREZ, such as streamlining government permitting, encouraging investment in new energy technologies, and expanding regional transmission capacity for renewable energy projects. *Exhibit H.12; Exhibit H.11.* On December 23, 2008, the Board "discussed the need for the County to pay for Skamania County Economic Development Director to attend an upcoming conference of the American Wind Energy Association". *Exhibit H.14.*

35. Skamania County contains areas that have been mapped by the U.S. Department of Energy National Renewable Energy Laboratory as Wind Power Class 4 ("good") or better. The wind power classifications range from Class 1 to Class 7, with Class 1 referring to "poor" resource potential (wind speeds not exceeding 12.5 miles per hour at 50 meters), and Class 7 referring to "superb" resource potential (wind speeds of 19.7 miles per hour or greater). *Exhibits D.1 and D.2.*

36. To facilitate potential wind energy projects, there are existing high-voltage Bonneville Power Administration electric transmission lines in the southern portion of Skamania County and on the west side of Swift Reservoir. *Exhibits H.1, D.1, and D.2.*

37. Skamania County has not yet received an application to develop a large-scale wind energy facility. However, SDS Lumber has approached Skamania County on multiple occasions over the past several years to discuss a possible large-scale wind energy project (Saddleback Project) on its property within the County. Ms. Witherspoon met with representatives of SDS and entities such as the Bonneville Power Administration on two or three occasions for "pre-application meetings" to discuss the permitting requirements for the project. Multiple pre-application meetings have been held because of changes in the development team. The project, if developed, would consist of at least 40 wind turbines. Although the last formal pre-application meeting was approximately two years ago, individuals associated with the project have been involved in the County's code update process and the president of SDS was present at the subject appeal hearing. *Testimony of Ms. Witherspoon.*

38. The Bonneville Power Administration (BPA) has produced a map entitled "Current and Proposed Wind Project Interconnections to BPA Transmission Facilities" (Exhibit D.4). This map depicts the SDS Saddleback project as a proposed wind generation facility of 70 megawatts (MW). The project location is in the southeast corner of Skamania County. *Exhibit D.4.*

39. Although no party was able to identify any specific wind power projects located or proposed on National Forest land, United States Forest Service regulations do not preclude the development of wind energy facilities. Wind energy uses are governed by the Forest Service's special use regulations set forth in 36 CFR 251, subpart B. Applications for wind energy facilities are processed in accordance with 36 CFR 251.54, Forest Service Manual 2726 ("Energy Generation and Transmission"), and Forest Service Handbook 2709.11 ("Special Use Administration"). In September of 2007, the Forest Service proposed amendments to the manual and handbook to specifically address wind energy uses. *72 Federal Register 184; Exhibit D-9, page 4-29; see also Testimony of Mr. Apostol.*

40. Although under SEPA each project is reviewed on an individual basis, there appears to be a general consensus among reviewing officials that large-scale wind energy facilities generate the type of impacts that are appropriately reviewed through an environmental impact statement. *Exhibits E.3, E.5, 6.1, 6.2, 6.3, and 6.4; Testimony of Ms. Witherspoon.* A typical large-scale wind energy facility includes numerous turbines that are arranged in "strings", electrical collector and/or transmission lines connecting the turbines to each other and to the electrical grid, access roads to each of the turbines, electrical substations, and support structures. The following examples of wind energy proposals in the region illustrate the scale of development associated with large-scale wind energy facilities:

Lakeview Light & Power Project (Harvest Wind) in Klickitat County (as described in DS issued April 25, 2008):

- 55 turbines with a maximum height of 410 feet each
- New 3.1-mile long electrical transmission line
- New substation occupying two acres
- An operations building
- Approximately 20 miles of new access roads
- 98.6 acres of land impacted (46.6 acres of temporary construction impact and 52 acres of long-term impact)

Exhibit 6.3.

Pacific Wind Development Project (Juniper Canyon) in Klickitat County (as described in DS issued April 11, 2008):

- 167 turbines with a maximum height of 492 feet each
- Two new substations occupying a total of 15 acres
- Unpaved access roads connecting the turbines and other facilities

Exhibit 6.4.

Windy Point Partners, LLC Project (Windy Point II) in Klickitat County (as described in DS issued July 9, 2008):

- 61 turbines
- Possible new substation
- Approximately 17 miles of new access roads
- 76 acres of land permanently disturbed

Exhibit 6.1.

Northwest Wind Partners, LLC Project (Goodnoe II) in Klickitat County on private and DNR land (as described in DS issued July 11, 2008):

- 17 turbines (added to an existing facility)
- Electrical transmission lines
- 15 acres of land permanently disturbed

Exhibit 6.2.

Stateline Wind Project in Walla Walla County, Washington and Umatilla County, Oregon (as described in Federal Register, June 5, 2000):

- 250 to 450 245-foot-tall turbines, arranged in several strings and spaced 200 to 300 feet apart
- New substation occupying one to two acres
- Eight to ten miles of new overhead transmission lines
- New access roads
- Operations building
- Water tank

Exhibit 5.4.

41. The National Academy of Sciences prepared a report, Environmental Impacts of Wind-Energy Projects, which "provides analyses to help to understand and evaluate the positive and negative environmental effects of wind-energy facilities." *Exhibit 4.4, Executive Summary, page 1.* The study addresses both the ecological and the human impacts of wind energy. *Exhibit 4.4, Chapters 3 and 4.* The study also includes recommendations for improving wind-energy planning and regulation. *Exhibit 4.4, Chapter 5, page 181.* With respect to planning, the recommendations of the National Academy of Sciences include the following:

- Standardized studies should be conducted before siting and construction and after construction of wind-energy facilities to evaluate the potential and realized ecological impacts of wind development. Pre-siting studies should evaluate the potential for impacts to occur and the possible cumulative impacts in the context of other sites being developed or proposed. *Exhibit 4.4, Executive Summary, page 9.*

- Regulatory reviews of individual wind-energy projects should be preceded by coordinated, anticipatory planning whenever possible.... This planning could be

implemented at scales ranging from state and regional levels to local levels. *Exhibit 4.4, Executive Summary, pages 12-13.*

Visual impacts

42. Skamania County contains unique and exceptional scenic resources, including the National Scenic Area in the southern portion of the County, Mt. St. Helens National Monument in the northwest corner of the County, and the base of Mt. Adams near the northeast corner of the County. Photographs depicting some of Skamania County's scenic resources are provided in Exhibit B.5 and Exhibit B.1 (see page 1-6). *2007 Comprehensive Plan, pages 13 and 35; Exhibits H.3, B.5 and B.1.*

43. The Swift Subarea is one of the areas that, under the Planning Commission Recommended Draft, could be developed with large-scale wind energy facilities. The Swift Subarea Plan describes the area as "mountainous with sweeping vistas", and as being one of the gateways into the Mt. St. Helens National Volcanic Monument, "which is a popular recreation and sightseeing location bringing thousands of tourists through the Swift Subarea every year." *Swift Subarea Plan, pages 7 and 9.*

44. Based on U.S. Department of Energy National Renewable Energy Laboratory mapping, Skamania County's best wind resources are found on ridgelines that lie transect to the Columbia River Gorge. The ridges may be visible from key viewpoints. Some are near the National Scenic Area boundary. *Exhibits D.1 and D.2; Exhibit B.5; Testimony of Mr. Apostol.*

45. Wind turbines of the maximum height permitted under the Planning Commission Recommended Draft (500 feet) have the potential to dramatically alter the landscape. To put the massive scale in perspective, the tallest building in Portland is 546 feet tall. Even a turbine that is only 300 feet tall could have a blade sweep diameter comparable to the length of a Boeing 747 Jumbo Jet. *Exhibit B.5; Testimony of Mr. Apostol.*

46. The visual impact associated with wind turbines is based not only on the scale of the structures, but on the amount of land that must be cleared to accommodate them. In a forested area, the clearing required for a string of turbines can be substantial (in the example provided in Exhibit B.5, four acres per turbine). With respect to aesthetic impacts, complex, ecologically fragile, and scenic landscapes are the poorest locations for large wind turbines, and open, level, simple landscapes (such as might be found in established agricultural areas) are the best locations for large wind turbines. *Exhibit B.5; Exhibit B.4; Testimony of Mr. Apostol.*

