

Section 3.1 EARTH

This section describes existing geologic and soil conditions in the project area of the proposed Wild Horse Wind Power Project (WHWPP). Potential impacts and mitigation measures intended to limit those impacts are also presented. The evaluation in this section is based primarily on information that the Applicant provided in the Application for Site Certification (ASC) (Wind Ridge Power Partners LLC 2004, Sections 2.2 and 3.1). Where additional information has been used to evaluate the potential impacts associated with the proposal, that information has been referenced herein.

3.1.1 Affected Environment

3.1.1.1 Topography

The WHWPP site is located in the northeast portion of Kittitas County in central Washington. Prominent geographic features in the site vicinity include the Yakima River and the Kittitas Valley to the west and southwest, the Wenatchee Mountains to the northwest and north, the Columbia River to the east, and the Boylston and Saddle mountains to the south. The immediate project area is dominated by northwest-southeast trending ridges that slope gently to the southeast. The ridge tops generally range from approximately 3,000 to 3,800 feet in elevation (mean sea level datum). Whiskey Dick Mountain is the highest point within the site, at elevation 3,873 feet.

Slopes within the project site generally range from less than 5° on flat plateau areas and ridge lines up to 40° on Whiskey Dick Mountain and incised side drainages. Figure 1-1, “Project Vicinity Map” shows the topography in the vicinity of the site.

Naneum Ridge forms a north-south topographic divide through the site. Numerous creeks and ephemeral springs/streams flow either west toward the Yakima River or east to the Columbia River from this divide. Creeks that flow to the Yakima River include Naneum, Caribou, and Whiskey Jim creeks. Skookumchuck and Whiskey Dick creeks flow from the divide east to the Columbia River.

Several continuous, relatively horizontal benches exist along the side slopes in the site vicinity. These benches are areas with a width of 20 to 40 feet where the ground surface is slightly flatter than adjacent sloped areas. These benches occur at two different elevations. The uppermost bench occurs on the north and south sides of Whiskey Dick Mountain, at an elevation of approximately 3,700 feet. Another set of benches was observed in the eastern portion of the site

at elevations between 3,300 and 3,400 feet. This second set of benches appears to coincide with the elevation of most of the known springs and seeps within the site. These benches probably also coincide with a geologic unit that is interbedded between basalt flows that has weathered and sloughed at the ground surface and that cannot stand at a slope as steep as that of basalt (Wind Ridge Power Partners LLC 2004).

3.1.1.2 Geology

Regional Geology

The project site is located on the Columbia Plateau, a broad lowland area at the eastern base of the Cascade Range and at the western edge of the Columbia Intermontane physiographic province (Freeman et al. 1945). This lowland, surrounded by mountain ranges and highlands, covers a vast area of eastern Washington and extends southward into northern Oregon. The province is characterized by moderate topography and a network of incised streams and rivers that drain toward the Columbia River.

The Columbia Plateau is underlain by a series of layered basalt flows extruded from vents that were located mainly in southeastern Washington and northeastern Oregon. The flows were extruded during the Miocene epoch, between 7 and 26 million years before present. Collectively, these basalt flows are known as the Columbia River Basalt Group. Individual basalt flows range in thickness from a few millimeters to as much as 300 feet (Bauer and Hansen 2000).

A variety of sedimentary units are interbedded with and overlie the Columbia River Basalt Group. Sedimentary rocks are also thought to underlie the basalt rocks in the project area (Bauer and Hansen 2000).

The Columbia Plateau is divided into three informal geographic subprovinces: the Yakima Fold Belt, Blue Mountain, and Palouse subdivisions (Meyer and Price 1979). The project site is located in the Yakima Fold Belt subprovince, an area that includes most of the western half of the Columbia Plateau north of the crest of the Blue Mountains. The subprovince is characterized by long, narrow anticlines (upward-arching folds in layered rocks) with intervening narrow to broad synclines (downward-arching folds) that extend in an easterly to southeasterly direction from the western margin of the plateau to its center.

Most major faults in the subprovince are thrust or reverse faults that strike generally parallel to the anticlinal fold axes. These faults are probably contemporaneous with the folding.

Northwest- to north-trending shear zones and minor folds commonly transect the major folds (Bauer and Hansen 2000).

Figure 3.1-1 shows bedrock geology and faults within a 25-mile radius of the project site.

Figure 3.1-2 shows geologic units and faults in the immediate vicinity of the site.

Local Geology

The bedrock underlying the project site consists of lava flows of the upper Grande Ronde Basalt and the Frenchman Springs Member of the Wanapum Basalt, with interbedded Ellensburg Formation.

The Grande Ronde Basalt is the most abundant and widespread formation of the Columbia River Basalt Group. Based on observations of outcrops and test pits excavated within the site (CH2M Hill 2003) the Grande Ronde Basalt appears to be dark gray, fine-grained, and very hard but is fractured into angular to subrounded cobbles within a few feet of the ground surface. The fractured portion is infilled by a silty and sandy matrix. In most of the test pits excavated within this basalt, the upper few feet were fractured and rippable, but fracture spacing and rock mass quality increased downward rapidly. Most test pits were terminated within 3 feet of the ground surface and were unable to be excavated further with a backhoe.

The Frenchman Springs Member is mapped in the site north of Whiskey Dick Mountain and overlies the Grande Ronde Basalt. It has characteristics similar to the Grande Ronde Basalt and (i.e., dark gray, fine-grained, and very hard but fractured, particularly close to the ground surface).

A localized outcrop of the Vantage Member of the Ellensburg Formation is mapped in the southeast portion of the site. This unit consists of interbedded, weakly cemented, volcanoclastic sandstone, siltstone, and minor dark mudstone. It occurs between the Grande Ronde and Wanapum basalts. Based on observations and documentation of springs in the site vicinity, the springs are generally located along a relatively horizontal low-permeability zone that likely correlates with the Vantage Member.

No unconsolidated deposits are mapped in the vicinity of the site (Figure 3.1-2), except for a landslide that is discussed below. Surficial materials overlying the bedrock at the site consist primarily of a thin veneer of brown, silty clay topsoil that was likely deposited by wind. The thickness of this material varies across the site from a few inches to 3 feet, based on test pit observations. Bedrock and talus were observed at the ground surface in several locations.

The structural geology of the site includes primarily folded and dipping basalt beds. The Whiskey Dick Anticline trends east-southeast through Whiskey Dick Mountain. Another anticline, the south-trending Naneum Ridge Anticline, extends along the west edge of the site and intersects the Whiskey Dick Anticline on Whiskey Dick Mountain. An east-dipping monocline is mapped just east of the site. The basalt beds dip down to the east at an inclination of as much as 6°.

