2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter of the EIS describes the proposed action and the alternatives to the proposed action that are being considered. **Section 2.1** provides an updated summary of project background information. **Section 2.2** is a complete description of the proposed action, as modified in response to analysis contained in the Draft EIS and review comments on the Draft EIS. It addresses the existing site conditions, the modified proposed project facilities, the construction process, operation and maintenance considerations, and decommissioning. **Section 2.3** describes the alternatives to the proposed action, including no action, that are evaluated in the EIS. **Section 2.4** identifies the alternatives to the proposed action that were considered by Kittitas County but are not evaluated in detail in the EIS.

2.1 BACKGROUND

2.1.1 Proposal History

enXco, Inc., a developer and operator of wind energy projects, began evaluating the prospects for developing a commercial-scale wind energy project in Kittitas County early in 2001. *enXco* initially focused on identifying areas of the county with sufficient wind resource potential to support a commercially viable project. Indicators of potentially sufficient wind resource include topography, vegetation growth patterns, and public and proprietary wind resource data. Areas indicated as having sufficient wind resources were then screened against other site selection criteria standard to the industry, including access to existing electrical transmission facilities; the presence of known environmentally sensitive resources; and the existence of relatively large tracts of open land. After identifying areas of the county considered worthy of further study, *enXco* contacted landowners for the purposes of negotiating agreements to permit wind exploration and (pending the outcome of the exploration activity) potential project development on their properties. Through this prospecting and exploration process, *enXco* succeeded in obtaining landowner agreements for a project area in central Kittitas County and proceeded with development of a formal proposal to build and operate a wind energy project in that area.

Desert Claim Wind Power LLC, a Washington limited liability company wholly owned and managed by *enXco*, submitted an application dated January 28, 2003 to Kittitas County Community Development Services for permits necessary to construct and operate a wind energy facility. The proposed project would be located on leased lands within a project area of 5,237 acres approximately 8 miles north of the City of Ellensburg, the county seat for Kittitas County. The project would consist of up to 120 wind turbine generators with a total nameplate capacity of 180 megawatts (MW). Construction of the project would also require construction and placement of access roads, control and power collection cables, one or more substations (to convert project-generated electricity to the higher voltage required for transmission), a transmission interconnection, and an operations and maintenance facility.

The January 2003 Development Activities Application (application) for the project included an environmental checklist; a project narrative addressing project objectives, location, facilities, construction, operation, decommissioning, and permitting and environmental considerations; a variety of graphics depicting the proposed project layout and existing conditions in the area; documentation of landowners participating in the project; and identification of landowners of parcels contiguous to the proposed project area. Submittal of the application in January 2003 initiated a formal review process for the project by Kittitas County. On February 4, 2003, Kittitas County issued a Notice of Application, seeking pre-threshold determination comments on Desert Claim's application. Kittitas County accepted
comments on the application until March 6, 2003. During this period, Kittitas County received nearly 70 comments on the application.

2.1.2 Kittitas County Review Process

The Kittitas County review process for the Desert Claim Wind Power Project includes two primary components. One is a review of the expected environmental impacts of the project under the provisions of SEPA. The other process involves the land use approvals that would be required to permit development of the project under Kittitas County planning and zoning provisions, KCC, Chapter 17.61A. The two processes applicable to this project are summarized below.

2.1.2.1 SEPA Process

Kittitas County Community Development Services is the lead agency for environmental review of the Desert Claim Wind Power Project under SEPA. Following review of the information in the Desert Claim application, including the environmental checklist, and review of the public comments received during the pre-threshold comment period for the application, Kittitas County issued a Determination of Significance (DS) for the proposed project on April 23, 2003. The DS documented Kittitas County’s conclusion that the proposal would be likely to have a significant adverse impact on the environment, and that an environmental impact statement (EIS) is required pursuant to Kittitas County Code Chapter 15.04 and RCW 43.21C.030(2)(c). Pursuant to Kittitas County Code 15.04.140, Kittitas County Community Development Services prepared the EIS, using the services of a team of environmental consultants under contract to Kittitas County.

The SEPA statute and corresponding state and local regulations prescribe the process that agencies must follow in preparing an EIS. The key steps in the process with respect to this proposed action generally are as follows:

1. Determination of Significance (DS), documenting the finding that a project would likely have significant impacts;
2. Scoping, defining the alternatives and significant environmental impact issues that should be addressed in the EIS, through agency deliberations and public input;
3. Technical studies corresponding to the significant issues, including characterization of the elements of the environment likely to be affected by the proposal, analysis of the expected impacts, and identification of potential mitigation measures (actions that, if implemented, would reduce or eliminate expected significant impacts);
4. Preparation and distribution of a Draft EIS;
5. Public and agency review of and comment on the Draft EIS;
6. Preparation and distribution of a Final EIS, incorporating responses to comments on the Draft EIS, and which may include modifications to the proposal and supplementation, modification and updates to the analysis contained in the Draft EIS; and
7. Issuance of the Final EIS by the County’s Responsible Official.

In conjunction with the DS, Kittitas County initiated a 30-day scoping process for the EIS. During this time, Kittitas County requested public and agency comments on the scope of the Desert Claim Wind Power Project EIS. The DS and request for scoping comments informed interested parties that comments on alternatives, probable significant adverse impacts and licenses and approvals that may be required were to be received by May 23, 2003. To facilitate public input in determining the scope of the EIS, Kittitas County held a public scoping meeting in Ellensburg on May 7, 2003.
Kittitas County received comments on the scope of the EIS in the form of letters (including letters transmitted by facsimile), electronic mail messages, written comments recorded on comment forms submitted at the scoping meeting, and verbal comments recorded at the meeting. Kittitas County’s EIS consultant team reviewed the entire body of scoping comments, identified the comments with respect to the topic or environmental issue addressed, and grouped the comments by similar topic area. The EIS team prepared a summary of the scoping process, which Kittitas County made available in July 2003. Based on the input provided through the formal scoping process, Kittitas County Community Development Services determined the appropriate scope for the Desert Claim Wind Power Project EIS; that scope includes the direct, indirect and cumulative impacts and mitigation measures associated with the environmental elements indicated in the subheadings of Chapter 3 of the EIS.

Kittitas County and its EIS consultants initiated technical studies for the Desert Claim EIS (Step 3 in the EIS process) in the late spring of 2003. This included incorporating certain technical studies conducted in the project area beginning in 2001 and continuing through 2002 and 2003. Following completion of the impact and mitigation assessments, the EIS team documented their findings and compiled the results into this published Draft EIS that addresses all elements identified in the scope for the EIS.

The fifth step in the SEPA process, public and agency review of and comment on the Draft EIS, began officially when Kittitas County filed the Draft EIS with the Washington Department of Ecology. Notices that the EIS was available for review were published in the SEPA Register and in local newspapers of general circulation on the same date. The SEPA rules provide for a minimum period of 30 days for the review of a Draft EIS. The SEPA rules also provide that this period may be extended to a maximum of 45 days in certain circumstances. Because the Desert Claim EIS is a lengthy and complex document, which includes a main body and multiple technical appendices, Kittitas County provided for the longer 45-day review period.