47. Landscape aesthetics have measurable, objective standards. It is possible to map aesthetically sensitive areas and use such information when making zoning decisions. Mr. Dean Apostol, the Appellants' landscape architect, recommended mapping as one means for the County to minimize aesthetic impacts. He also recommended that the County adopt aesthetic standards. *Testimony of Mr. Apostol; Exhibit B.5.*

48. The National Forest Service (NFS) has developed a Scenery Management System for the inventory and analysis of the aesthetic values of national forests. The Scenery Management System is described in an NFS publication entitled "Landscape Aesthetics – A Handbook for Scenery Management" (Exhibit B.1). The Handbook provides a multi-step process for mapping scenic resources. The concepts and processes contained in the Handbook are not limited to national forests; some jurisdictions use the Handbook to evaluate scenic impacts. *Exhibit B.1; Testimony of Mr. Apostol.*

49. The American Wind Energy Association (AWEA) has prepared a Wind Energy Siting Handbook that provides information regarding the regulatory and environmental issues associated with the development of wind energy facilities. In its handbook, the AWEA notes that government agencies with approval authority over wind farms often require a formal assessment of the visual compatibility of a wind farm, such as the extent to which the wind farm adversely affects the aesthetics of vistas known to be important to the community. According to the AWEA, a visual impact assessment should include a characterization of baseline conditions, photo simulations, and specific investigation of the potential visual impacts based on identified changes from the baseline condition. *Exhibit D.9, pages 5-28 to 5-31; see also Exhibit B.4.*

50. The use of aesthetic criteria to control land uses is not new to Skamania County; the Columbia Gorge National Scenic Area Ordinance (Title 22 of the Skamania County Code) contains aesthetic criteria. All development applications for the National Scenic Area must include "a list of all key viewing areas from which the proposal would be visible." *SCC 22.06.060(A)(1)(e).* The key viewing areas, which are defined by ordinance, include Cook-Underwood Road, I-84, the Columbia River, the Pacific Crest Trail, and numerous other locations. *SCC 22.04.010(91).* Those developments visible from key viewing areas must comply with certain standards, including that the development must be "visually subordinate"[27] to its setting as seen from the viewing areas. *SCC 22.18.030; see also Exhibit B.4.*

51. With respect to large-scale wind energy facilities, the Planning Commission Recommended Draft does not contain standards or criteria relating to aesthetic impacts, nor does it require a visibility analysis as an application requirement. *AR- 205 to 212.*

52. Based on Geographic Information System (GIS) mapping prepared by a consultant with significant prior experience with the National Scenic Area (see Exhibit B.2), 415-foot-tall wind turbines in the southeast portion of Skamania County, but outside of the National Scenic Area, would be visible to a six-foot-tall observer from Cook-Underwood Road within the National Scenic Area and from Interstate 84 (I-84) on the Oregon side of the Gorge.[28] With respect to the western portion of the study area, the visibility would be

[27] "Visually subordinate means a description of the relative visibility of a structure or use where that structure or use does not noticeably contrast with the surrounding landscape, as viewed from a specified vantage point, generally a key viewing area. As opposed to structures that are fully screened, structures that are visually subordinate may be partially visible. They are not visually dominant in relation to their surroundings...." *SCC 22.04.010(181).*
[28] Within the study area, I-84 passes through the Hood River Urban Area. *Exhibit B.3.*

greatest significant from Cook-Underwood Road (i.e., only in the northernmost portion of the study area would turbines not be visible), but not as significant from I-84 (i.e., only in the southernmost portion of the study area, adjacent to the NSA boundary, would turbines be visible). With respect to the eastern portion of the study area, which generally corresponds to the panhandle lying south of Klickitat County, turbines would be visible from I-84 at nearly all locations, and would be visible from Cook-Underwood Road at locations near the NSA boundary. *Exhibit B.3.*

53. A viewshed analysis was prepared specifically for the Saddleback project, which, if developed, would be located in the southeast portion of Skamania County. According to the submitted site plan, 44 wind turbines would be located along some north-south ridgelines located immediately north of the Scenic Area boundary.[29] The turbines would be visible for several miles, and would be particularly visible from areas to the west and north of the project and from the south side of the Columbia River Gorge (I-84 and environs). Views from Cook-Underwood Road would also be affected. *Exhibits 2.2a, 2.2b, and 2.2c.*

Wildlife Impacts

54. Wind turbines typically kill at least some birds and bats. Bird fatalities are generally caused by collision with the turbines or associated infrastructure. Bat fatalities can be caused by collision or by "barotrauma" from air pressure changes near the turbines.[30] The extent of the impact depends on factors such as the type of species present and how they use the landscape, the type of habitat that is provided (forested areas are more sensitive), and design features such as the height of the turbines. *Testimony of Mr. Smallwood; Exhibit C.14; see generally, Exhibit 4.4, Chapter 3.*

55. Klickitat County had an Avian Study Report (WEST, 2003) prepared as part of its FEIS. The purpose of this study was to "provide data on avian use of potential wind power development areas in Klickitat County." *AR-71, Appendix B, page 1.* In addition to data on avian use, the study included predictions of the number of collisions per turbine by avian group for each of six study regions. *AR-71, Appendix B, page 3.* Two of the avian sampling points were in southeast Skamania County, in the general vicinity of the panhandle that extends south of the Klickitat County line. *AR-71, Appendix B, Figure 1.* However, the study did not include collision predictions with respect to the Skamania County sites. *AR-71, Appendix B, page 3 and Figure 1.*

56. Overall, the WEST study predicted relatively low avian fatality rates throughout Klickitat County, with the highest rate of raptor fatalities west of U.S. 97 and within 1.5 miles of the Columbia River (0.058 per year per turbine), the lowest rate of raptor fatalities east of

[29] It should be noted that because no formal application has been submitted to the County, the site plan submitted by the Appellants might not represent the layout ultimately reviewed.

[30] Pulmonary barotrauma is lung damage due to the expansion of air in the lungs that is not accommodated by exhalation. In a study of bat fatalities from a wind energy facility in Alberta, Canada, more than 90 percent of the bats exhibited internal hemorrhaging and pulmonary lesions consistent with barotrauma, and approximately half showed no sign of external injury such as would be caused by direct collision. *Exhibit C.14.*

Rock Creek and greater than 1.5 miles from the Columbia River. The prediction for passerines was the same for all study areas, at 1.6 fatalities per year per turbine. The prediction for all birds combined was similar for the study areas, with annual fatalities per turbine ranging from 1.624 east of Rock Creek and more than 1.5 miles from the Columbia River and 1.725 east of Rock Creek and less than 1.5 miles from the Columbia River. *AR-71, Appendix B, Table 32.*

57. The Appellant's wildlife expert, Dr. Kenneth Smallwood, is uniquely qualified to testify on the issue of the effects of wind turbines and other types of infrastructure on wildlife. He has a Ph.D in ecology, and has served as a consultant to the California Energy Commission, conducting research on bird behavior in the Altamont Pass Wind Resources Area. He has published 56 peer-reviewed articles, including three specifically relating to Altamont Pass. *Exhibit G.4.* Mr. Smallwood submitted that the Klickitat County FEIS underestimates the potential impact of wind turbines on birds. Mr. Smallwood reviewed the avian and bat fatality rates of the Big Horn Wind Energy Project, a 133-turbine facility that was recently constructed in Klickitat County. During the environmental review process, the developer of the Big Horn facility predicted low fatality rates for birds and bats, based in part on the results of the Klickitat County FEIS.[31] The project was then constructed and avian and bat mortality was monitored for a year. Mr. Smallwood evaluated the monitoring results, and developed estimates of actual bird and bat mortality. With respect to raptors, he found that the number of deaths was 12 to 16 times higher than the number predicted in the preliminary studies. With respect to bats, he found that the number of deaths was more than two times higher than originally predicted. *Exhibits C.19 and C.22.*

58. Although the WEST study underestimated the avian mortality associated wind power facilities, it provided some general conclusions that are relevant to the appeals:

- Avian mortality would be reduced by siting turbines where lowest avian use occurs
- Avian mortality would be reduced by siting turbines away from riparian areas
- Avian mortality would be reduced by siting turbines in agricultural areas rather than in native landscapes
- Impacts to raptors would be reduced by avoiding siting turbines at the crests and edges of hilltops, where raptors use the uplift created by the cliff face. "A requirement to consider avoiding wind turbine placement within 50 meters of hilltop rim edges is recommended to be included in the Energy Overlay Comprehensive Plan."