As indicated in Figure 3.1-2, two faults are mapped in the southeast portion of the site. These faults extend roughly parallel to and on either side of the Whiskey Dick Anticline. Several other faults that also trend northwest to southeast are mapped approximately 5 miles west of the site. These faults offset the Columbia River Basalt units and are concealed beneath Quaternary formations (Tabor et al. 1982). These faults are thus considered older than Quaternary age.

Mineral resources in the immediate vicinity of the site include a small inactive borrow pit near the northwest corner. No petrified wood deposits similar to the ginkgo deposits that exist in the Ginkgo Petrified Forest State Park (approximately 5 miles east of the project site) have been discovered at the site.

3.1.1.3 Surface Soils

Soils at the project site along the ridge tops, where most construction would occur, consist primarily of shallow complexes that formed in residuum weathered from basalt and loess.

Upland soils in this portion of the site, which encompasses the wind turbine locations, include the following series (USDA 2002):

- **Rock Creek Series:** consists of shallow and very shallow soils formed in residuum from basalt bedrock. They are well drained with slow to medium runoff and moderately slow permeability. Slopes are 0 to 70%, with a bedrock contact typically at a depth of 14 inches.
- **Argabak Series:** consists of very shallow soils formed from loess and residuum from basalt. They are well drained with slow to very rapid runoff and moderately slow permeability. Slopes are 0 to 65%, with a bedrock contact at depths ranging from 4 to 12 inches. Associated soils are Whiskey Dick soils, occurring on hill slopes and ridge tops with a thickness of 20 to 40 inches over bedrock. Whiskey Dick soils are clayey, well-drained soils with slow to very rapid runoff and slow permeability.
- **Vantage Series:** consists of shallow soils formed in residuum and colluvium from basalt bedrock. They are well drained with slow to very rapid runoff and moderately slow permeability. Slopes are 0 to 45%, and depth to bedrock typically ranges from 4 to 12 inches.

Figure 3.1-3 shows the surface soil distribution in the site vicinity. In general, site soils are well drained, have slow to moderately slow permeability, and have slow to very rapid runoff, depending on slope.

3.1.1.4 Geologic Hazards

Geologic hazards that could occur at the project site include earthquakes, volcanic eruptions, and landslides.

Earthquakes

Earthquakes in the region result from three seismic sources: interplate events, interslab events, and crustal events. Interplate and interslab events are related to the subduction of the Juan de Fuca plate beneath the North American plate, referred to as the Cascadia Subduction Zone (CSZ). Movements along crustal faults, generally in the upper 10 to 15 miles, comprise the third source of earthquakes. In Washington, these movements occur within the crust of the North American tectonic plate when built-up stresses near the surface are released. The largest earthquake in eastern Washington in the last 50 years was a shallow magnitude 4.4 event northwest of Othello on December 20, 1973 (WDGER 2002).

According to the Uniform Building Code Seismic Risk Map of the United States, the project site, along with all of eastern Washington and eastern Oregon, is within Seismic Zone 2B. This corresponds to an intensity VII earthquake (comparable to a magnitude 6.0 event) on the Modified Mercalli Intensity Scale. This earthquake could produce moderate damage should it occur. However, in comparison to Alaska, California, and some parts of western Washington, Seismic Zone 2B is a relatively low hazard zone.

Seismograph records indicate that there has been a relatively low degree of seismic activity in the site vicinity since 1959. The closest recorded earthquake had an epicenter about 7 miles from the site and had a magnitude of 3.2 and MM Intensity of III+. The largest recorded seismic

event within a 60-mile radius of the site occurred 44 miles from the site and had a magnitude of 4.8 (Wind Ridge Power Partners LLC 2004, Section 3.1).

Based on the low level of historical seismicity and the lack of late Quaternary displacements of local deposits, the faults in the site and vicinity are likely inactive or else active but typically produce events with magnitudes less than 3.0 (Wind Ridge Power Partners LLC 2004, Section 3.1). Based on this information, local faults are not considered to be capable of generating significant earthquakes.

The project site is not susceptible to liquefaction or lateral spreading because these phenomena require loose, saturated soils. The project site is underlain at shallow depth by bedrock and is well above the regional groundwater table.

Volcanic Eruptions

Within the state of Washington, the U.S. Geological Survey (USGS) recognizes five volcanoes as either active or potentially active: Mount St. Helens, Glacier Peak, Mount Rainier, Mount Adams, and Mount Baker. In the last 200 years, only Mount St. Helens, which is approximately 110 miles southwest of the site, has erupted more than once (USGS 2002).

The project site was in the ash fallout zone from the May 18, 1980, eruption of Mount St. Helens. Mount St. Helens remains a potentially active and dangerous volcano, even though it is currently quiescent. In the last 515 years it is known to have produced four major explosive eruptions, each with at least 1 cubic kilometer of eruption deposits, and dozens of lesser eruptions (Wolfe and Pierson 1995).

Glacier Peak also has a tendency to produce explosive eruptions that generate large quantities of volcanic ash. Eruptions of Glacier Peak have deposited at least nine layers of pumice ash near the volcano in the last 15,000 years. The thickest deposits from some of the earlier eruptions during this period were laid down east, southeast, and south of the volcano (Waitt et al. 1995).

Mount Rainier is a moderate volcanic ash producer relative to other Cascade volcanoes. Eleven eruptions have deposited layers of pumice ash near Mount Rainier in the past 10,000 years, most recently in the first half of the nineteenth century. Ash-producing eruptions from Mount Rainier occur about once every 900 years (Hoblitt et al. 1998).

Mount Adams has, during much of its history, displayed a relatively low degree of eruptive activity. Highly explosive eruptions have been rare (Scott et al. 1995). Similarly, Mount Baker has not had highly explosive eruptions like those of Mount St. Helens or Glacier Peak nor has it erupted as frequently (Gardner et al. 1995).

Data accumulated following the 1980 eruption of Mount St. Helens indicate that the most likely effect on the project site would be ash fallout if one of the five Cascade volcanoes described above were to erupt and the resulting ash cloud were to reach the site.

Landslides

A landslide is mapped on the south side of Whiskey Dick Mountain and near the C and D turbine strings. The slide location is indicated in the site map included in Figure 3.3-1, in Section 3.3, "Water Resources." It has an area of approximately 0.33 square mile and is almost 1 mile long.