The County held a public meeting to receive comments and testimony on the Draft EIS on January 20, 2004. Thirty (30) people testified at the meeting, providing comments on the Draft EIS. Additionally, the County received 78 items with written comments on the Draft EIS during the formal review period.

The formal review period for the Draft EIS closed on January 30, 2004. The County’s EIS team then processed and evaluated the public and agency comments on the Draft EIS, prepared responses to those comments, and revised the Draft EIS as necessary in response to the comments. This Final EIS is the result of that responsive process.

In response to comments received on the Draft EIS during the formal review period and the information contained in the Draft EIS, Kittitas County and the applicant, Desert Claim, decided to modify the project proposal to include additional mitigation measures, and to conduct additional and updated technical studies. The modifications to the project proposal—the proposed action—are described in Section 2.2.2, below, while the additional studies are detailed in Chapter 3.

The Final EIS is being prepared and distributed in a fashion similar to the Draft EIS. As specified in the SEPA rules (WAC 197-11-460 [5]), Kittitas County may not take action on the proposal sooner than 7 days after the Final EIS has been issued. Kittitas County SEPA procedures provide for a period of 10 working days after the issuance of a Final EIS during which an appeal of that EIS may be filed.

Subsequent decisions on the specific approvals requested for the project will follow adoption of the Final EIS and are discussed in Section 2.1.2.2.
2.1.2.2 Land Use Approval Process

The Kittitas County Code (KCC), Chapter 17.61A, sets forth the requirements for approval of a wind energy project in the County. These include: (1) securing a Wind Farm Resource Development Permit from the County; (2) executing a development agreement with the County; (3) County adoption of a site-specific amendment to the Comprehensive Plan land use designation map, changing the designation for the project area to Wind Farm Resource overlay district, which may be completed as a sub-area plan; and (4) County adoption of a site-specific rezone of the project area to Wind Farm Resource Overlay Zoning District. In conjunction with preparation of the Final EIS, the Planning Division of Kittitas County Community Development Services will prepare a staff report on the proposed action pending before the County and will forward that report to the Planning Commission and the Board of County Commissioners for their consideration. The Planning Division also will prepare the development agreement for the project pursuant to KCC, Chapter 17.61A. The Planning Commission will review the development agreement and make a recommendation to the Board of County Commissioners to either approve or reject the development agreement. In addition to reviewing the EIS and the staff report prepared by the Planning Division, the Board of County Commissioners will review and approve or reject the development agreement. The development agreement may include standards for densities, number, size, setback, and location of turbines; mitigation measures; and other development conditions necessary to protect surrounding properties, the local neighborhood, or Kittitas County as a whole.

The Board of County Commissioners will make the final land use approval decision for the project. The defined criteria for Board approval include adoption of findings that:

- The project is essential or desirable to the public convenience;
- The project is not detrimental or injurious to the public health, peace, or safety, or to the character of the surrounding neighborhood; and
- The project will not be unreasonably detrimental to the economic welfare of the county and will not create excessive public cost for public facilities and services.

2.1.3 Wind Generation Overview

This section provides a brief overview of how wind energy projects work and introduces some key terms used to describe proposed project elements in Section 2.2.

2.1.3.1 Wind Development History

Wind has been a source of power since 5000 B.C., when it was used to power sailboats along the Nile River, and more recently to pump water (China, 200 B.C.), or to grind grain in ancient Persia. Harnessing the wind for large-scale electricity generation is a relatively recent development. The first wind turbine used for electricity was invented in the 19th century. Major advances in wind generation technology have occurred since then, particularly in approximately the past two or three decades.

The level of investment in and development of wind energy has typically fluctuated with the price of fossil fuels. When fossil fuel prices fell after World War II, interest in wind turbines declined. When oil prices rose dramatically in the 1970s, worldwide interest in wind power rose as well. One of the most important events in the development of wind power as a legitimate electricity source was the oil crisis of 1973. The event boosted interest in large wind turbines and sparked several government-sponsored research programs in Germany, Sweden, Canada, the U.K., and the U.S.
The wind turbine technology research and development that followed the oil embargoes of the 1970s refined old ideas and introduced new ways of converting wind energy into useful power. Many of these approaches have been demonstrated in “wind farms” or wind power plants (groups of turbines that feed electricity into the utility grid). Because of these efforts, the unit cost of wind power dropped dramatically. Prices for wind-generated electricity in the early 1980s were approximately 38 cents per kWh. They are currently between 2 and 6 cents per kWh (Renewable Energy Policy Project, 2003).

Wind power is currently the world’s fastest-growing source of electricity. Installed generating capacity grew at an average annual rate of 25 percent between 1990 and 2000, exceeding annual growth rates of less than 2 percent each for nuclear, oil and natural gas sources and an annual decline of 1 percent in coal consumption over this period. Installed wind energy generating capacity in the United States now totals 4,685 MW and generates approximately 11.2 billion kWh of electricity, although representing less than 1 percent of total U.S. electrical generation (AWEA, 2003).

As of December 2002, Washington State had a production capacity of 228 MW of wind power. Two wind power projects, Stateline near Walla Walla and Nine Canyon south of Kennewick, are currently operating in the state (Stifler, 2003). Both projects have recently been expanded or are currently being expanded. Five additional proposed wind energy projects, including Desert Claim and two others in Kittitas County, are currently in the permitting process.

2.1.3.2 Energy Production and Transfer

Converting energy from the wind into electrical energy occurs through five basic steps or functions, including power generation, transfer, collection, substation and transmission. These functions are summarized below and are illustrated in Figure 2-1.

1. **Electrical Power Generation** – Electricity is generated by wind turbines, which consist of a tubular tower supporting a nacelle (the housing for an enclosed generator that is connected via a gear box to the rotor) and a three-bladed rotor. Wind blowing against the turbine blades causes them to rotate, which in turn rotates an electrical generator in the nacelle that produces an electrical current.

2. **Energy Transfer** – The generated electricity is carried down cables within the tower to a base panel at ground level inside the tower. The electricity then is fed to a pad-mounted transformer located adjacent to the tower that increases (steps up) the power to a higher voltage.

3. **Collection System** – The stepped-up power from the transformer then is fed into a power collection system. Power collection lines, most of which are typically underground, connect groups of wind turbines within the project to a project substation.

4. **Substation** – Substation equipment transforms or again steps up the voltage of the electricity from the project. It is also at the substation that the project’s energy is metered and controlled for safety and marketing.

5. **Transmission** – Energy is then fed by a transmission line connection from the substation to the regional electrical transmission system, through which it is conveyed to utility distribution systems for delivery to customers.
Source: Desert Claim, LLC, 2003

Kittitas County
Desert Claim Wind Power
Project EIS

Figure 2-1
How Wind Energy Works
2.2 PROPOSED ACTION

The proposed action evaluated in the Final EIS reflects modifications to project elements presented in the Draft EIS. Under SEPA, the lead agency and the applicant may respond to comments received on a Draft EIS by modifying alternatives, including the proposed action, and may add mitigation measures to reduce and/or eliminate potential adverse environmental impacts (WAC 197-11-560). With approval and advice from Kittitas County, Desert Claim Wind Power LLC developed a modified project configuration that now represents the applicant’s proposal for development of the project.