AR-71, page 3-64.

[31] The estimates associated with the Big Horn facility correlate fairly closely with the estimates contained in the Klickitat County FEIS. In the Avian Study Report, WEST estimated that the number of raptor deaths per turbine per year would range from 0.022 to 0.058 depending on geographic location. The preliminary Big Horn studies estimated that the number of raptors killed per year by the entire project would be three to four, or 0.022 to 0.03 raptors per turbine. *AR-71, Appendix B, Table 32; Exhibit C-19.*

59. Skamania County is predominately forested. Forested areas support more special-status species that would be vulnerable to turbine collision. *Exhibit C.21, page 15; Testimony of Mr. Smallwood.*

60. Skamania County's planning documents acknowledge that at least portions of the County provide habitat for protected species. For example, according to the Swift Subarea Plan, the Swift area may contain or provide habitat for the following bird and bat species that are federally listed as Endangered, Threatened, or Species of Concern: Bald Eagle, Northern Spotted Owl, Pacific Townsend's Big-Eared Bat, and Peregrine Falcon. *Swift Subarea Plan, page 8.* No evidence was presented that the County considered the presence of protected species when determining which zones should allow large-scale wind energy development.

61. Turbine collision is not the only impact to wildlife associated with large-scale wind energy facilities. The infrastructure associated with wind turbine development (roads, transmission lines) has potential to adversely affect wildlife by fragmenting habitat. *Exhibit 4.4, Chapter 3, pages 105-108.* The Planning Commission Recommended Draft and proposed zoning map do not restrict energy uses to areas where infrastructure is available or could be developed with minimal environmental impact. Although energy uses such as large-scale wind energy facilities would be conditionally allowed in substantial portions of the County, the existing road and electricity infrastructure is extremely limited or nonexistent in some areas. *Exhibit H.4; County Exhibit 2.*

62. Pine Creek, located within the Swift Subarea, provides spawning grounds for bull trout, a federally listed species. The U.S. Fish and Wildlife Service considers the Pine Creek bull trout population to be "especially important in achieving recovery for this species." *Exhibit C.17; Swift Subarea Plan, page 8.* Pine Creek is "especially vulnerable to land management activities on account of its steep slopes and highly erosive volcanic soils." *Exhibit C.17, page 2; see also Exhibit C.16.*

63. There are map-based tools that can be used on a countywide level to determine where energy facilities and other development would minimize impacts to wildlife. For example, Mr. Smallwood has developed an indicators approach for assessing the impacts of wind power development on bird species at any location in California. *Exhibit C-21, pages 4-5.*

64. The Planning Commission Recommended Draft contains measures to protect wildlife from impacts associated with large-scale wind energy development. These include the following (paraphrased):

- Take "reasonable efforts" to preserve existing trees, vegetation, and water resources
- Flag construction limits
- Design wind energy structures to discourage bird nesting, by using tubular rather than lattice supports, avoiding use of external ladders and platforms, avoiding use of guy wires, and using bird deterrent devices on guy wires

- Control weeds to avoid creating raptor habitat
- Use anti-perching devices on transmission lines
- Set back turbines at least 2,500 feet from known nesting sites of state and/or federally threatened or endangered raptor species and at least 1,500 feet from wetlands identified on the National Wetlands Inventory maps
- Monitor raptor nest activity prior to commencing construction
- Survey avian use of the site prior to finalizing site design
- Remove animal carcasses to avoid attracting foragers
- Should consult with WDFW before making final siting decisions
- Restore temporarily disturbed areas

AR-209 to 210. The measures do not include minimum setbacks from ridgelines.[32]

65. Although all development within the County would be subject to the critical areas code, the County did not present any evidence that it evaluated the presence of critical areas prior to establishing zoning districts or allowed uses within the zones. *Testimony of Ms. Witherspoon.*

66. The 2007 Comprehensive Plan contains policies that support protecting wildlife on a planning level rather than on a project-specific basis. These include the following:

> Policy E.4.2: Develop strategies for preserving, protecting or restoring important habitats and corridors, particularly if they are at risk of significant degradation. Some strategies may include ... promoting land use plans and development that avoid impacts on habitat....
>
> Policy E.4.4: Coordinate with other jurisdictions and agencies to protect environmentally critical habitats, particularly ecosystems and watersheds that span jurisdictional boundaries.

2007 Comprehensive Plan, page 46.

Air quality

67. According to the Klickitat County FEIS, biomass involves combustion of an organic fuel (such as wood), and consequently the emissions from such facilities include nitrogen oxides, carbon monoxide, particulate matter, sulfur dioxide, greenhouse gases, and toxic air pollutants (i.e., toluene, formaldehyde, etc.). *AR-71, page 3-9.* The FEIS notes that both biomass and natural gas-fired plants could affect visibility within the National Scenic Area, even though the Scenic Area is not within the overlay, and recommends the use of state-of-the-art air pollution technologies to mitigate impacts. *AR-71, page 1-7.*

---

[32] The County Critical Areas Ordinance would also not require a minimum setback from the edge of a bluff or mountain ridge. Development on slopes steep enough to be classified as a Landslide Hazard Area requires preparation of a geotechnical report. No minimum setback is specified. *SCC 21A.06.020.*

68. The United States Forest Service (USFS) monitors air quality within the Scenic Area, as well as within national forests in the Pacific Northwest region, through chemical analysis of lichen tissue. Based on study conducted between 1993 and 2001, the USFS found that mean concentrations of sulfur, nitrogen, lead, cadmium, copper, and zinc within the Scenic Area were significantly higher than means within the national forests, and were comparable to levels found within urban areas. *Exhibit A.3.* Cultural resources such as rock art might be adversely affected by the air pollution. *Exhibits A.1 and A.5.* Other ecological effects associated with nitrogen deposition are described in Exhibit A.4. *Exhibit A.4.*

69. The visibility within the Columbia Gorge National Scenic Area is poor compared to the conditions within many national parks and scenic areas in the western U.S., and is comparable to conditions within locations in California and in northwest Washington. *Exhibit A.1, pages 3 and 4.*

70. The Planning Commission Recommended Draft includes the following air quality/pollution control standard relating to bio-energy facilities: "All applicable air emission permits shall be obtained and all conditions complied with." *AR-214.*

Noise/Health

71. The Planning Commission Recommended Draft contains the following standards with respect to the noise generated by large-scale wind energy facilities:

    i. The owner/operator shall operate the project in compliance with applicable Washington State Environmental Noise Levels, Chapter 173-60 WAC.
    ii. Applicants shall provide documentation of expected noise generation levels.