The ground surface elevation ranges from approximately 3,000 to 3,700 feet over the length of the slide. It has an average ground slope inclination of 2H:1V (horizontal to vertical). The surface of the slide is irregular and hummocky. The direction of slide movement is to the south, away from the project site.

Springs were reported to be emanating from some portions of the slide. Native vegetation was observed at the surface throughout the slide area, suggesting that slide activity was either historical or at a rate slow enough to allow establishment of the vegetation.

3.1.1.5 Feeder Lines

The Bonneville Power Administration (BPA) and Puget Sound Energy (PSE) feeder lines would cross terrain with geologic and soil conditions similar to the project site. Both lines would cross areas underlain by the Frenchman Springs and Grande Ronde Basalt units. A short segment of the BPA feeder line would cross alluvial deposits near the interconnection to the Schultz substation. A system of inactive faults is mapped near the Schultz substation (Figure 3.1-2).

Both the BPA and PSE feeder lines would cross areas mantled with Argabak and Vantage Series soils (described above). A section of the PSE feeder line would cross areas mantled with Blint Series soils, which are similar to the Argabak and Vantage Series soils.

3.1.1.6 Kittitas Valley Alternative

The Kittitas Valley Wind Power Project site is north and east of the Yakima River on the Columbia Plateau. The project area is characterized by moderate topography with a network of streams and rivers that drain into the Yakima River. Local elevations range from approximately 2,200 to 3,100 feet. Slopes within the project area generally range from 9 to 36% and can reach 84% or more in some of the canyons.

The project site contains basaltic bedrock with shallow to moderately deep alluvium and glacial drift soils. The primary geologic hazard at the project site is earthquakes. The project site is also located seismic zone 2B. An approximately 2.5-mile-long fault runs east-west through the project area, crossing U.S. 97 approximately 2,500 feet north of Bettas Road. This fault is not considered to be a significant seismic hazard. There is no potential landslide-prone terrain in the project area.

The Kittitas Valley site is located in the same zone of influence of volcanic eruptions as the WHWPP, and could be affected by ash fall if any of the local volcanoes erupted.

Mineral resources in the immediate vicinity of the site include active and inactive commercial and private rock quarries. In addition, the area is known for presence of the "Ellensburg Blue," a rare type of agate classified by some gemologists as a precious gem. However, other areas in Kittitas County could potentially contain deposits of Ellensburg Blue.

3.1.1.7 Desert Claim Alternative

The proposed location for the Desert Claim wind energy facility is on the western edge of the Columbia Plateau, approximately 50 miles east of the Cascade Range divide. The ridges and

valleys in the region have a general northwest to southeast structural orientation, as do the folds and faults in the bedrock. Evidence of erosion in the project area was observed along stream drainages, irrigation ditches, paved roads, and dirt roads. Three types of landslides commonly occur in the project vicinity, ranging from deep to shallow: earth slump; debris slump, or debris flow; and rock falls.

A large landslide (36 acres) has been identified in the northwest portion of the proposed site, although it is fully revegetated and represents an ancient event. This area possesses a large landslide risk particularly during seismic events. The slide covers the eastern drainage wall of a Reecer Creek tributary. Active erosion of the landslide toe will occur during high concentrated flows. Several small areas in the northwest and southeast portions of the site with high steep slope gradients and high slopes have a moderate risk of rockfall and pose a moderate landslide hazard particularly during a seismic event. Most of the project area has moderate to low slopes with low landslide hazards. Overall, the risk of seismically induced landslides occurring on the site is interpreted to be low, except for localized areas along steep slopes where the risk is considered to be moderate.

The Desert Claim Project, like the WHWPP, is located in a Seismic Zone 2B. Proximity of seismic activity discussed above for the WHWPP is also representative for the Desert Claim site. There are inferred northwest-southeast trending faults that cross the project area, but recent activity along the faults has not been documented in post-Pliocene deposits. Although the project site is underlain by unconsolidated sediments up to 300 feet, it is likely that the potential for liquefaction on the site is low. Certain wetlands and stream corridors may be susceptible to liquefaction during larger seismic events. The Desert Claim site is located in the same zone of influence of volcanic eruptions as the WHWPP, and could be affected by ash fall if any of the local volcanoes erupted.

3.1.1.8 Springwood Ranch Alternative

Springwood Ranch is composed of terraced upland surfaces incised by the Yakima River, Taneum Creek, and several intermittent drainages. The Yakima River has eroded a relatively steep-walled canyon along most of the eastern limits of the property in the north and central portions of the site. Beneath the site, shallow bedrock consists of the Grande Ronde Basalt and the Ellensburg Formation. Most of the surficial soils on site range in thickness from about 0.5 to 6 feet. Mapped soil series at the site include Amabilis, Argixerolls, Kayak, Lablue, Maxhill, McDaniel, Metser, Millhouse, Nint, Qualla, Reelow, Reeser, Sketter, Swauk, and Weirman (NRCS 1998).

The Springwood Ranch site is located in an area of relatively low historical seismicity, also within seismic zone 2B, with no identified active surface faults or lineaments in the vicinity. Areas along the Yakima River, on the northeastern boundary of the site, have been designated as high erosion hazard and landslide hazard areas. Most of the traverse of Taneum Creek through the site is surrounded by soils with moderate erosion potential, and around the mouth of the creek, soils have been identified as having high erosion potential.

Evidence of past landslides has been observed along portions of the steep bluffs along the Yakima River. These areas generally occur within the outwash deposits and the Ellensburg Formation and are considered to have a high landslide potential. Areas with moderate to low

landslide potential occur along the side slopes of on-site terraces, sections of the Yakima River Valley slopes, and slopes along Taneum Creek near the confluence with the Yakima River.

The Springwood Ranch site is located in the same zone of influence of volcanic eruptions as the WHWPP, and could be affected by ash fall if any of the local volcanoes erupted.

3.1.1.9 Swauk Valley Ranch Alternative

The Swauk Valley Ranch site is north of the Yakima River on the Columbia Plateau. The project area is characterized by moderate topography with few streams, the largest of which drains into Swauk Creek and then to the Yakima River. Local elevations range from approximately 2,200 to 4,000 feet. Slopes within the project area generally range from 9 to 36% and can reach 84% or more in some of the canyons.

The project site contains basaltic bedrock with shallow to moderately deep alluvium and glacial drift soils. Potential geologic hazards at the project site include earthquakes and volcanic eruptions. The project site is also located in the seismic Zone 2B earthquake hazard zone. The Swauk Valley Ranch site is located in the same zone of influence of volcanic eruptions as the WHWPP, and could be affected by ash fall if any of the local volcanoes erupted.