Section 2.2 describes the construction and operation of the proposed Desert Claim Wind Power Project, and how the proposal was modified subsequent to the distribution and review of the Draft EIS. Desert Claim Wind Power LLC developed the modified project proposal pursuant to the provisions of SEPA. The modifications are intended to respond to comments received on the Draft EIS and suggestions from Kittitas County. In general, the modifications incorporate additional mitigation measures designed to reduce potential adverse environmental impacts from the project.

Most notably, Desert Claim modified the project to include a performance-based safety zone setback of 487 feet from all project area boundaries and adjoining property lines, public roads, utility transmission corridors and the Kittitas Reclamation District (KRD) North Branch Canal. The 487-foot performance-based safety zone setback essentially doubles the 250-foot setback from these features originally proposed by Desert Claim, as represented in the Draft EIS. The proposal would provide the 487-foot safety zone setback while maintaining a 1,000-foot setback between turbines and residences. Based on hazard analysis documented in the Draft EIS, a 487-foot setback would provide sufficient protection to address potential mechanical hazards including tower collapse, blade throw and ice throw from the turbine model selected for the project—the GEWE 1.5sl.

In addition to providing the expanded safety zone setback, the modified project layout is designed to address other expected environmental constraints identified in the Draft EIS. Specifically, the modified project configuration is intended to incorporate mitigation of some visual impacts described in the Draft EIS, and to resolve potential conflict with air traffic associated with Bowers Field, the airport serving Ellensburg. Locations of sensitive environmental resources, including streams, wetlands and cultural resource sites, were also taken into account in developing the modified project configuration. Section 2.2.2 provides more detailed discussion of the modifications to the project layout. The efficacy of these mitigation measures is discussed in the documentation of project impacts in Chapter 3.

The remainder of the section describes project construction and operation, based primarily upon the information provided in Desert Claim’s January 2003 application to Kittitas County, supplemented in some instances with additional project planning information from the applicant. The project characteristics documented in Section 2.2 provide the basis for the updated and supplemented impact analysis presented in Chapter 3 of the EIS.

The description of the proposed action includes five separate components. Section 2.2.1 identifies the proposed site for the wind energy project and summarizes the existing conditions at that site. Section 2.2.2 describes the various types of facilities that will comprise the completed project, as modified pursuant to the SEPA objectives to incorporate mitigation measures designed to reduce potential adverse environmental impacts from the project. The construction process and operation and maintenance functions for the project are discussed in Sections 2.2.3 and 2.2.4, respectively. Section 2.2.5 addresses provisions for future decommissioning of the project.
2.2.1 Existing Project Site Conditions

The location of the project area for the proposed Desert Claim Wind Power Project is indicated in Figure 1-1. This area has not changed or been modified since publication of the Draft EIS. Desert Claim Wind Power LLC has defined a project area boundary based on the property boundaries of the parcels for which Desert Claim has executed landowner agreements to permit development of the project. The project area contains approximately 5,237 acres held by eight landowners, all of whom signed agreements with enXco permitting it to seek permits to construct and operate the project on their lands. The southern edge of the project area is located approximately 8 miles north of the central part of Ellensburg. The project area extends approximately 5.5 miles from east to west and up to 5 miles in a north-to-south direction. The southwestern corner of the project area is over 1.5 miles east of U.S. Route 97 and can be accessed from U.S. Route 97 via Smithson Road. Access to the project area from Ellensburg can be via Wilson Creek Road, Robbins Road, Pheasant Lane, Reecer Creek Road or Lower Green Canyon Road.

2.2.1.1 Physical Setting

The project area is situated along the northern margin of the Kittitas Valley, which is the broad valley area of central Kittitas County on either side of the Yakima River between approximately Lookout Mountain and the Yakima Canyon. The terrain within the project area is relatively flat and open, with a gradual south-to-north rise in elevation totaling approximately 1,000 feet over a distance of approximately 5 miles. Surface elevations range from approximately 2,100 feet to 2,500 feet above sea level across most of the project area. The northernmost portion of the project area lies within the foothills of the Wenatchee Mountains (a portion of the Cascade mountain range), which rise to the north of the Kittitas Valley. The highest elevations and steepest slopes in the project area are in Township 19N, Range 18E, Sections 9 and 4, where the project area includes a foothill ridge rising from approximately 2,600 feet to approximately 3,100 feet in elevation.

Geologically, the project area is located on a broad alluvial fan at the base of the mountains. The alluvial fan is a gently sloping area built up by soils carried down and deposited over millennia by water generated by receding glaciers that at one time covered the mountainous area to the north. Several small, gently sloping creeks flow generally north to south across the project area, forming shallow depressions across the otherwise even landscape.

The Kittitas Valley has an arid to semi-arid climate, with annual precipitation in Ellensburg averaging 8.5 inches per year (Kittitas County Conservation District 2003). Some patches of native shrub-steppe or grassland vegetation remain, particularly around the outer edges of the valley, while the existing vegetative cover in most of the valley is dominated by agricultural cultivation and landscape plantings.

2.2.1.2 Wind Resource

The climate of the Kittitas Valley is strongly influenced by surrounding mountainous terrain and air masses traveling east from the Pacific Ocean towards central and eastern Washington. The Cascade Mountains form a north-south topographic and climatic barrier influencing prevailing wind direction, temperatures and precipitation. Cooling and condensation occur as air rises over the western slope of the Cascades, producing heavy precipitation in the mountains; as the air masses descend along the eastern slope they become warmer and drier, however, producing lighter precipitation and consistent winds in the Kittitas Valley. Prevailing local winds are generally from the west to northwest and are strongest in the spring and summer. The wind speed in Ellensburg averages approximately 4.8 meters/second (m/s) (nearly 11 miles per hour [mph]) for the year, with seasonal averages of over 6 m/s (13 mph) for the spring
and nearly 7 m/s (16 mph) in the summer (NREL 2003). Figure 2-2 illustrates prevailing wind patterns for the project area.

Figure 2-2
Wind Rose for Project Area

Publicly available wind resource maps characterize the project area and surrounding lands as an area of Class 4 (Good) wind resource, with typical wind speeds at a height of 164 feet (50 meters) averaging 15.7 to 16.8 mph (Northwest Sustainable Energy for Economic Development, 2003). Average wind speeds of at least 13 mph are generally considered to be the minimum requirement for utility-scale wind power plants (American Wind Energy Association 2003). enXco collected meteorological data at multiple sites within Kittitas County beginning in 2001 as part of its resource exploration studies. Temporary meteorological (met) towers were erected in several locations. Each tower was equipped with several anemometers to measure wind speed, a wind vane to measure wind direction and a temperature sensor. All of the instruments provided site data to loggers that recorded the observed data. The desired baseline criterion for feasible, utility-scale wind power production (depending on the model of turbine selected) is a wind speed of 13 to 15 miles per hour (mph) at least 30 percent of the time annually.

enXco and Desert Claim installed six 50-meter-high (164 feet) meteorological towers within the project area in 2001 and 2002. The meteorological data collected over the past 3 years confirm that there is a sufficient commercial wind resource for power generation in the proposed project area.