    AR-207. The Washington noise standards are based on the land use classification of both the noise source and the noise receiver. When the receiver is a residential property, the daytime noise limit ranges from 55 to 60 dBA[33] depending on the classification of the noise source. At night, the maximum ranges from 45 to 50 dBA. *WAC 173-60-040.*

72. Mr. Richard James, an acoustical engineer, provided credible testimony that wind turbines generate a type of noise that is not adequately measured by the dBA scale used in the Washington noise standards. The dBA scale is designed to detect noises audible to humans. Wind turbines generate low-frequency noise (20 Hz or lower) that might cause the body to resonate even if it is not audible. Such effects are measurable on the C-weighted scale (dBC). *Testimony of Mr. James.*

73. Wind turbines have unique sound characteristics due to the interaction of the blades with the air around the towers. As described in one of the articles submitted by the Appellants:

[33] "dBA" means the sound pressure level in decibels measured using the "A" weighting network on a sound level meter." *WAC 173-60-020.*

"The interaction of the blades with air turbulences around the towers create low frequency and infrasound components, which modulate the broadband noise[34] and create fluctuations of sound level. The low frequency fluctuations of the noise is described as 'swishing' or 'whooshing' sound, creating an additional disturbance due to the periodic and rhythmic characteristic." *Exhibit 1.12, page 11.* Mountainous conditions can exacerbate the noise effects of wind turbines. *Testimony of Mr. James.*

74. Mr. James recommended a minimum distance of 1.2 miles between turbines and residences, based on health effects research conducted by Dr. Nina Pierpont. *Testimony of Mr. James.*

75. Dr. Pierpont, a pediatrician, interviewed by telephone 23 members of ten families, and through those interviews obtained information on a total of 37 people (she obtained information on young children from their parents). The ten families were not from the same town or situated around the same wind farm; some families lived in Canada and others lived in various Western European countries. Only one family lived in the United States. The families lived distances ranging from 0.19 mile to 0.93 mile from minimum 328-foot-tall, modern (i.e., constructed 2004 or later) wind turbines. Six of the ten families lived less than one-half mile from the turbines. Based on the interviews, Dr. Pierpont found that most study members experienced sleep disturbance, and at least half experienced a variety of other systems such as headaches, dizziness, and memory problems, which symptoms improved when the member was away from the turbines.[35] Dr. Pierpont calls the constellation of symptoms "Wind Turbine Syndrome." Her theory is that the low-frequency noise or vibration associated with wind turbines stimulates receptors for the balance system in a discordant fashion. Dr. Pierpont recommends that wind turbines be set back a distance of at least 1.2 miles from residences.[36] *Exhibit 8.3 (see in particular, pages 8, 12, 20, 22, 23, 26, 60, and 61).*

76. Dr. Pierpont's research has several limitations. The study was based on an extremely small number of families, and the only families that were included in the study were those in which a member reported severe effects and the family considered the problem to be serious enough to take action to reduce turbine exposure (such as moving to a new location). Dr. Pierpont did not physically examine any of the participants; the information obtained was based on medical histories taken by telephone. *Exhibit 8.3, page 18; Testimony of Dr. Pierpont.* The study was not epidemiological in nature; it does not show how prevalent any of the symptoms were within the larger community. Individuals outside of the selected families who lived near turbines but did not experience symptoms were not interviewed. *Testimony of Dr. Pierpont; Exhibit 8.3, page 51.* Wind Turbine

[34] "Broadband noise is characterized by a continuous distribution of sound pressure with frequencies greater than 100 Hz." *Exhibit 1.12, page 4.*
[35] Mr. Banks objected to the hearsay nature of Dr. Pierpont's testimony on this issue.
[36] All of Dr. Pierpont's subjects lived less than a mile from wind turbines. The recommendation of 1.2 miles is based on surveys conducted by Robyn Phipps of New Zealand. *Exhibit 8.3, page 8.* Robyn Phipps is not a medical doctor. *Exhibit 8.1, page 2.*

Syndrome (or the same group of symptoms) is not described in any medical journal or other professional literature.[37] *Exhibit 8.3, page 15; Testimony of Dr. Pierpont.*

77. The National Academy of Sciences does not consider noise produced by wind turbines to be a "major concern" for people living more than a half-mile from the turbines. *Exhibit 4.4, Chapter 4, page 159.* However, it notes that "industry standards ... for assessing and documenting noise levels emitted may not be adequate for nighttime conditions and projects in mountainous terrain. This work on understanding the effect of atmospheric stability conditions and on site-specific terrain conditions and their effects on noise needs to be accounted for in noise standards. In addition, studies on human sensitivity to very low frequencies are recommended." *Exhibit 4.4, Chapter 4, page 176.*

Shadow Flicker

78. Shadow flicker is the phenomenon in which the blades of a wind turbine, as they rotate in sunny conditions, "cast moving shadows on the ground resulting in alternating changes in light intensity." *Exhibit 4.4, Chapter 4, page 160*.

79. According to one article, for individuals with photosensitive epilepsy (one in 4,000 people), "flicker from turbines that interrupt or reflect sunlight at frequencies greater than 3 Hz poses a substantial risk of inducing photosensitive seizures." *Exhibit 2.1, page 4.* However, modern large wind turbines do not generate shadow flicker at frequencies greater than 3 Hz. *Exhibit 4.4, Chapter 4, page 161 ("Flicker frequency due to a turbine is on the order of the rotor frequency (i.e., 0.6 – 1.0 Hz)"); see also Exhibit 2.1, page 4.*

80. Although shadow flicker might still be considered annoying even if not an actual health hazard, shadow flicker only occurs during a limited portion of the day, and only during certain conditions. As described in the National Academy of Sciences publication on wind-energy projects, "Even in the worst situations, shadow flicker only lasts for a short time each day – rarely more than half an hour. Moreover, flicker is observed only for a few weeks in the winter season." *Exhibit 4.4, Chapter 4, page 161.*

81. Shadow Flicker can be easily modeled on a project-specific basis, and shadow flicker modeling was performed for the Wild Horse Wind Power Project in Kittitas County. *Exhibit 4.4, Chapter 4, page 161.* As described in the FEIS for the project, the shadow flicker frequency for each turbine would be less than one-fifth the frequency reported to trigger seizures, and the project would not have a shadow flicker impact on residences due to distance and intervening terrain. *Exhibit 5.2, page 3.15-1.* With respect to an off-site alternative location with potential shadow flicker impacts (potential exposure ranging from six minutes to two hours), micro-siting of some of the turbines was identified as a potential mitigation measure. *Exhibit 5.2, page 3.15-2.*

[37] "Other than articles on the internet, there is currently no published research on wind turbine associated symptoms." *Exhibit 8.3, page 15.*

CONCLUSIONS

Jurisdiction:
The Hearing Examiner is granted authority to conduct hearings and make decisions on appeals of State Environmental Policy Act (SEPA) threshold determinations pursuant to Skamania County Code (SCC) 2.80.060(A)(13).

Standards for Review of a SEPA Threshold Determination:
SEPA requires an Environmental Impact Statement (EIS) to be prepared "on proposals for legislation and other major actions having a probable significant, adverse environmental impact." RCW 43.21C.031.

- "Significant" as used in SEPA means a reasonable likelihood of more than a moderate adverse impact on environmental policy. Significance involves context and intensity and does not lend itself to a formula or a quantifiable test. *WAC 197-11-794.* Several marginal impacts when considered together may result in a significant adverse impact. *WAC 197-11-330(3)(c).*

- "Probable" as used in SEPA means likely or reasonably likely to occur. Probable is used to distinguish likely impacts from those that merely have a possibility of occurring, but are remote or speculative. *WAC 197-111-782.*

In *King County v. Boundary Review Board,* 122 Wn.2d 648 (1993), the Washington Supreme Court clarified that the term "probable" does not mean that an impact must be "inevitable" before an EIS may be required. In that case, the City of Black Diamond had issued a DNS for a proposed annexation of unincorporated King County land. The land was "largely uninhabited" (*Id.* at 656), and while some of the owners identified preferred future land uses, none presented a formal development proposal to the City. In response to argument that any future development of the property is too speculative to warrant full environmental review, the Court held, "a proposed action is not insulated from full environmental review simply because there are no existing specific proposals to develop the land in question or because there are no immediate land use changes which will flow from the proposed action. Instead, an EIS should be prepared where the responsible agency determines that significant adverse environmental impacts are probable following the government action." *Id.* at 664. The Court explained its reasoning as follows:

> One of SEPA's purposes is to provide consideration of environmental factors at the earliest possible stage to allow decisions to be based on complete disclosure of environmental consequences. Decision-making based on complete disclosure would be thwarted if full environmental review could be evaded simply because no land-use changes would occur as a direct result of a proposed government action. Even a boundary change, like the one in this case, may begin a process of government action which can "snowball" and acquire virtually unstoppable administrative inertia.

Id.

In determining an impact's significance, the responsible official must take into account that:

(a). The same proposal may have a significant adverse impact in one location but not in another location;

(b). The absolute quantitative effects of a proposal are also important, and may result in a significant adverse impact regardless of the nature of the existing environment;

(c). Several marginal impacts when considered together may result in a significant adverse impact; For some proposals, it may be impossible to forecast the environmental impacts with precision, often because some variables cannot be predicted or values cannot be quantified.