3.1.2 Impacts of Proposed Action

This section describes the potential direct impacts of the proposed action on project site geology and soils. Direct environmental impacts are associated with construction and operational activities that could increase erosion or affect geologic hazard areas. Direct impacts could be associated with construction, operations, and decommissioning of any of the proposed project elements, including wind turbines, meteorological towers, existing and new access roads, additional power lines, substations, and the operations and maintenance facility. Indirect impacts are not anticipated because the project is not expected to substantially induce regional growth to an extent that would significantly change off-site geology and soil resources. Table 3.1-1 summarizes potential impacts related to the three project scenarios.

Table 3.1-1. Summary of Potential Earth Resource Requirements and Impacts

Facility	104 Turbines/3 MW	136 Turbines/1.5 MW (Most Likely Scenario)	158 Turbines/1.0 MW
Construction Impacts			
Changes to local topography/area of temporary ground disturbance	289 total acres disturbance	356 total acres disturbance	401 total acres disturbance
Cut-and-fill requirements	326,693 cubic yards	328,866 cubic yards	326,891 cubic yards
Import sand and gravel fill requirements	52,575 cubic yards	53,686 cubic yards	51,875 cubic yards
Off-site excavation spoils disposal	0 cubic yards	0 cubic yards	0 cubic yards
Operation and Maintenance Impacts			
Erosion potential/area of permanent ground disturbance	165 acres	165 acres	165 acres

Facility	104 Turbines/3 MW	136 Turbines/1.5 MW (Most Likely Scenario)	158 Turbines/1.0 MW
Earthquake hazard	Low	Low	Low
Volcanic hazard	Low	Low	Low
Landslide hazard	Low	Low	Low
Decommissioning Impacts	Similar to, but less than, construction impacts. Extent depends on fate of roads.	Similar to, but less than, construction impacts. Extent depends on fate of roads.	Similar to, but less than, construction impacts. Extent depends on fate of roads.

Source: Wind Ridge Power Partners LLC 2004

3.1.2.1 Construction Impacts

Topographic Modification, Geology, and Soils

Impacts on topography, geologic units, and soils from project construction would result from clearing, excavation and filling associated with constructing roads, establishing temporary crane pads and constructing the base for each turbine, and installation of underground and overhead electrical lines. Each project scenario requires the same length of access road.

The total amount of temporary ground disturbance during construction would range from 289 acres under the 104-Turbine/3 MW scenario to 401 acres under the 158-Turbine/1 MW scenario. Detailed requirements for cut and fill for each project element under each project scenario are presented in Table 3.1-2.

Table 3.1-2. Estimated Cut-and-Fill Requirements for Proposed Turbines (Cubic Yards)

Facility	104 Turbines/3 MW	136 Turbines/1.5 MW (Most Likely Scenario)	158 Turbines/1.0 MW
Project site roadways	152,700	152,700	152,700
Electrical trenching, poles, and switch panel foundations	72,271	72,271	72,271
Turbine foundation excavations (typical is 18 ft. diameter by 25 ft. deep)	23,222	25,306	23,520
Wind turbine generator and crane pads (approx. 30 ft. by 100 ft., 1–2 ft. deep)	15,022	15,111	14,922
O&M and visitor facilities with parking (approx. 4 acres by 1 ft. deep)	6,453	6,453	6,453
Substations (approx. 9 acres by 1 ft. deep)	14,520	14,520	14,520

Facility	104 Turbines/3 MW	136 Turbines/1.5 MW (Most Likely Scenario)	
		136 Turbines/1.5 MW (Most Likely Scenario)	158 Turbines/1.0 MW
Turnaround areas (approx. 26 acres by 1 ft. deep)	41,947	41,947	41,947
Meteorological towers (approx. 0.3 acre by 1 ft. deep)	558	558	558
Total Cut/Fill Amount	326,693	328,866	326,891

Source: Young pers. comm. 2004

Estimated quantities of imported sand and gravel fill for the three project scenarios are presented in Table 3.1-3. Table 3.1-4 presents estimated quantities of on-site fill (generated from excavations) for the three scenarios. No export of excavated materials from the site is anticipated.

A local sand and gravel company would supply imported fill materials for electrical line trenches and foundation concrete, although the exact source would be selected by the construction contractor.

Three on-site rock quarry pits have been identified for the project. Each quarry would have a disturbance footprint of approximately 5 acres, and the depth would be approximately 10 to 20 feet, depending on the type of rock encountered in each.

The Applicant plans to use on-site excavated materials for backfill to the extent possible. Excess excavated material not used as backfill for turbine foundations would be used to level out low spots on crane pads and roads consistent with the surrounding grade (Wind Ridge Power Partners LLC 2004). The surface of the excavated materials would be reseeded with a designated mix of grasses and/or seeds around the edges of the disturbed areas. Approximately 50% of excavated spoils are expected to contain material too large for reuse as backfill at foundations and in electrical line trenches. These larger cobbles and boulders would be crushed into smaller rock pieces for use as backfill or road surfacing or used as backfill in the rock quarries (Young pers. comm. 2004).

Table 3.1-3. Estimated Quantities of Import Sand and Gravel for Proposed Turbines (Cubic Yards)

Facility	104 Turbines/3 MW	136 Turbines/1.5 MW (Most Likely Scenario)	
		136 Turbines/1.5 MW (Most Likely Scenario)	158 Turbines/1.0 MW
Electrical trench bedding and backfill	37,200	38,700	39,000
Pea gravel for turbine, meteorological tower, and other foundation concrete	15,375	14,986	12,875
Total Import Fill Amount	52,575	53,686	51,875

Source: Young pers. comm.

Table 3.1-4. Estimated Quantities of On-site Fill (Generated from Excavations) for Proposed Turbines (Cubic Yards)

Facility	136 Turbines/1.5 MW (Most Likely Scenario)		
	104 Turbines/3 MW		158 Turbines/1.0 MW
Project site roadways	152,700	152,700	152,700
Backfill for pole foundations	325	325	325
Wind turbine generator and crane pads	15,111	15,111	15,111
O&M and visitor facilities with parking (approx. 4 acres by 1 ft. deep)	6,453	6,453	6,453
Substations (3 @ 3 acres ea. by 1 ft. deep)	14,250	14,250	14,250
Turnaround areas (18 @ 0.5 acre ea. by 1 ft. deep)	41,947	41,947	41,947
Meteorological towers (approx. 0.75 acre by 1 ft. deep)	558	558	558
Total On-site Fill Amount	231,525	231,344	231,425

Source: Young pers. comm.