2.2.1.3 Land Ownership and Use

Land Ownership

Figure 2-3 identifies current land ownership within the project vicinity. The parcels included within the project comprise portions of:

- Township 19N, Range 18E, Sections 4, 9, 17, 20, 21, 24 to 29, and 35; and
- Township 19N, Range 19E, Sections 30 and 31.

The surface estates for the 5,237 acres of land within the project area are entirely within private ownership, distributed among eight landowners. One project parcel has a severed estate, in which a private party owns the surface and the Washington Department of Natural Resources (WDNR) controls the mineral rights. There are no publicly-owned lands in the project area. There are several rights-of-way easements crossing the project area, however, including the following:

- The Kittitas Reclamation District (KRD), a local irrigation district, owns and operates the North Branch Canal, which traverses the south portion of the project area;
- The Bonneville Power Administration (BPA), a federal power marketing agency, maintains six electrical transmission lines that cross the project area;
- Puget Sound Energy (PSE), an investor-owned utility, maintains one transmission line within the project area and another outside but near the project area;
- The Kittitas County Public Utility District (PUD) maintains the electrical distribution system that serves the project area and vicinity; and
- Kittitas County maintains the county roads within and adjacent to the project area.

Other lands interspersed among the project parcels and in the surrounding area include the following:

- Several widely spaced sections and partial sections of State-owned land managed by WDNR;
- Federal land managed by the U.S. Forest Service (USFS) within the Cle Elum Ranger District of the Wenatchee National Forest, which begins one-half mile from the northernmost boundary of the project area; and
- Numerous parcels of varying size owned by other private parties not participating in the project.

Consistent with County regulations, Desert Claim’s application provides the names and addresses of 56 landowners who at that time owned the 101 parcels located within 300 feet from and parallel to the boundaries of the proposed activities and such contiguous area under the legal control of the applicant.

Land Use

The project area is in a rural, relatively lightly populated section of Kittitas County and is characterized primarily by a variety of agricultural uses. Much of the land within and surrounding the project area is cultivated for feed crop production or pasture. There are extensive areas of rangeland used for grazing. Rural residential development occurs in a number of locations, including dwellings on farm or ranch properties, scattered residences on large lots, and a few small clusters of homes.
In response to comments received on the Draft EIS, the applicant and the County’s EIS team verified the number of residences that are within the project area or within 1,000 feet of the project area boundary. This field study, conducted in the spring of 2004, established that there are 32 residences that are within the project area or within 1,000 feet of the project area boundary. Maps indicating the locations of these residences are included in Sections 3.7, 3.8 and 3.9.

There are also several notable utility or infrastructure uses in and near the project area. The project area is within a major cross-state electrical transmission corridor linking hydroelectric dams on the Columbia River with the large power consumer market of western Washington. Eight high-voltage transmission lines either directly cross or are adjacent to the project area; six are owned and operated by the Bonneville Power Administration (BPA) and two by Puget Sound Energy (PSE). A BPA regional substation is located on a 133-acre parcel adjacent to the northeastern corner of the project area. The KRD North Branch Canal, providing irrigation water for much of the northern part of the Kittitas Valley, traverses east to west in the vicinity of Smithson Road, generally along or near the southern edge of the project area. Most irrigated agriculture occurs downhill and south of the canal and the Project Area.

Wenatchee National Forest lands north of the project area are used for recreation, grazing and commercial forestry. Recreational activities include camping, hiking, horseback riding, mountain biking, off-road vehicle (ORV) use, hunting, snowmobiling and cross-country skiing. Members of the Yakama Nation hunt, gather plants, and conduct other traditional activities in the vicinity of the project area, pursuant to reserved treaty rights applicable to ceded lands. The private lands of the project area itself are not open to general public access and use. Some low-intensity outdoor recreational uses, including hunting, horseback riding, and snowmobile and ORV use, occur within the project area with permission from individual landowners.

Most of the land within the project area is zoned Ag-20 (agricultural use, with a 20-acre minimum parcel size) under the Kittitas County Code (see Section 3.7 for more detailed discussion). The northwestern portion of the project area is within a foothill-area band zoned as Forest & Range (FR). Residential development at a maximum density of 20 acres per dwelling unit is allowed in this zone. The entire project area and the adjacent lands are within a large area designated as Rural in the Kittitas County Comprehensive Plan. Forested areas to the north are designated as Commercial Forest, and there are some areas several miles to the south designated as Commercial Agriculture.

### 2.2.2 Project Facilities

As indicated in Section 2.1.3, wind energy projects consist of several distinct types of project facilities. These include the wind turbines themselves, power collection, substation and transmission facilities, project access roads, and a project operations and maintenance facility. Each facility component is described below, based on the project planning information that is currently available.

#### 2.2.2.1 Wind Turbines

The proposed action involves construction of a maximum of 120 individual wind turbines within the project area. In this document, the term wind turbine, or turbine, refers to the entire structure that produces electricity. Each turbine consists of three rotor blades connected at the rotor hub, a nacelle (the housing for the generator, which is connected via a gear box and rotor to the blades), and a tubular tower anchored to a tower foundation. Each of these turbine components is summarized below. Figure 2-4 is a photograph of a typical wind turbine in current use.
Figure 2-4
Photo of Typical Wind Turbine
At the time the Draft EIS was published, Desert Claim had not selected the turbine model it would use in this project. Therefore, the Draft EIS included a list of potential turbine manufacturers and models shown in Table 2-1. The Draft EIS analyzed a “maximum turbine envelope” within which each wind turbine would fit, including the rotor blade (when pointing straight up). The maximum turbine envelope was 393 feet (120 meters) tall; each tower (measured to the rotor hub) within that maximum envelope was up to 262 feet (80 meters) tall, and the rotor blades would be up to 262 feet (80 meters) in diameter and would reach 131 feet (40 meters) above the ground when pointing straight down (although the blades could be closer to the ground if a different turbine configuration were used). Figure 2-5 in the Draft EIS illustrated the maximum turbine envelope for a typical turbine that would be used for the Desert Claim project; this graphic has been modified for the Final EIS to show the dimensions of the GEWE 1.5sl turbine selected by the applicant.

Desert Claim selected the General Electric Wind Energy (GEWE) 1.5sl as the turbine to be used in this project. The GEWE 1.5sl has a nameplate generation capacity of 1.5 megawatts (MW) of electricity. The GEWE 1.5sl was listed in the Draft EIS table of potential turbines (Table 2-1) and fits within the maximum turbine envelope analyzed in the Draft EIS; the GEWE 1.5sl is actually smaller than the maximum turbine analyzed in the Draft EIS because it uses a 212-foot (65-meter) tall tower and a 253-foot (77-meter) diameter rotor.