(d). A proposal may to a significant degree:

i. Adversely affect environmentally sensitive or special areas, such as loss or destruction of historic, scientific, and cultural resources, parks, prime farmlands, wetlands, wild and scenic rivers, or wilderness;

ii. Adversely affect endangered or threatened species or their habitat;

iii. Conflict with local, state, or federal laws or requirements for the protection of the environment; and

iv. Establish a precedent for future actions with significant effects, involves unique and unknown risks to the environment, or may affect public health or safety.

WAC 197-11-330(3).

A threshold determination "shall not balance whether the beneficial aspects of a proposal outweigh its adverse impacts, but rather, shall consider whether a proposal has any probable significant adverse environmental impacts." *WAC 197-11-330(5).* Thus, in *King County v. Boundary Review Board,* the Court rejected the argument that an EIS need not be prepared for the annexation proposal because development could also take place under county jurisdiction, stating, "The specter of adverse environmental effects in the absence of government action ... is itself not a justification for evading full environmental review." *King County v. Boundary Review Board,* 122 Wn.2d at 666. Even proposals designed to improve the environment might have significant adverse environmental impacts. *WAC 197-11-330(5).*

The lead agency must make its threshold determination "based upon information reasonably sufficient to evaluate the environmental impact of a proposal." *WAC 197-11-335.*

If a DNS is issued, the agency has the burden of demonstrating "that environmental factors were considered in a manner sufficient to be a prima facie compliance with the procedural dictates of SEPA." *Lassila v. City of Wenatchee,* 89 Wn.2d 804, 814 (1978). To uphold the DNS, the reviewing body "must be presented with a record sufficient to demonstrate that ACTUAL consideration was given to the environmental impact of the proposed action or recommendation." *Id. (emphasis in original).*

Clear error is the standard of review applicable to substantive decisions under SEPA.

Cougar Mt. Assocs. v. King County, 111 Wn.2d 742, 747, 765 P.2d 264 (1988). The determination by the governmental agency is clearly erroneous only if the reviewing tribunal is left with "the definite and firm conviction that a mistake has been committed." *Id.* at 747 (quoting *Polygon Corp. v. Seattle*, 90 Wn.2d 59, 69, 578 P.2d 1309 (1978)). In deciding this appeal, the Hearing Examiner must accord the County's SEPA determination "substantial weight." *RCW 43.21C.090.* The burden of proof is on the Appellants to show that the threshold determination was clearly erroneous.

Conclusions Based on Findings:

1. The County has not demonstrated that it has considered environmental factors to the extent required by SEPA. Most significantly, the County did not consider County-specific environmental studies prior to developing the zoning text and map amendments and did not consider the types of development that might result from the amendments. The County was not able to articulate a strong rationale for some the proposed alternative energy development standards, even though such standards have the potential to create environmental impacts. *Findings 12, 27, 28, 29, and 65.*

2. The Appellants have demonstrated, consistent with *King County v. Boundary Review Board,* that development with significant adverse environmental impacts is probable after adoption of the proposed zoning amendments.

   A. The zoning amendments would facilitate the development of large-scale wind energy and other alternative energy facilities on or near lands known for their unique scenic resources and habitat value. Some of the alternative energy uses are not identified in the Comprehensive Plan or the existing zoning code. *Findings 3, 11, 12, 13, 14, 16, 18, 42, and 43.*

   B. The potential significant, adverse environmental impacts of large-scale wind energy facilities are many and well documented. The Hearing Examiner finds most compelling the evidence regarding aesthetic and wildlife impacts. These impacts can and should be evaluated on a planning level rather than when individual projects are proposed. With full environmental analysis, the County might decide to refine the zoning map or development regulations to avoid environmental impacts. *Findings 40 – 66.*

   C. Although based on the evidence submitted the Hearing Examiner is not convinced that an adverse impact to public health is probable if wind turbines are allowed to be sited less than 1.2 miles from residences, wind turbines do generate noise and the impact should be evaluated prior to adopting a setback standard. *Findings 71-77.*

   D. The significant, adverse environmental impacts associated with wind energy facilities are not ameliorated by the conditional use permit requirement. Under the proposed zoning amendments, a conditional use cannot be denied. *Finding 17.*

E. The significant, adverse environmental impacts associated with wind energy facilities would not be fully addressed by project-specific environmental impact statements. Because project proposals are tied to specific parcels of land, the ability to consider alternative locations that might reduce environmental impacts is limited.

F. Development of wind energy facilities is probable after the zoning action due to the County's unique wind resources, the County Commissioners' expressed interest in and support of alternative energy development, and the fact that a developer has already approached the County with a potential wind power project. *Findings 31-38.*

3. The significance of the County action is not diminished by the fact that only a small fraction of the County located outside of the scenic area and the incorporated areas is privately owned. Even five percent of the County's total acreage (an amount less than the actual private ownership) is a significant amount of land.[38] Further, no evidence or legal authority was presented to suggest that the County's regulations would not apply to the 60,000 acres of land owned by the State of Washington. Klickitat County, for example, is processing permit applications for wind energy facilities located on Washington DNR land. *Finding 40.* Finally, even if the County does not have jurisdiction to regulate public lands within its boundaries[39], the County's regulations might be influential to state and federal decision makers when evaluating requests for alternative energy facilities. For example, 36 CFR 251.56 states that special use approvals on National Forest land "may be conditioned to require State, county, or other Federal agency licenses, permits, certificates, or other approval documents, such as a Federal Communication Commission license, a Federal Energy Regulatory Commission license, a State water right, or a county building permit." *36 CFR 251.56(a)(2).*

4. Contrary to the County's assertion, the proposed wind energy regulations would not be preempted by the Washington Energy Facilities Site Locations Act (EFSLA) (Chapter 80.50 RCW) automatically. The EFSLA establishes a certification process that is mandatory for development of certain types of energy facilities (e.g., natural gas transmission pipelines in excess of 14 inches in diameter and 15 miles in length; stationary thermal power plants with generating capacity of 350,000 KW or more; facilities capable of processing more than 25,000 barrels per day of petroleum into refined products) but that is voluntary for the development of energy facilities that exclusively use alternative energy resources, such as wind, solar, geothermal, and biomass energy. *RCW 80.50.060; RCW 80.50.020(7), (11), (15), and (18).* When certification under the EFSLA is sought, the Energy Facility Site Evaluation Council holds a public hearing "to determine whether or not the proposed site is consistent and in compliance with city, county, or regional land use plans or zoning ordinances." *RCW*

[38] In *Ullock v. Bremerton*, 17 Wn. App. 573 (1977) the court reviewed an EIS prepared for a rezone of five acres.
[39] In *South Dakota Mining Assoc. v. Lawrence Co.*, 155 F.3d 1005 (1998), the court determined that federal laws allowing mining on National Forest land preempted a county ordinance prohibiting mining.

80.50.090. If the site is not consistent with the local ordinances, then the Council must determine whether to recommend to the governor that the state preempt the local ordinances. *WAC 463-28-060.* Even if the Council recommends preemption, it must include conditions in the draft certification agreement that considers local interests and the purposes of the ordinances that are preempted. *WAC 463-28-070.* The governor ultimately decides whether to approve the certification agreement. *RCW 80.50.100.* Because state preemption must be applied for, is discretionary, and is granted only after consideration of local ordinances, RCW 80.50 does not provide a rationale for avoiding full environmental review of the County's alternative energy regulations.

5. The Appellants have met their burden of proving that the County's issuance of a DNS was in error.

DECISION

Based upon the preceding Findings and Conclusions, the appeals of the October 8, 2008 Determination of Nonsignificance issued for the County's proposed zoning text and map amendments are granted. The Determination of Nonsignificance is reversed, and remanded to the County for preparation of an Environmental Impact Statement for the zoning text and map amendments.

Dated February 19, 2009.

Toweill Rice Taylor
Hearing Examiners for Skamania County
By:

LeAnna C. Toweill

Appendix A
Exhibit List

County Exhibits

Note: Citations to County Exhibit 1 items are to the "Administrative Record" (AR) page number only.