Erosion

Soils on the project site have a high potential for runoff, with runoff and erosion potential increasing as the slope increases. In general, site slopes range from 5 to 40%. Even though much of the construction activity would take place on the tops of ridges where slopes tend to be more gradual, there would still be a potential for substantial runoff during significant rain events in all three project scenarios.

Significant erosion could result from a combination of temporary site disturbance and cut-and-fill activities. Total temporary site disturbance would range from 289 to 401 acres. Cut-and-fill requirements are summarized in Table 3.1-2. The largest volume of cuts and fills would be required for the 136-turbine/1.5-MW scenario, with an estimated 328,866 cubic yards for cuts and fills. Compliance with the requirements of the project's stormwater construction permit and implementation of appropriate best management practices (BMPs) would reduce this impact (see Section 3.1.4, "Mitigation Measures," for further discussion).

Earthquakes

The probability of a significant earthquake event occurring during construction is very low. The probability that crustal faults in the region are active is also low, and therefore, the potential for fault displacements during a large earthquake is low. Even if fault displacement occurred, no adverse effects on project construction are anticipated.

Volcanic Eruptions

The probability of a significant ashfall event resulting from a volcanic eruption during project construction is low. Even if ashfall occurred, it would not impact or otherwise conflict with project activities other than to delay construction temporarily.

Landslides

Construction (cut and fill) of access roads in some areas could occur on or under relatively steep slopes (i.e., slopes steeper than 21 to 30°. As a result, some sliding of soil and alluvial materials could be expected during construction, particularly if the cut slope were to fail (i.e., during an earthquake or heavy rain event). Site-specific BMPs for site slopes will be implemented to control landslides and limit erosion in these areas (see Section 3.1.4, “Mitigation Measures,” for further discussion).

Feeder Lines

Construction impacts associated with the BPA and PSE feeder lines are included in Tables 3.1-1 through 3.1-4. The total temporary disturbance area associated with these feeder lines is 0.3 acre. The primary earth-related impacts of feeder line construction would be erosion, and the impacts would be similar as described above for the other project facilities.

3.1.2.2 Operation and Maintenance Impacts

Topographic Modification, Geology, and Soils

No significant impacts on soils or topography are anticipated during operation and maintenance of the project. Additional crushed rock fill or sand and gravel may be needed for repairs to roads and underground utilities. However, the amount of these materials required would be minor. Surface topography of the site would not be altered after project construction is completed.

Erosion

No significant soil erosion would occur during operation and maintenance of the project. The potential for erosion of site soils is small because exposed soils would either be revegetated following construction or covered with impervious or erosion-resistant surfaces such as structures, pavement, or compacted crushed rock. Operational BMPs will be implemented to control erosion and sedimentation through site landscaping, grass, and other vegetative covers (see Section 3.1.4 for further discussion).

Earthquakes

A large earthquake in the region could affect wind power operations, disrupt the regional electrical distribution system, or possibly cause turbine towers to collapse. However, the likelihood of catastrophic impacts is remote. WHWPP facilities would be designed to at least the

minimum current engineering standards applicable in Kittitas County (i.e., the 1997 Uniform Building Code [UBC 1997]) (Wind Ridge Power Partners LLC 2004). Measures inherent in project design and implementation of on-site emergency plans to protect public health and safety and the environment on and off the site would significantly reduce the potential for impact (see Section 3.1.4).

Volcanic Eruptions

The main hazard to the project site from volcanic eruptions from any of the five Washington volcanoes would be volcanic ash. Major hazards from ashfall include:

- impact of falling fragments,
- suspension of abrasive fine particles in air and water, and
- burial of structures, transportation routes, and vegetation.

In particular, ashfall could cause lung damage, respiratory difficulties, and, in extreme conditions, death by suffocation. In addition, ash may clog machinery and filters, cause electrical short circuits, and make roads slippery. Ash could also damage computer disk drives and other electronic equipment, strip paint, corrode machinery, and dissolve fabric. Communications and transportation may also be disrupted in the region (Wind Ridge Power Partners LLC 2004).

Measures inherent in the project design and implementation of on-site emergency plans would significantly reduce the potential impacts of ashfall (see Section 3.1.4). Other types of volcanic hazards, such as pyroclastic flow, lava flow, or volcanic gas, pose much less of a hazard because of the distances from the volcanoes to the site.

Landslides

Most of the project facilities would not be located on unstable slopes or landslide-prone terrain. The turbines would be located on the tops of ridges, on relatively flat areas, and not on steep slopes. Therefore, sliding of near-surface soils and rock is unlikely in these areas. However, a landslide is mapped on the south side of Whiskey Dick Mountain as indicated in Figure 3.1-2: “Geologic Units and Faults” and in Figure 3.3-1 in Section 3.3, “Water Resources.” The location of this slide and its mechanisms of behavior could influence final turbine locations in the vicinity of the C and D turbine strings. As currently planned, the nearest turbines and their related facilities would be set back at least 800 feet from the top of the slide area.

In the event that roads would be constructed below steep slopes (greater than 21 degrees), soil and fractured rock exposed in cuts could fall on the road if the cut slopes were to fail. Cut slope failure could result from an earthquake, seasonal freeze/thaw action, and slope raveling. However, the proposed site layout does not include any roads in slopes exceeding 21%. Also, the risk to humans associated with rock fall and/or cut slope movement is low because the project access roads would be used infrequently during operations.

3.1.2.3 Decommissioning Impacts

Decommissioning would consist of removing aboveground equipment such as wind turbines, meteorological towers, and their associated foundations to a depth of 3 feet below the ground surface. If the overhead power lines could not be used by the applicable utility (PSE or BPA), all structures, conductors, and cables would also be removed. The Applicant proposes to leave the underground electrical collection system in place subject to landowner approval. The substations could revert to the ownership of the applicable utility. At the time of decommissioning, the Applicant would consult with the applicable landowner to determine the appropriate disposition of the O&M facility.

The ground surface will be restored as close as reasonably possible to its original condition. Reclamation procedures would be in accordance with site-specific requirements and techniques commonly used at the time the area would be reclaimed, including regrading, adding topsoil, and revegetating all disturbed areas. Decommissioned roads would be reclaimed or left in place, depending on landowner preferences. Rights-of-way and the leased property would be vacated and surrendered to the landowners (Wind Ridge Power Partners LLC 2004).