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</table>

* Desert Claim proposes to use the GEWE 1.5sl model for the project, as described in Section 2.2.2.1.
Figure 2-5
Diagram of Proposed Wind Turbine

Source: Desert Claim LLC, 2003
Towers

The Desert Claim project would employ tubular steel towers to support the nacelle, rotor and blades. The purpose of the tower is to position the turbine blades high enough to intercept winds that are stronger than those near the ground surface, and to avoid wind turbulence that might be created by nearby trees, buildings, terrain or other obstructions (National Wind Coordinating Committee, 2002). As indicated above, each tower would be a maximum of 212 feet (65 meters) in height. The tower would have a diameter of approximately 12 feet at the base, tapering to 9 feet at the top of the structure. When fully assembled, each tower would weigh approximately 100 tons. The heavy, rolled steel forming the tower structure would have a smooth exterior surface. The turbine towers may be painted a neutral color (such as light gray), to be selected based on analysis of the visibility of the project structures.

A locked steel door would provide secured access to the base of each tower. A locked, computerized control cabinet would be located inside the tower at the base. Cables and a steel ladder would extend within the hollow tower interior from the tower base to the nacelle, to provide access for turbine maintenance.

Foundations

The freestanding, tubular towers would sit atop steel and concrete foundations designed for the specific subsurface conditions at the individual turbine sites. There are two industry-standard foundation designs that could be applicable for use in the Desert Claim project, which are depicted in Figures 2-6A and 2-6B. The first graphic illustrates an “inverted T” foundation, which employs a relatively shallow concrete base with a relatively large diameter. The maximum depth of the base would be about 8 feet below the ground surface, while the diameter would be approximately 42 feet. The turbine tower would be anchored to the foundation base by a baseplate ring consisting of long, steel bolts extending nearly to the bottom of the concrete base.

Figure 2-6B shows a cross-section view of the pile type foundation. In this case, a cylindrical culvert instead of a concrete foundation is used to anchor the tower base. Inner and outer sections of culvert pipe of slightly different diameter are sunk into an excavation that would range from 25 to 35 feet in depth, depending on specific subsurface conditions, and are backfilled with compacted soil. Two parallel rings of full-length steel anchor bolts extend from the tower base plate through the culvert section, which is filled with concrete after installation of the bolts.

A Washington-state licensed engineer would select the appropriate foundation design for each turbine location during the design phase of the project. The foundation selections would be based on site-specific information on geotechnical conditions present, advice on load-bearing capacities from a geotechnical engineer, and the design engineer’s recommendations. The foundation designs would conform to state and county requirements and standard industry practices. All foundation designs would be reviewed and approved by a Washington State-registered structural engineer.
Figure 2-6A

Typical Turbine Foundation – Inverted T

Source: Desert Claim LLC, 2003

Figure 2-6B

Typical Turbine Foundation – Pile Type

Kittitas County
Desert Claim Wind Power Project EIS

Figure 2-6A & B
Typical Turbine Foundations
Nacelle and Rotors

The nacelle is the rectangular housing that covers the operating mechanism of the turbine. Each nacelle would be approximately 29 feet long, 12 feet wide and 13 feet high. The exterior surface of the nacelle would be constructed of fiberglass lined with sound-absorbing foam. The generator, gear box and associated control equipment for the turbine would be housed inside the shell of the nacelle (see Figure 2-7). The nacelle would be accessed internally through the tower, and most servicing of the machinery would be conducted within the nacelle to protect the equipment and the workers from the elements.

The rotor assembly for each turbine would include three blades, and would be attached to the front of the nacelle at the hub. The Desert Claim project would use the “upwind” turbine design, in which the nacelle is turned into the wind to place the generator and tower behind the blades. The blades would be composed of laminated fiberglass or a fiberglass composite, and would have a smooth outer surface. Each blade would be fabricated offsite in one piece, transported to the project site, and then the assembly would be bolted to the rotor hub, raised into position by crane and connected to the nacelle. When fully assembled at the site, each nacelle, rotor hub and blades combined would weigh approximately 120 tons.

The equipment inside the nacelle would include electrical motors used to turn the nacelle and rotors into the wind, and to control the pitch of the rotor blades, and an automatic braking system. The pitch of the rotor blades would be controlled by a computer that would rotate them continually on their axis to maintain the optimum angle to the wind to maximize generation output at a given wind direction and speed. At wind speeds above the maximum safety threshold of 56 mph, the blades would be rotated into a feathered position and the braking system would stop the rotor from turning. After 20 minutes and when the wind speed reduces to 45 mph or below, the blades would rotate into the wind and start turning again.

2.2.2.2 Turbine Locations

Desert Claim modified the proposed turbine locations depicted in the Draft EIS, using a multi-step process. First, Desert Claim, working with the County’s EIS team, field-verified the number and location of 32 residences located within the project area or within 1,000 feet of the project area boundary.

Next, Desert Claim developed and incorporated a 487-foot performance-based safety zone setback into the turbine layout for the project, while maintaining a 1,000-foot setback from residences. The original project proposal analyzed in the Draft EIS included a 1,000-foot setback from residences and a 250-foot setback from the project area boundary, adjoining property lines, public roads, utility corridors and the KRD canal. Numerous comments on the Draft EIS requested a larger setback. Those comments and the responses are provided in Chapter 5 of the Final EIS.
1. Nacelle
2. Heat Exchanger
3. Generator
4. Control Panel
5. Main Frame
6. Impact Noise Insulation
7. Hydraulic Parking Brake
8. Gearbox
9. Impact Noise Insulation
10. Yaw Drive
11. Yaw Drive
12. Rotor Shaft
13. Oil Cooler
14. Pitch Drive
15. Rotor Hub
16. Nose Cone

Source: GE Wind Energy
Analysis in the Draft EIS (Section 3.8) indicated the potential for, and physical range of potential impacts from mechanical hazards including tower collapse, blade throw and ice throw. For tower collapse, the Draft EIS stated “...human access should be restricted and high-value facilities should not be built within a distance equal to 110 percent of the tower height plus half the rotor diameter.” For the GEWE 1.5sl, the tower collapse safety zone is 416 feet (127 meters). For blade throw, the Draft EIS stated “...human access should be restricted and high-value facilities should not be built within a distance equal to 110 percent of the maximum blade throw...” For the GEWE 1.5sl, the blade throw safety zone is 487 feet (443 feet plus 10 percent -- 44 feet, or 148 meters; see Table 3.8-1). For ice throw, the Draft EIS stated “Ice throw over 100 m has not been documented as a hazard and an ice throw injury has not been reported. GE Wind Energy, the manufacturer of the GEWE 1.5sl, recommends using an ice throw exclusion zone with a radius of 125 m [410 feet] on the downwind side of the tower, which it cites as 125 percent of the largest recorded throw distance.” Therefore, using the safety zone for the GEWE 1.5sl for blade throw (487 feet) also provides sufficient setback protection for both tower collapse (416 feet) and ice throw (410 feet).

The performance-based safety zone would provide an adequate setback to ensure protection for the mechanical hazards discussed above and provide flexibility based on the turbine model selected for a specific wind power project. For example, if a turbine model using a larger tower or rotor were proposed, the safety zone setback would increase proportionate to the greater turbine size. Desert Claim incorporated this performance-based safety zone into the modified turbine layout for the project.