1. Record for Skamania County SEPA on Planning Commission Recommended Draft Zoning Text and Map Revisions and Minor Comprehensive Plan Map Amendments, File No. SEP-08-35 (April, 2008 to November 3, 2008), which includes the following:

Date	Description	Pages
11/3/08	Pre-Hearing Order from LeAnna Toweill, Hearing Examiner	1-2
10/22/08	Notice Administrative Appeal for SEP-08-35 from Reeves, Kahn, & Hennesy, Attorneys for Friends of the Gorge	3-23
10/22/08	Certificate of Mailing from Nathan J. Baker, Staff Attorney for Friends of the Gorge	24-28
10/22/08	Notice of Administrative Appeal and Certificate of Mailing for SEP-08-35 from Save Our Scenic Area, Richard Aramburu, Attorney	29-42
10/20/08	Email from Bonnie Anderson, Skamania County Planning Department - Administrative Assistant, to Nathan Baker	43-44
10/14/08	Affidavit of Publication for the Determination of Non-Significance SEP-08-35, Skamania County Pioneer	45
10/8/08	Determination of Non-Significance with no Checklist	46-46A
10/8/08	Determination of Non-Significance with Checklist	47
10/7/08	Certificate of Mailing for SEP-08-35 by Bonnie Anderson	64-68
10/2/08	Publication notice for SEP-08-35 to Skamania County Pioneer	69-70
	Compact Disc - Klickitat County Energy Overlay Zone Draft EIS and Final EIS; Klickitat County Energy Overlay Zone - FEIS Documents Incorporated by Reference 1 of 2; Klickitat County Energy Overlay Zone - FEIS Documents Incorporated by Reference 2 of 2	71
9/2/08	Skamania County Code Title 21 - Zoning - Planning Commissions Recommended Draft and Minor Comprehensive Plan Map Amendments	72-232
8/2008	Research for SEPA Determination and Zoning Ordinance (WA EFSEC Order on Remand, No. 831)	233-237
5/2008	Research for SEPA Determination Zoning Ordinance (SEPA checklists from other jurisdictions)	238-333
4/2008	Research for SEPA Determination Zoning Ordinance (checklists, WA noise standards, WDFW Windpower Guidelines)	334-359

2. Full-size color map entitled "PC Recommended Draft Skamania County Zoning Map

Appellant Save our Scenic Area Exhibits

Note: Citations to SOSA Exhibits are to the numbers as listed. Exhibits 8.1, 8.2 and 8.3 were admitted into the record but not assigned exhibit numbers at the hearing. Numbers are assigned for the first time here.

1.1 NINA PIERPONT, M.D., Ph.D., FAAP
Curriculum Vitae

Author: Nina Pierpont, M.D., Ph.D., FAAP
Dated July 5, 2006

1.2 PIERPONT LETTER TO SCHWARTZ, GENOUILLE, FRANCE
Author: Nina Pierpont, M.D., Ph.D., FAAP
Dated February 23, 2008

1.3 NOISY WIND AND HOT AIR
Author: Nina Pierpont, M.D., Ph.D., FAAP
Dated May 7, 2005.
Malone Telegram (New York)

1.4 HEALTH EFFECTS OF WIND TURBINE NOISE
Author: Nina Pierpont, M.D., Ph.D., FAAP
Dated March 2, 2006
www.ninapierpont.com

1.5 WIND TURBINE SYNDROME
Testimony before the New York State Legislature Energy Committee explaining Wind Turbine Syndrome and wind turbine siting.
Author: Nina Pierpont, M.D., Ph.D., FAAP
Dated March 7, 2006

1.6 LOCATION, LOCATION, LOCATION
Author: The Noise Association, UK Noise Association, 2nd Floor, Broken Wharf House, 2 Broken Wharf, London EC4V 3DT, U.K.
Dated July 2006
www.ukna.org.uk

1.7 NOISE RADIATION FROM WIND TURBINES INSTALLED NEAR HOMES: EFFECTS ON HEALTH
Authors: Barbara J. Frey, BA, MA, and Peter J. Hadden, BSc, FRICS
Dated February 2007
www.windturbinenoisehealthhumanrights.com

1.8 EFFECTS OF THE WIND PROFILE AT NIGHT ON WIND TURBINE SOUND
Author: G.P. van den Berg
Dated 2003 (Submitted to Elsevier Ltd Jan 2003, accepted Sept 2003)
www.elsevier.com/locate/jsvi (Journal of Sound and Vibration); www.sciencedirect.com;
g.p.van.den.berg@phys.rug.nl

1.9 INDUSTRIAL WIND TURBINES, INFRASOUND AND VIBRO-ACOUSTIC DISEASE (VAD)
Authors: Professor Mariana Alves-Pereira, School of Health Sciences, Lusofona University, Portugal and Dept. of Environmental Sciences and Engineering, New University of Lisbon, Portugal; Nuno Castelo Branco, MD, Surgical Pathologist and President, Scientific Board, Center for Human Performance.
Dated May 31, 2007
vibroacoustic.disease@gmail.com

1.10 INFRASOUND AND LOW FREQUENCY NOISE DOSE RESPONSES: CONTRIBUTIONS
Authors: Professor Mariana Alves-Pereira, School of Health Sciences, Lusofona University, Portugal and Dept. of Environmental Sciences and Engineering, New University of Lisbon, Portugal; Nuno Castelo Branco, MD, Surgical Pathologist and President, Scientific Board, Center for Human Performance.
Dated 28-31 August 2007
INTER-NOISE 2007, Istanbul, Turkey (International conference)

1.11 WHO HAS HEARD THE WIND

Author: Jules Smith
Dated 2006 (Copyright LightningStrike Studios)
www.lightningstrikestudios.com

1.12 WIND FARM NOISE AND REGULATIONS IN THE EASTERN UNITED STATES from the Second International Meeting on Wind Turbine Noise, Lyon, France, 2007
Author(s): Hilkat Soysal and Oguz Soysal, Department of Physics and Engineering, Frostburg State University, Frostburg MD
Dated September 20-21, 2007
renewable@frostburg.edu

1.13 WIND TURBINES, NOISE AND HEALTH
Author(s): Dr. Amanda Harry, M.B., Ch.B, P.G.Dip.E.N.T.
Dated February 2007

2.1 WIND TURBINES, FLICKER, AND PHOTOSENSITIVE EPILEPSY: CHARACTERIZING THE FLASHING THAT MAY PRECIPITATE SEIZURES AND OPTIMIZING GUIDELINES TO PREVENT THEM
Author(s): Graham Harding, Neurosciences Institute Aston University, Birmingham, U.K.; Pamela Harding, Neurosciences Institute Aston University; and Arnold Wilkins, Department of Psychology, University of Essex, Colchester, U.K.
Dated February 2008
Blackwell Publishing, Inc. International League Against Epilepsy.

2.2 Scenic Analysis

a. Diagram showing wind turbine placement.

b. Color diagram showing wind turbine placement and visibility from the National Scenic Area.

c. Visual simulation based on the turbine location map provided by SDS Lumber and the actual turbine height specification, demonstrating the visual impacts and providing help in understanding the visibility of project.

2.3 Topographical Map of Skamania County area

3.1 FRANCE'S NATIONAL ACADEMY OF MEDICINE CALLS FOR 1.5 KM SETBACK FOR ALL INDUSTRIAL WIND TURBINES FROM RESIDENCES
Translation of publication notice for "Repercussions of wind turbine operations on human health"
Author: Dr. Chantal Gueniot
Dated March 29, 2006

3.2 HEALTH, HAZARD AND QUALITY OF LIFE NEAR WIND POWER INSTALLATIONS; HOW CLOSE IS TOO CLOSE?
Author: Nina Pierpont, MD, PhD
Dated March 2, 2005
Malone Telegram, New York

4.1 WIND TURBINE SYNDROME: NOISE, SHADOW, FLICKER AND HEALTH
Author: Nina Pierpont, M.D., Ph.D., FAAP
Dated August 1, 2006
4.2 SUMMARY REPORT: LITERATURE SEARCH ON THE POTENTIAL HEALTH IMPACTS ASSOCIATED WITH WIND-TO-ENERGY TURBINE OPERATIONS
Author: Robert C. Frey, Ph.D, Chief, Health Assessment Section; John R. Kollman, R.S., Toxicologist, Health Assessment Section, Ohio Health Department.