3.1.3 Impacts of Alternatives

3.1.3.1 Impacts of Off-Site Alternatives

Kittitas Valley Alternative

Project construction activities, including clearing, excavation, and filling, would result in soil impacts. The total amount of ground disturbance during construction would range from 231 acres to 371 acres. Total site disturbance and cut-and-fill activities in steep slope areas could result in significant erosion and some sliding of soil and alluvial materials. Soils and surface topography would not be altered after construction of the project is complete. Landscaping, grass, and other vegetative cover would prevent significant soil erosion during operation and maintenance of the project. A detailed Stormwater Pollution Prevention Plan (SWPPP) and site-specific BMPs would minimize the potential for pollutant discharge and erosion from the project site during construction and operations. Imported fill materials would be required primarily for construction of access roads and turbine foundations. Between 232.5 and 259.9 cubic yards of fill would be required depending on the project scenario selected. Fill would be transported to the site from local gravel sources.

Development would have no influence on the level of seismic or volcanic hazard in the project area. A large earthquake in the project area could impact wind power operations, disrupt the regional electrical distribution system, damage wind power equipment, or cause collapse of the turbine towers. Project design and implementation of emergency plans would minimize these potential impacts and protect the public health and safety and environment in the project vicinity.

Decommissioning would consist of removing above-ground equipment such as wind turbines, meteorological towers, and their associated foundations to a depth of 3 feet below the ground surface. These activities would slightly alter topography and potentially cause minor erosion.

Desert Claim Alternative

Short-term impacts to soils during project construction and decommissioning include clearing and grading, excavation, and fill for access roads, underground cable trenching, and turbine pads. Erosion could potentially result in increased sedimentation to surface water features, gully erosion, slope instability, and slope failures such as earth slumps, debris flows/slumps, and rock falls. The increased risk of erosion and landslides would be addressed by the following measures:

- BMPs such as sediment and erosion control measures,
- setbacks,
- micro-siting, and
- additional geological studies.

During project operation, the risk of erosion would be similar to existing conditions. However, impervious surfaces associated with the O&M building, substation, project access roads, and footings of turbines/transformers could increase runoff and pose a risk, especially on steep slopes. Potential soil loss and landslide impacts can be mitigated to acceptable levels during and after construction with proper implementation of BMPs and erosion control measures. Siting and design of project facilities such as turbines and buildings will consider existing seismic risks present in the area.

The proponent for the Desert Claim Project proposes that the amount of fill that would need to be imported be estimated after the type of selection of foundation is chosen for each turbine. Based on the fact that the Desert Claim Project proposes a similar number of turbines as the WHWPP, and an estimated requirement for 23 miles of access roads, it is likely that fill requirements would be similar to those for the WHWPP. Fill may be imported from off-site sources, if insufficient native materials are available.

Development would have no influence on the level of seismic or volcanic hazard in the project area. A large earthquake in the project area could impact wind power operations, disrupt the regional electrical distribution system, damage wind power equipment, or cause collapse of the turbine towers. A volcanic eruption from any of the five Washington volcanoes could potentially contribute hazards from volcanic ash. Project design and implementation of emergency plans would minimize these potential impacts and protect the public health and safety and environment in the project vicinity.

Decommissioning would consist of removing above-ground equipment such as wind turbines, meteorological towers, and their associated foundations to a depth of 4 feet below the ground surface. These activities would slightly alter topography and potentially cause minor erosion.

Springwood Ranch Alternative

Project construction activities, including clearing, excavation, and filling, would result in soil impacts. Based on a siting number of 40 to 45 turbines, the total amount of ground disturbance during construction is estimated to be approximately 125 acres of temporary impact, of which 30 acres would be permanently impacted. Short-term erosion impacts would likely occur from clearing and grading activities during construction. During project operation, the risk of erosion

would be similar to existing conditions on the site. Approximately 10 to 15 turbines could be located near areas of either high or moderate landslide potential. Setback and/or engineered protective measures would need to be required for these areas. Given the use of standard erosion control and stormwater management BMPs, erosion impacts would be localized, temporary, and insignificant.

Given the smaller number of turbines than proposed for the WHWPP, and the smaller project area, it is probable the amount of new access roads to be developed would also be smaller than for the WHWPP. The resulting amount of required fill would therefore probably be half that required for the WHWPP. It is unknown if this amount of fill would be available on-site, or if it would have to be imported from elsewhere in the county.

Development would have no influence on the level of seismic or volcanic hazard in the project area. A large earthquake in the project area could impact wind power operations, disrupt the regional electrical distribution system, damage wind power equipment, or cause collapse of the turbine towers. A volcanic eruption from any of the five Washington volcanoes would contribute hazards from volcanic ash. Project design and implementation of emergency plans would minimize these potential impacts and protect the public health and safety and environment in the project vicinity.

Impacts of decommissioning would depend on the degree of facility removal that would be required. It is anticipated that these activities would slightly alter topography and potentially cause minor erosion.

Swauk Valley Ranch Alternative

Project construction activities, including clearing, excavation, and filling, would result in soil impacts. Based on an estimated number of 42 turbines, the total amount of ground disturbance during construction is estimated to be approximately 97 acres of temporary impact, of which 53 acres would be permanently impacted. Total site disturbance and cut-and-fill activities in steep slope areas could result in significant erosion and some sliding of soil and alluvial materials. Soils and surface topography would not be altered after construction of the project is complete. Landscaping, grass, and other vegetative cover would prevent significant soil erosion during operation and maintenance of the project. A detailed SWPPP and site-specific BMPs would minimize the potential for pollutant discharge and erosion from the project site during construction and operations.

Given that the total number of turbines would only be one half to one third of the turbines planned for the WHWPP, and that the total length of access roads would also be approximately one half of the roads planned for the WHWPP, the total amount of fill that might be required for a project located on the Swauk Valley Ranch site would be approximately 115 thousand cubic yards.

Development would have no influence on the level of seismic or volcanic hazard in the project area. A large earthquake in the project area could impact wind power operations, disrupt the regional electrical distribution system, damage wind power equipment, or cause collapse of the turbine towers. A volcanic eruption from any of the five Washington volcanoes would contribute hazards from volcanic ash. Project design and implementation of emergency plans

would minimize these potential impacts and protect the public health and safety and environment in the project vicinity.

Impacts of decommissioning would depend on the degree of facility removal that would be required. It is anticipated that these activities would slightly alter topography and potentially cause minor erosion.