A maximum of 120 turbines would be installed within the project area, distributed across the project site according to the modified location plan indicated in Figure 2-8A; as before, turbines would be micro-sited at each location to minimize environmental impacts disclosed in this EIS. The modified turbine placement plan was determined using computerized modeling software that incorporated the field-verified residence data, the performance-based safety zone setback and wind resource considerations from metrological data collected in the project area, long-term weather data, project area topography and environmental factors. For comparison purposes, Figure 2-8B shows both the modified turbine location plan and the original proposal described in the Draft EIS.

The objective of the turbine location plan is to provide each turbine with optimum exposure to wind from all directions, with emphasis on exposure to the prevailing northwesterly wind direction. Sufficient spacing was established between wind turbine towers to minimize array and wake losses (i.e., energy losses created by turbulence between and among the turbines).

The distribution of turbines for the Desert Claim project differs from what is often seen at existing wind energy projects. Wind projects typically have turbines located in long strings along ridge tops, because the ridge tops are where the winds are strongest and not slowed or stirred by the land. Winds in the Desert Claim project area typically come out of the northwest from the upper valley, after funneling through passes in the Cascade Mountains, and spread out on the lower, flat portion of the northern Kittitas Valley. Therefore, the Desert Claim turbines would be dispersed rather evenly over a broad plain in response to the site’s wind energy pattern.
2.2.2.3 Project Electrical System

The electrical system for the Desert Claim project would consist of three primary components. These include the power collection system, a project substation and an interconnection to the regional power transmission grid. The function of the electrical system would be to collect the electricity produced by the project turbines and convert it to higher-voltage electricity that can be fed into the regional power system.

**Power Collection System**

Desert Claim has also reconfigured the power collection system as part of modifying the turbine layout. This was intended to avoid sensitive environmental features identified in the Draft EIS, and to place power collection cables underground except where it is not reasonably feasible to do so. These modifications were designed to minimize project impacts by avoiding sensitive environmental features, including wetlands and streams, as discussed in Chapter 3.

The generator housed in the nacelle of each turbine would produce low-voltage electricity at 575 volts. Low-voltage cables located inside the tower would carry the electricity from the nacelle through the tower to a transformer mounted on a concrete pad adjacent to the base of each tower (see Figure 2-6). The pad would be approximately 8 to 9 feet square and 1 foot thick. The transformer would occupy almost the entire area of the concrete pad and would be approximately 5 feet high. The transformer would raise the voltage from 575 volts to 34.5 kilovolts (kV).

Electricity would be carried underground from the transformer into a 34.5-kV power cable installed as part of the power collection system. The network of power collection cables would connect the 120 project turbines to the project substation (see below). Junction boxes (equipment for merging multiple incoming cables into one outgoing line) would be installed at various locations within the project area to facilitate the collection of power from individual and groups of turbines. Figure 2-9 illustrates the expected layout of the project power collection system.

Power collection cables would be placed underground except where it is not reasonably possible to do so based on site-specific physical conditions (i.e., where it would be less disruptive to sensitive environmental features to place the cables above ground, or where steep and/or rocky terrain favored the use of overhead cable). Underground cables would be installed in trenches or plowed-in at a depth of 4 feet below the ground surface.

Overhead collection lines, where they might be used to avoid impacts caused to sensitive environmental features by placing cables underground, would be carried on wood-pole structures typically 37 feet high. Figure 2-10 includes an illustration of a typical structure that could be used for 34.5-kV overhead collection lines (left panel of graphic). The structures for overhead lines would provide a conductor spacing of at least 3 feet, to reduce the possibility of conductors contacting each other in storms.
Source: Desert Claim LLC, 2003

Figure 2-10
Typical Overhead Power Collection and Transmission Interconnection Structures
The modified configuration of the power collection system represents a net reduction of 1.5 lineal miles of cable compared to the layout documented in the Draft EIS. Overall, the collection system is now estimated to contain approximately 31 lineal miles of underground cable, with less than 1 lineal mile of overhead power collection cable to be substituted for underground cable, if needed in areas where it was not feasible to bury cable. This compares to 25 lineal miles of underground cable and 7.5 lineal miles of overhead cable as stated in the Draft EIS. As before, most of the power collection lines would be located within the properties that comprise the project area. Given the configuration of the project land parcels, however, some lines would need to be located outside the project boundary. This condition applies to approximately 3 miles of collection cable connecting portions of the project area to the substation; wherever feasible, these power collection cables would be located underground, within existing County right-of-way and/or easements obtained by Desert Claim. Prior to operation, the applicant would need to acquire permits, easements, and agreements from the appropriate entities for power collection lines outside the project area boundary.

**Substation**

An electrical substation would be needed to provide a further increase in voltage for the power collected from the project turbines. Two alternative locations for a project substation are identified in the Final EIS. The Draft EIS identified a substation location near the southeastern corner of Section 21, T. 19N, R. 18E, consistent with the Desert Claim application. This location is essentially adjacent to the multiple BPA transmission lines that cross the project area. The modified project configuration, as shown in Figure 2-9, also identifies a proposed substation location near the northeast corner of Section 21, approximately 1 mile north of the intersection of Reecer Creek Road and Pheasant Lane. This location nearly abuts the PSE Rocky Reach-Cascade 230 kV transmission line that also crosses the project area.

The applicant has indicated that either alternative location or that two substations might be required, depending on which transmission system (BPA and/or PSE) is the receiver for the project interconnection and the voltage requirements for that interconnection. The final selection of the substation location(s) would be made after the interconnection point had been determined with the transmission system owner. The applicant has identified a suitable substation location for either case, and the Final EIS addresses the impacts of substation development at either location. Both substation locations are shown on Figure 2-9 and related graphics showing the location of project facilities.

A larger power transformer (as compared to the pad-mounted transformers at the base of the turbines) located within the project substation would step up the voltage of the electricity flowing from the project power collection system (at 34.5 kV) to meet the higher voltage of the receiving electrical transmission line (see discussion below). Substation equipment would include a power transformer, disconnect switches, and metering relays. The substation would include a small building that would house the power generation control and relaying equipment, station batteries, and the supervisory control and data acquisition (SCADA) system. The entire substation area would be cleared, graded and covered with gravel, and would be surrounded by a chain-link fence. The completed substation would occupy an area of approximately 2 acres. The substation would be designed to meet the standards of the National Electric Safety Code and the requirements of the entity operating the receiving transmission line. The operations and maintenance (O&M) facility would be co-located with the project substation.
Transmission Interconnection

An overhead transmission line would be constructed to connect the project substation with an onsite high-voltage electrical transmission line. Desert Claim and enXco have not yet negotiated a power sale agreement or an interconnection agreement, but have identified several possible options for interconnecting the project to the regional transmission network. Existing regional transmission lines located on or near the project area include the following:

- The Bonneville Power Administration operates five transmission lines, at voltages ranging from 230 kV to 500 kV, within a major corridor that extends west from the Columbia River hydroelectric system and essentially bisects the project in two areas; the proposed project substation location is just to the south of this corridor.
- The BPA Columbia-Moxee 115 kV line diverges from the main corridor approximately 1 mile west of Schultz Substation and proceeds on a southwesterly path toward the Yakima Valley, crossing through the eastern portion of the project area.
- The Puget Sound Energy Rocky Reach-Cascade 230 kV line follows a generally east-to-west path through the project area; near the proposed substation location, it is approximately one-half mile north of the main BPA corridor.
- The PSE Cle Elum-Kittitas 115 kV line passes near the project area and could provide an interconnection point at the Woldale substation, which is located near the intersection of U.S. Route 97 and State Route 10.