Dated March, 2008
Health Assessment Section, Bureau of Environmental Health, Ohio Department of Health

4.3 IMPACT OF WIND FARMS ON PUBLIC HEALTH
Author: Kansas Legislative Research Department
Dated July 18, 2007 (Revised)
kslegres@klrd.state.ks.us, http://www.kslegislature.org/klrd

4.4 ENVIRONMENTAL IMPACTS OF WIND-ENERGY PROJECTS
Author: The National Academy of Sciences Committee on Environmental Impacts of Wind-Energy Projects (Board on Environmental Studies and Toxicology).
Dated 2007
National Academies Press, 500 Fifth Street, NW, Washington, D.C. 20001; www.nap.edu, http://books.nap.edu/catalog.php?record_id=11935

4.5 PROVISIONS OF THE PROPOSED STATE ENERGY PLAN ON INDUSTRIAL WIND-ENERGY DEVELOPMENT
Letter from Congressman Alan B. Mollohan, 1st Dist., WV, to the director of the West Virginia Division of Energy.
Author: Congressman Alan B. Mollohan, First District, West Virginia
Dated October 31, 2007
Alan B. Molloham, Congress of the United States, House of Representatives, 2302 Rayburn HOB, Washington DC 20515-4801

5.1 KITTITAS VALLEY WIND POWER PROJECT – FEIS Table of Contents[1] at
http://www.efsec.wa.gov/kittitaswind/FEIS/kvfeis.shtml

5.2 WILD HORSE WIND POWER PROJECT - EIS at
http://www.efsec.wa.gov/wildhorse/feis/whfeis.shtml

5.3 DESERT CLAIM WIND POWER PROJECT - FEIS Table of Contents at
http://www.efsec.wa.gov/Desert%20Claim/FEIS/FEIS.shtml[2]

5.4 STATELINE WIND ENERGY PROJECT – Federal Register: June 5, 2000 (Volume 65, Number 108)

5.5 KLICKITAT COUNTY ENERGY OVERLAY ZONE - FEIS available at
http://www.klickitatcounty.org/planning/ContentROne.asp?fContentIdSelected=2119658607&fCategoryIdSelected=948111261

6.1 WINDY POINT II WIND PROJECT - DS within scoping notice of 7/9/08 at
http://www.klickitatcounty.org/planning/FilesHtml/WPSN.pdf.

6.2 GOODNOE II WIND PROJECT - DS within scoping notice at
http://www.klickitatcounty.org/planning/FilesHtml/Goodnoe%20II%20Wind%20Project%20Scoping%20Notice.pdf

6.3 HARVEST WIND - DS within scoping notice of 4/24/08 at
http://www.klickitatcounty.org/Planning/ContentROne.asp?fContentIdSelected=549483787&fCategoryIdSelected=948111261

---

[1] Appellant SOSA offered the entire EIS but only provided the Table of Contents at the hearing. The Hearing Examiner did not visit the website and did not consider the remainder of the document.
[2] See Footnote 1.

6.4 JUNIPER CANYON - DS within scoping notice at
http://www.klickitatcounty.org/planning/FilesHtml/Juniper%20Canyon%20Scoping%20Notice.pdf

7.1 Resume of Rick James, E-Coustics Solutions

8.1 Evidence of Dr. Robyn Phipps, In the Matter of the Moturimu Wind Farm, March 2007
http://www.wind-watch.org/documents/writ of prohibition-content/uploads/phipps-moturimutestimony.pdf

8.2 Visual and Noise Effects Reported by Residents Living Close to Manawatu Wind Farms: Preliminary Survey Results, by Dr. Robyn Phipps at al.

8.3 Wind Turbine Syndrom, A Report on a Natural Experiment, by Nina Pierpont, MD, PhD (10-17-08 draft)

Appellants Friends of the Columbia Gorge et al. Exhibits

Note: Citations to these exhibits are to the letter/number combinations as listed. The "F" series documents are admitted for standing purposes only.

Ex.	Document Description	Date
A.1	Air Quality Issues in the Columbia River Gorge National Scenic Area, USDA Forest Service, Pacific Northwest Region, Air Resource Management Program, available at http://www.fs.fed.us/r6/aq/gorgis.pdf	Apr. 1999
A.2	Excerpts from the Management Plan for the Columbia River Gorge National Scenic Area pertaining to the protection and enhancement of air quality, available at http://www.gorgecommission.org/managementplan.cfm	Adopted May 2000
A.3	Air Quality Biomonitoring in the Columbia River Gorge National Scenic Area by the US Forest Service, 1993-2001, Geiser, L. H. and B. Bachman, USDA Forest Service, Pacific Northwest Region, Air Resource Management Program, available at http://ocid.nacse.org/airlichenPDF/AQ_CRGNSA.pdf	Sep. 27, 2001
A.4	Ecological effects of nitrogen deposition in the western United States, Fenn, M.E., Baron, J.S., Allen, E.B., et al. *BioScience*, vol. 53, no. 4, pp. 404-20, available at http://www.cdphe.state,co.us/ap/rmnp/exhibith.pdf	Apr. 2003
A.5	Winter Deposition of Nitrogen and Sulfur in the Eastern Columbia River Gorge National Scenic Area, Mark E. Fenn and Timothy J. Blubaugh, USDA Forest Service, Pacific Southwest Research Station, available at http://www.fs.fed.us/psw/programs/atdep/col_river/crgnsa_final_report.pdf	Feb. 3, 2005
B.1	Landscape Aesthetics: A Handbook for Scenery Management, Forest Service, USDA (appendices omitted from exhibit), available at http:www.urbanforestrysouth.org/resources/library/landscape-aesthetics-ah-701-complete-document/at_download/file_name	Dec. 1995
B.2	Declaration of Margo Blosser	Sep. 2, 2008
B.3	Maps of wind turbine locations in southeast Skamania County visible from I-84 and Cook Underwood Road, Gorge GIS	Sep. 2, 2008
B.4	Declaration of Dean Apostol	Jan. 14, 2009
B.5	"Skamania County Alternative Energy Code Project" PowerPoint Presentation, Dean Apostol	Jan. 14, 2009
C.1	Development of a practical modeling framework for estimating the impact of wind technology on bird populations, Morrison, M.L. and K.H. Pollock, National Renewable Energy Laboratory, Golden, Colorado, available at http://www.nrel.gov/wind/pdfs/23088.pdf	Nov. 1997
C.2	Avian risk and fatality protocol, Morrison, M.L. and K.H. Pollock, National Renewable Energy Laboratory, Golden, Colorado, available at	1998