3.1.3.2 Impacts of No Action Alternative

Under the No Action Alternative, the project would not be constructed or operated and the impacts described above would not occur. Development by others could occur at the project site in accordance with Kittitas County's existing Comprehensive Plan and zoning regulations. The project site is currently zoned Commercial Agriculture and Forest and Range. Depending on the location, type, and extent of future development at the project site, impacts on earth resources could be similar to or even greater than the proposed action. If long-term energy needs are to be met, development of new renewable and non-renewable generation sources might be required. It is estimated that a base load combustion turbine facility generating 60 average megawatts (aMW) of power could require approximately 14 acres for the plant site. Renewable generation sources might require substantially greater land area for a facility site.

Construction of a base load gas-fired combustion turbine projects may also result in greater disturbance of earth resources compared to the WHWPP because of the possible need to establish a gas pipeline to the facility and electrical transmission interconnections. The specific type, nature, and extent of earth resource impacts under the No Action Alternative, such as erosion and risk of earthquakes and volcanic eruption, would depend on the site-specific location of the energy plant and its associated facilities.

3.1.4 Mitigation Measures

3.1.4.1 Erosion Control during Project Construction

The following Mitigation Measures are proposed by the applicant.

Before construction begins, a detailed SWPPP would be developed by the Applicant and approved by the Washington Energy Facility Site Evaluation Council (EFSEC) for the project to reduce the potential for erosion and pollutant discharge from the site during construction and operation activities. The SWPPP would be designed to meet the requirements of the Washington State Department of Ecology General Permit to Discharge Storm Water through its stormwater pollution control program (Chapter 173-230 WAC) associated with construction activities and a Washington State Department of Ecology General sand and gravel permit. Requirements of a National Pollution Discharge Elimination System (NPDES) Stormwater Construction Permit would also be followed.

The SWPPP would include both structural and non-structural BMPs. Examples of structural BMPs include installation of silt fences and other physical controls to divert flows from exposed soils or otherwise limit runoff and pollutants from exposed portions of the site. Examples of

nonstructural BMPs include materials handling protocols, disposal requirements, and spill prevention methods.

The SWPPP would be prepared along with a detailed project grading plan by the Engineering, Procurement, and Construction (EPC) contractor when design-phase topographic surveying and mapping are completed for the site. The EPC would implement the construction BMPs, with enforcement by the project's environmental monitor, who would be responsible for implementing the SWPPP.

Site-specific BMPs would be identified on the construction plans for site slopes, construction activities, weather conditions, and vegetative buffers. The sequence and methods of construction activities would be controlled to limit erosion. Also, the majority of areas that would be disturbed by the project are sloped at 20% or less (Wind Ridge Power Partners LLC 2004). Clearing, excavation, and grading would be limited to the smallest areas necessary to construct the project. Surface protection measures such as erosion control blankets or straw mulching may also be required during construction or before restoration if the potential for erosion is high in a particular portion of the site.

All construction practices would emphasize erosion control through such measures as:

- using straw mulch and vegetating disturbed surfaces,
- retaining original vegetation wherever possible,
- directing surface water runoff away from denuded areas, keeping runoff velocities low by minimizing slope steepness and length, and
- providing and maintaining stabilized construction entrances.

Work on the access roads would include grading and resurfacing (with additional gravel) existing roads and constructing new roads. The site would generally have gravel roadways with a low-profile design, allowing water to flow over them in most areas. Erosion control measures to be installed during work on the access roads include the following:

- maintaining vegetative buffer strips between the affected areas and any nearby receiving waterways;
- installing sediment fence/straw bale barriers on disturbed slopes and other locations shown in the SWPPP;
- using straw mulch at locations adjacent to an affected road;
- providing temporary sediment traps and synthetic mats downstream of seasonal stream crossings;
- installing silt fences on steep, exposed slopes; and
- planting affected areas with designated seed mixes.

At each turbine location, a crane pad area of approximately 3,000 square feet would be graded and covered with crushed rock. During construction, silt fences, hay bales, or matting would be placed on the down-slope side of the crane pad. Wind turbine equipment such as blades, tower sections, and nacelles would be transported and off-loaded at each turbine location near the foundation and crane pad. After construction, disturbed areas at and around all crane pad staging

areas would be reseeded as necessary to restore the area as closely as possible to its original condition.

Design specifications and further details for excavation, blasting, and other activities associated with the removal and preparation of quarry materials for project construction will be included in the project plans and specifications. This information and a reclamation plan for the rock quarries will be provided to EFSEC for review and approval prior to start of construction.

3.1.4.2 Erosion Control during Project Operation

The project operations group would be responsible for monitoring the SWPPP measures that are implemented during construction to ensure that they continue to function properly. Final designs for the permanent BMPs would be incorporated into the final construction plans and specifications prepared by the engineering team's civil design engineer. The EPC contractor's civil design engineer and the project's engineering team will prepare an operations manual for permanent BMPs. The permanent stormwater BMPs would include erosion and sedimentation control through site landscaping, grass, and other vegetative cover. The final designs for these permanent BMPs would conform to either 1) the Washington State Department of Ecology Western Washington Stormwater Management Manual, with adjustment for conditions in eastern Washington, or 2) a similar Stormwater Management Manual that is expected to be published by Ecology in the summer of 2004.

Operational BMPs will be adopted, as part of the SWPPP, to prevent stormwater pollution by implementing good housekeeping, preventative, and corrective maintenance procedures; steps for spill prevention and emergency cleanup; employee training programs; and inspection and record-keeping practices as necessary. Examples of good operational housekeeping practices identified by the Applicant that would be used by the project include the following:

- prompt cleanup and removal of spillage,
- regular pickup and disposal of garbage,
- regular sweeping of floors,
- HAZMAT data sheet cataloging and recording, and
- proper storage of containers.

The project operators would periodically review the SWPPP against actual practice. The plant operators would determine if the controls identified in the plan are adequate and if employees are following them.

3.1.4.3 Earthquakes

The Applicant proposes to design and construct project facilities in accordance with engineering standards in effect at the time of construction, which would be either the Uniform Building code (UBC) or the International Building Code (IBC) requirements. The wind turbines would be equipped with vibration sensors that would automatically shut down the turbine in the event of a severe earthquake (Wind Ridge Power Partners LLC 2004, Section 3.1).

Additional mitigation measures that would minimize risks from earthquakes would also be implemented and are discussed below.

Prior to final project design, a detailed geotechnical evaluation and field survey would be completed so that no turbine locations or other project elements lie immediately above a high-risk fault. Geotechnical explorations would be conducted at each location where a deep foundation is required (i.e., at each turbine and meteorological tower location) and at the substations and O&M facility.