The characteristics of the project interconnection facility would depend upon which transmission option is selected for the interconnection. The length of the interconnection line would be no more than approximately 300 feet for a connection to either the BPA or PSE lines within the project area, based on the alternative substation locations indicated in Figure 2-9. If the project connected to a 230-kV transmission line (either BPA or PSE), the interconnection line would likely be mounted on either wood poles or H-frame structures. The structures would likely be from 70 to nearly 100 feet in height and would typically be spaced several hundred feet apart. Connection to a 115-kV line could also involve steel or wood structures with similar spacing but slightly shorter structures. Figure 2-10 also illustrates typical designs for transmission lines of the applicable sizes (115-kV in the center panel, 230-kV in the right panel).

At this time, the most probable location for a project substation is between the BPA and PSE transmission lines in Section 21, T. 19N, R. 18E. The modified project layout includes two alternative substation locations that provide suitable locations for connection to either the BPA or PSE systems, and that would minimize the length of the transmission interconnection in either case.
2.2.2.4 Meteorological Towers

Permanent towers supporting meteorological measuring equipment are standard features of utility-scale wind power projects. Project development typically involves the use of temporary meteorological (met) towers during the exploration and project design phases. Temporary met towers are usually slender, tubular aluminum structures that are secured by multiple guy wires that extend up to 110 feet from the tower base. Six temporary met towers are currently installed in the Desert Claim project area. Permanent met towers used in wind power projects may be guyed or self-supporting steel structures. Self-supporting met towers use concrete foundations. Figure 2-11 is a drawing of a typical free-standing met tower. The towers usually have multiple anemometers to measure wind speed and direction at different elevations, and are placed at strategic locations that best support automated control of the turbine operations.

Figure 2-11
Typical Permanent Met Tower
Desert Claim is proposing to construct five (5) permanent, free-standing met towers in the locations depicted in Figure 2-9. The permanent towers would be approximately 212 feet (65 meters) tall, free-standing rather than secured by guy wires, and set on concrete bases. The met towers would be included in the FAA-required lighting plan for the project.

2.2.2.5 Access Roads

Desert Claim reconfigured the project access road system in conjunction with modifying the turbine layout, to avoid some of the sensitive environmental features identified in the Draft EIS. The modified road system also includes a project access road from the eastern terminus of Smithson Road to the eastern-most project area boundary that would be available for use by emergency vehicles, as requested by Kittitas County. This new project access road would greatly reduce emergency vehicle response time by providing a direct route between Smithson Road/Robbins Road and Wilson Creek Road. Reconfiguring the access road system to provide these mitigation measures resulted in a net addition of approximately 4.5 lineal miles of project access roads; the Draft EIS plan included 23 miles of access roads, while the plan evaluated in the Final EIS includes approximately 27.5 miles. The modified project access road layout is depicted in Figure 2-12.

Road access to the project area is currently provided by a number of existing public roads, as shown previously in Figure 2-8. Kittitas County roads that cross or pass adjacent to parcels within the project area include Smithson Road, Robbins Road, Reecer Creek Road, Pheasant Lane and Lower Green Canyon Road. Wilson Creek Road and Charlton Road also connect with private roads that provide access to parcels in the eastern portion of the project area.

Development of the Desert Claim project would include construction of a system of project access roads providing access connections to all 120 turbines, the project substation, and other key project facilities.

The project roads would connect with the existing public road system at a number of locations including (generally from east to west):

- a point near the eastern end of Smithson Road;
- a point along Robbins Road approximately ½ mile north of the North Branch Canal;
- five points along various sections of Reecer Creek Road; and
- three points on Pheasant Lane.

The project access roads would be one-lane roads with a 15-foot travel surface width for straight sections and up to a 20-foot travel surface width for curved sections. Project access roads would have a compacted gravel surface. Figure 2-13 shows a typical cross-section for the project access roads. Based on the modified layout, the access road system would include a total of 27.5 lineal miles of road. Existing private roads on the project area properties would be utilized to the greatest extent possible in developing the access road system, so as to minimize the need for new road construction.

Detailed plans for the project road system and the connections to county roads would be prepared following micro-siting of the turbines. Project access road connections to county roads would be designed pursuant to County road standards and would be constructed in coordination with Kittitas County Public Works and Community Development Services.
Figure 2-13
Typical Access Road Cross Section
2.2.2.6 Operation and Maintenance Facility

The proposed project facilities include a permanent building to support ongoing operations and maintenance ("O&M") activities. The O&M building would include an enclosed bay for storage of equipment, parts and supplies; a workshop; an office for administration and monitoring of the facility; restroom and kitchen facilities; and parking for vehicles. The enclosed space needed for the O&M building is approximately 4,000 square feet, and the overall footprint for the facility area would be up to approximately 2 acres.

The Desert Claim application indicated that two options exist for the location of the O&M building. Following publication of the Draft EIS, Desert Claim determined that it would locate the O&M facility at the project substation site (see discussion in Section 2.2.2.3), 1 mile north of the intersection of Reecer Creek Road and Pheasant Lane. Domestic water for the O&M facility at this location would either be acquired from the landowner or through development of an exempt well; water consumption would be considerably less than 5,000 gallons per day. Restroom and kitchen facilities would drain into an on-site septic system. The O&M facility would be surrounded by a fenced enclosure with a locked gate.

2.2.2.7 Safety and Control Systems

The completed project would include a communication system for monitoring and control of the turbines. The communication system would use either copper lines, similar to telephone lines, or fiber-optic lines. Wind project communication lines typically run to each turbine, parallel to the low- and medium-voltage power collection lines. The communication lines would likewise be either underground or overhead on poles. In the latter case, both types of lines are thin and not highly visible. The rotor control and braking system (discussed in Section 2.2.2.1) would be a key component of the project safety systems.

Safety lighting would be installed on the exterior of some nacelles, to comply with Federal Aviation Administration (FAA) rules for structure lighting. Specific requirements for the Desert Claim project would be developed in conjunction with the FAA and Kittitas County, based on the turbine heights and site-specific conditions. The applicant has developed a proposed lighting plan for the modified turbine layout. Under the updated plan, 48 of the total 120 turbines, or 40 percent, would be equipped with a dual lighting system. This lighting system includes low-intensity flashing red lights (L-864) for nighttime use and medium-intensity flashing white lights (L-865) for daytime and twilight use. Experience with FAA reviews of prior lighting plans indicates this configuration should meet the FAA requirements and provide safe lighting for daytime and nighttime use. See Section 3.13 for additional discussion.