	http://www.nrel.gov/docs/fy99osti/24997.pdf	
C.3	Sample map of designated critical wildlife habitat circles surrounding Northern spotted owl site centers in a portion of Skamania County (Township 3N, Range 9E), Washington Department of Natural Resources	May, 2000
C.4	Excerpts from Chapter 22-16 of the Washington Administrative Code relevant to the protection of Northern spotted owls (*Strix occidentalis caurina*) in Skamania County	July 2001
C.5	The Butterflies of Cascadia: A Field Guide to All the Species of Washington, Oregon and Surrounding Territories, Robert Michael Pyle	2002
C.6	Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines, U.S. Fish and Wildlife Service, available at http://www.fws.gov/habitatconservation/wind.pdf	May 13, 2003
C.7	Wind Turbine Interactions with Birds and Bats: A Summary of Research Results and Remaining Questions, National Wind Coordinating Committee, available at http://www.nationalwind.org/publications/wildlife/wildlife_factsheet.pdf	Nov. 2004
C.8	Relationships between Bats and Wind Turbines in Pennsylvania and West Virginia, An Assessment of Fatality Search Protocols, Patterns of Fatality, and B ehavioral Interactions with Wind Turbines: A Summary of Findings from the Bats and Wind Energy Cooperative's 2004 Field Season, Bats and Wind Energy Coooperative, available at http://www.batcon.org/wind/BWEC2004Reportsummary.pdf	2005
C.9	Memo to Wind Energy Production and Wildlife Conservation Planners, Tuttle, M.D., available at http://www.protectpendleton.com/nbw_batmemo.htm	Jan. 2005
C.10	Wind Power: Impacts on Wildlife and Government Responsibilities for Regulating Development and Protecting Wildlife, US Government Accountability Office, available at http://www.gao.gov/new.items/d05906.pdf	Sep. 2005
C.11	Assessing Impacts of Wind-Energy Development on Nocturnally Active Birds and Bats: A Guidance Document, Kunz, T.H, Arnett, E.A., Cooper, B.M., et al. *Journal of Wildlife Managment*, 71(8):2449-2486, available at http://www.nationalwind.org/pdf/Nocturnal_MM_Final-JWM.pdf	Nov. 2007
C.12	Letter from Ted Labbe and Michael Ritter, Washington Department of Fish and Wildlife, to Karen Witherspoon, Skamania County Planning Department, regarding comments on 2008 draft Skamania County zoning update	June 5, 2008
C.13	American Society of Mammalogists unanimous resolution: Effects of wind-energy facilities on bats and other wildlife, available at http://www.wind-watch.org/documents/wp-content/uploads/asm-windenergyresolution.pdf	June 21-25, 2008
C.14	Barotrauma is a Significant Cause of Bat Fatalities at Wind Turbines, Baerwald, E.F., D'Amours, G.H., Klug, B.J, Barclay, R.M.R., Current Biology, Vol 18, R695-R696.	Aug. 26, 2008
C.15	Declaration of K. Shawn Smallwood	Sep. 2, 2008
C.16	Review of Habitat Assessment Report for Forest Road 25 and Loowit Lane, Steve Manlow, Washington Department of Fish and Wildlife	May 5, 2005
C.17	Potential development north of Swift Reservoir in Skamania County, known as the North County Area, Ken S. Berg, U.S. Fish and Wildlife Service	Dec. 8, 2005
C.18	Oregon Columbia Plateau Ecoregion Wind Energy Siting and Permitting Guidelines	Sept. 29, 2008
C.19	Avian and Bat Mortality at the Big Horn Wind Enery Project, Klickitat County, Washington, K. Shawn Smallwood	Oct. 18, 2008
C.20	How *too much* wind power may hurt salmon, Dan Tilkin, KATU 2 Portland, available at http://www.katu.com/outdoors/featured/33967994.html	Nov. 21, 2008
C.21	Second Declaration of K. Shawn Smallwood	Dec. 8, 2008
D.1	Washington wind power and speed maps, Northwest Sustainable Energy for Economic Development, available at http://www.windpowermaps.org/windmaps/states.asp#washington	June 2002
D.2	Washington - Wind Power Resource Estimates map, National Renewable Energy Laboratory,	June 7,

	U.S. Department of Energy, available at http://wdfw.wa.gov/hab/engineer/major_projects/graphics/wind_power_resource_estimates_map.jpg	2002
D.3	Permitting of Wind Energy Facilities: A Handbook, National Wind Coordinating Committee, available at http://www.nationalwind.org/publications/siting/permitting2002.pdf	Aug. 2002
D.4	Current and Proposed Wind Project Interconnections to BPA Transmission Facilities, Bonneville Power Administration, available at http://www.transmission.bpa.gov/PlanProj/Wind/documents/Windmap_external_03242008_8-5x11.pdf	Mar. 27, 2008
D.5	Excerpts from Klickitat County's Energy Overlay Zone Final EIS	Sep. 2004
D.6	Agenda and materials, Columbia Gorge Bi-State Renewable Energy Zone Leadership Meeting, Mid-Columbia Economic Development District	Oct. 19, 2007
D.7	*Rose v. Chaikin*, 187 N.J. Super. 210, 453 A.2d 1378 (1982).	Nov. 10, 1982
D.8	*Burch v. Nedpower Mt. Storm, LLC*, 220 W. Va. 443, 647 S.E.2d 879 (2007)	June 8, 2007
D.9	*Wind Energy Siting Handbook*, American Wind Energy Association, available at http://www.awea.org/sitinghandbook/	Feb. 2008
E.1	Memorandum regarding Cascade Wind Project Update for March 2008, Adam Bless, Oregon Department of Energy	March 13, 2008
E.2	Map of approved and proposed wind projects in Klickitat county	Apr. 30, 2008
E.3	Windy Point II Wind Farm Project EOZ Application	May 23, 2008
E.4	Notice of Community Meeting, Windy Point II Windpower Project, Klickitat County	May 27, 2008
E.5	Determination of Significance and Request for Comments on Scope of EIS, Goodnoe II project, EOZ2008-05 and SEP2008-31, Klickitat County	July 14, 2008
F.1	Declaration of Chris Lloyd	Aug. 31, 2008
F.2	Declaration of Renee Tkach	Sep. 2, 2008
F.3	Declaration of Kevin Gorman	Sep. 2, 2008
F.4	Second Declaration of Chris Lloyd	Dec. 8, 2008
F.5	Second Declaration of Kevin Gorman	Dec. 8, 2008
F.6	Second Declaration of Renee Tkach	Dec. 8, 2008
F.7	Declaration of Mary Repar	Dec. 8, 2008
F.8	Declaration of Brett VandenHeuvel	Dec. 9, 2008
F.9	Declaration of Emily Platt	Dec. 9, 2008
G.1	Resume/CV of Dean Apostol	Aug. 2008
G.2	Resume/CV of Margo Blosser	Sep. 2008
G.3	Resume/CV of Carl Dugger	Sep. 2008
G.4	Resume/CV of K. Shawn Smallwood	Sep.

		2008
H.1	BPA Transmission Lines by kV, Bonneville Power Administration, available at http://www.bpa.gov/corporate/pubs/EX_A_BPA_Service_Area.pdf	Apr. 17, 1998
H.2	Determination of Significance and Request for Comments on Scope of EIS, Klickitat Count (regarding the possible amendment of the County's comprehensive plan and development regulations to provide for the development of energy resources)	June 6, 2002
H.3	Gifford Pinchot National Forest Vicinity Map, Gifford Pinchot National Forest, USDA Forest Service, available at http://www.fs.fed.us/gpnf/04maps/documents/gpnf-forest-vicinity-map-20080730_11x17_000.pdf	July 30, 2008
H.4	Skamania County Ordinance 2008-01, available at http://www.skamaniacounty.org/Ordinances_2008/Ord%202008-01%20Moratorium%20Extension%20Unzoned%20Land.htm	Jan. 8, 2008
H.5	Comments on Skamania County Proposed Zoning Amendments, Nathan Baker, Friends of the Columbia Gorge	Oct. 22, 2008
H.6	Comments on Skamania County Proposed Title 21 Zoning Amendments, Richard F. Till, Friends of the Columbia Gorge	Oct. 22, 2008
H.7	MCEDD Rural Cluster Project: Renewable Energy Cluster, Mid-Columbia Economic Development District, available at http://www.oregonclusters.org/Docs/MCEDD%20Ren%20Energy%20cluster.doc	N/A
H.8	Minutes for the December 18, 2007 Meeting, Board of Skamania County Commissioners, available at http://www.skamaniacounty.org/Minutes_Files_2007/Minutes%2012-18-07.htm	Dec. 18, 2007
H.9	Skamania County Resolution 2007-59, available at http://www.skamaniacounty.org/Resolutions_2007/Res%20200759%20Renewable%20Energy.htm	Dec. 18, 2007
H.10	Annual Performance Report, July 1, 2007 to June 30, 2008, Mid-Columbia Economic Development District, available at http://www.mcedd.org/documents/FY2008MCEDDAnnualoReport.pdf	June 30, 2008
H.11	Minutes for the September 30, 2008 Meeting, Board of Skamania County Commissioners, available at http://www.skamaniacounty.org/Minutes_Files_2008/Minutes%2009-30-08.htm	Sep. 30, 2008
H.12	Skamania County Resolution 2008-51	Sep. 30, 2008
H.13	Skamania County Commission home page, available at http://www.skamaniacounty.org/commissioners1.htm	Jan. 5, 2009
H.14	Minutes for the week of December 23, 2008, Board of Skamania County Commissioners, available at http://www.skamaniacounty.org/Minutes_Files_2008/Minutes%2012-23-08.htm	Dec. 23, 2008