In addition, current engineering standards applicable in Kittitas County (the 1997 UBC) would be used in design of the project facilities, to assure that the facility performance is acceptable during a design earthquake. Given the relatively low level of earthquake risk for the site, application of the UBC in project design would provide adequate protection for the project facilities and for human safety (Wind Ridge Power Partners LLC 2004, Section 3.1).

The Applicant would prepare on-site emergency plans to protect the public health and safety and environment on and off the project site in case of a major natural disaster such as an earthquake. The Applicant proposes that detailed emergency plans developed prior to project construction and operation contain the following measures to mitigate for potential hazards during an earthquake (Wind Ridge Power Partners LLC 2004):

- Personnel would seek safety at the nearest protected location.
- Personnel would take cover to avoid falling debris.
- Personnel would check the immediate area to identify injuries and equipment failures and report to the site construction manager, O&M manager, or designee.
- Personnel would be instructed to report to a protected area, as necessary, or would continue monitoring the operating equipment.
- A determination would be made about missing personnel, and a search and rescue effort would be initiated if safe and appropriate.
- If the conditions warranted, the Kittitas County Emergency Communications Center and BPA or PSE (the electric transmission line operator) would be notified.
- Turbines could also be shut down manually as required depending on the severity of the earthquake and brought back online after they have been cleared for restart.
- Off-duty personnel would report to the site, if they are able, as designated in the emergency plan.
- If the structures are intact and other plant safety issues are under control, the O&M manager would approve re-entry of personnel to any turbines for search and rescue efforts.

3.1.4.4 Volcanic Eruptions

In the event of damage or potential impact from a volcanic eruption, the project facilities would be shut down until safe operating conditions return. If an eruption occurred during construction, a temporary shutdown would most likely be required to protect equipment and human health (Wind Ridge Power Partners LLC 2004).

To help protect against the impacts of dust and ash all key outdoor project facilities would be coated with corrosion-resistant materials. The turbine rotor blades and other fiberglass shrouds, such as those on the nacelles for example, are resistant to wind-blown dust and precipitation. The turbine towers would have venting and filtering in the doors to prevent wind blown dust from reaching the internal electrical equipment and machinery.

The Applicant would prepare on-site emergency plans to protect the human health and safety and the environment on and off the project site in case of a major natural disaster such as a volcanic eruption. The Applicant proposes the following actions be taken to reduce potential impacts from a volcanic eruption (Wind Ridge Power Partners LLC 2004).

- Close all O&M facility vents to prevent ash from entering buildings.
- Cover data processing equipment and computers not required for safe project operation or shutdown, and shut down other electronic equipment sensitive to dust (ash).
- If the dust load is heavy, shut down the project facilities.
- If the conditions warrant, notify the Kittitas County Emergency Communications Center and BPA or PSE (the electric transmission line operator).
- Determine whether employees should be sent home immediately before roads become unsafe or if personnel must be sheltered on-site.
- Initiate ash cleaning operations by personnel wearing protective equipment.
- Coordinate all ash disposal activities with local Kittitas County officials.

3.1.4.5 Landslides

The Applicant proposes to locate project facilities in areas with relatively low-gradient topography with a thin cover of soil that overlies basalt bedrock. No project facilities would be constructed on unstable slopes or landslide-susceptible terrain. A sufficient setback distance would be provided between the landslide identified in the southern portion of the project site and the nearest project facilities.

In addition, the following mitigation measure would be implemented. Prior to project construction, additional geotechnical explorations, including drilling and ground-penetrating radar (GPR) surveys, would be completed as necessary to delineate the limits of the landslide area to verify that the turbines are not placed in potentially unstable terrain and to provide final recommendations for safe setback distances from known or suspected slide areas.

3.1.4.6 Unique Features

In the unlikely event that unique physical or unique geological features such as petrified ginkgo deposits were discovered at the site during construction, the Applicant has stated that construction personnel would stop work at that location and notify the project manager. The project manager would immediately contact appropriate personnel at EFSEC and the Washington State Historic Preservation Office to coordinate an appropriate response.

3.1.4.7 Contaminated Soils

The Applicant commissioned KTA of Seattle, Washington, to conduct a Phase I Environmental Site Assessment (ESA) of the site to be developed. The Phase I ESA was performed in accordance with the scope and limitations of American Society of Testing and Materials Practice E 1527. The results of the Phase I ESA indicated no evidence of environmental contamination within the project site. Based on these findings, the potential for encountering environmental contamination during project construction or operation is low. In the unlikely event that contaminated soils are encountered, the Applicant has stated that they will notify EFSEC and appropriate personnel with the Washington State Department of Ecology (Wind Ridge Power Partners LLC 2004). Contaminated soils would be handled and disposed of according to state and local requirements.

3.1.4.8 Decommissioning Plans

Prior to commencement of construction the Applicant would obtain EFSEC approval of a detailed Initial Site Restoration Plan.

If the project were to terminate operations, the Applicant would obtain the necessary authorization from the appropriate regulatory agencies to decommission the facilities. A Final Site Restoration Plan would be developed and submitted to EFSEC for review and approval.

All foundations for above-grade facilities would be removed to a depth of 3 feet below grade and unsalvageable material would be sent to authorized sites for disposal. The soil surface would be restored as close as reasonable possible to its original condition. The projects substation(s) is generally valuable and, as is often the case on older power projects, the substation would revert to the ownership of the utility (PSE and/or BPA). If the overhead transmission feeder lines could not be used by the utility, all structures (including the portion of pole foundations within 3 feet of the ground surface), conductors and cables would be removed.

Reclamation procedures would be based on site-specific requirements and techniques commonly employed at the time the area is to be reclaimed, and would include regrading, adding topsoil, and reseeding all disturbed areas. Reseeding would be done with appropriate seed mixes, based on native plant types in the project site vicinity. Decommissioned roads would be reclaimed or left in place based on landowner preferences, and rights of way would be vacated and surrendered to the landowners.

Although no hazardous materials will be used on the site, an audit will be performed of the relevant operation records and a project site survey will be performed to determine if a release of any hazardous material has occurred. An inspection of all facilities will be performed to determine if any hazardous or dangerous materials (as then defined by regulation) are present. The inspection will record the location, quantity, and status of all identified materials. (Wind Ridge Power Partners LLC 2004)

3.1.5 Significant Unavoidable Adverse Impacts

The proposed action would not result in any significant unavoidable adverse impacts on earth resources. Implementation of the SWPPP, BMPs, on-site emergency plans, and other mitigation measures described above would result in low risk from erosion or natural hazards such as earthquakes, volcanoes, and landslides.