Each wind turbine, including the rotor blades, would be equipped with a lightning protection system. The lightning protection system would be connected to an underground grounding arrangement to facilitate lightning flow safely to the ground. In addition, all equipment, cables, and structures comprising the wind turbines would be connected to a metallic, project-wide grounding network. All turbine towers would be locked, and the substation would be fenced and locked to prevent unauthorized entry.

2.2.2.8 Visitor Facilities

The Desert Claim project is expected to provide some level of attraction or interest for tourists who want to view a working wind energy facility. Therefore, the project facilities would need to provide accommodation for those visitors. The primary objectives for developing project visitor facilities would be to accommodate public interest in the project, minimize potential traffic impacts to the surrounding area, reduce the potential for trespass and ensure visitor safety.
Specific plans for project visitor facilities have not yet been proposed. Plans for such a facility would be incorporated into the provisions of the development agreement and conditions of approval imposed by Kittitas County. Visitor facilities would likely consist of a roadside turnout adjacent to a County road at a location providing a suitable view of project wind turbines, along with an information kiosk and appropriate signage. The facility could be established either within or outside the project area or it could be incorporated within the O&M facility. In review comments on the Draft EIS, the Kittitas County Public Works Department recommended locating a tourist kiosk along the U.S. Highway 97 corridor or along Smithson Road adjacent to the project area. Discussion in of this facility in Chapter 3 is based on the assumption it would be located along Smithson Road. Desert Claim Wind Power LLC would construct and maintain any such facility.

2.2.3 Construction Process

Construction of the proposed project would involve the use of standard construction procedures typical for wind energy projects in the Northwest. The project area has relatively flat or gently sloping terrain and good drainage, so it is suitable to the construction of roads and turbine foundations. This section summarizes the schedule and general sequence for the construction process, and describes the procedures that would be used for construction of the various project components.

2.2.3.1 Schedule and General Sequence

Construction of the project facilities would start following completion of the environmental review and issuance of project permits. The construction process would be completed over approximately a 9-month period. The applicant may elect to develop the 120-turbine project in two or more phases, depending upon market conditions and power sales commitments at the time construction begins. If constructed in phases, each phase would take approximately 9 months to complete.

The primary tasks in the construction process are outlined as follows:

- survey and stake project facility locations;
- construct project access roads and turbine pads;
- construct foundations for towers;
- excavate trenches for underground utilities;
- place underground power collection and communication cables in trenches;
- construct overhead power collection and communication cables and interconnection with the BPA, PSE or PUD transmission line;
- construct the project substation;
- construct the project operation and maintenance facility;
- transport tower sections to the site and assemble towers;
- assemble and install nacelles, rotors and other turbine equipment;
- install safety and control systems;
- test all project systems; and
- conduct final site grading, reclamation and cleanup.
Several actions to minimize environmental effects and to protect County roads would be included in the development agreement and conditions of approval imposed by the county. Such actions would be instituted before construction begins. Habitat protection areas within the project area would be delineated, defined in contracting documents and marked in the field, pursuant to consultations with Kittitas County, Washington Department of Fish and Wildlife (WDFW) personnel, landowners and other stakeholders.

In general, the first few months of construction activity would involve initial civil and electrical construction, including construction of the project access roads and tower foundations, the power collection system and communication lines, and the project substation. Tower installation would be accomplished in phases. As project access roads and tower foundations are completed, turbines would be erected. Installation of the nacelles, rotors and associated equipment would be the final task of major construction activity for each turbine. Desert Claim expects to begin commercial operation within 1 month after commissioning the first wind turbine.

2.2.3.2 Construction Equipment and Space Requirements

Constructing the proposed project would require the use of various types of construction equipment. Table 2-2 summarizes the types and functions of construction equipment that are typically used in the construction of commercial wind energy projects.

Table 2-2
Typical Construction Equipment for Wind Energy Projects

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulldozer</td>
<td>Road and pad construction, substation, O&amp;M facility, construction staging areas</td>
</tr>
<tr>
<td>Grader</td>
<td>Road and pad construction, substation, O&amp;M facility, construction staging areas</td>
</tr>
<tr>
<td>Water trucks</td>
<td>Compaction, erosion and dust control</td>
</tr>
<tr>
<td>Roller/compactor</td>
<td>Road and pad compaction</td>
</tr>
<tr>
<td>Loader</td>
<td>Loading/unloading/moving construction materials</td>
</tr>
<tr>
<td>Backhoe/trenching machine</td>
<td>Excavating trenches for underground utilities</td>
</tr>
<tr>
<td>Truck-mounted drilling rig, augur</td>
<td>Drilling tower foundations, holes for power poles</td>
</tr>
<tr>
<td>Concrete trucks and pumps</td>
<td>Pouring tower and other structure foundations</td>
</tr>
<tr>
<td>Cranes</td>
<td>Erecting towers, nacelles and rotors</td>
</tr>
<tr>
<td>Dump trucks</td>
<td>Hauling road and pad construction materials</td>
</tr>
<tr>
<td>Flatbed trucks</td>
<td>Hauling towers, blades and other equipment</td>
</tr>
<tr>
<td>Pickup trucks</td>
<td>General use and hauling minor equipment</td>
</tr>
<tr>
<td>Small hydraulic cranes/forklifts</td>
<td>Loading and unloading equipment</td>
</tr>
<tr>
<td>Rough terrain forklift</td>
<td>Lifting equipment</td>
</tr>
<tr>
<td>Truck-mounted high reach</td>
<td>Aerial framing and clipping</td>
</tr>
<tr>
<td>Truck-mounted tensioner and cable reels</td>
<td>Stringing power collection/transmission lines</td>
</tr>
<tr>
<td>Winch truck</td>
<td>Realign power collection/transmission structures</td>
</tr>
<tr>
<td>Construction Cranes</td>
<td>Off-loading and erecting towers, nacelles, blades</td>
</tr>
</tbody>
</table>

Source: BPA 2001
Construction activities would require temporary disturbance of a larger area than would be occupied by the permanent project facilities. Table 2-3 identifies the estimated area that would be disturbed in construction and within the permanent footprint of the various project components.

**Table 2-3**

**Estimated Area of Construction Disturbance and Permanent Facilities**

(in acres)

<table>
<thead>
<tr>
<th>Project Feature</th>
<th>Temporary Construction Disturbance</th>
<th>Permanent Project Footprint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind Turbine Pads</td>
<td>146.3</td>
<td>13.2</td>
</tr>
<tr>
<td>Internal Power Collection System</td>
<td>1.3</td>
<td>0</td>
</tr>
<tr>
<td>Project Substation</td>
<td>2.8</td>
<td>2.1</td>
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<tr>
<td>External Underground Collection System</td>
<td>3.4</td>
<td>0</td>
</tr>
<tr>
<td>Met Towers</td>
<td>1.4</td>
<td>0.1</td>
</tr>
<tr>
<td>Project Access Roads</td>
<td>163.6</td>
<td>72.9</td>
</tr>
<tr>
<td>Project O&amp;M Facility</td>
<td>2.8</td>
<td>2.1</td>
</tr>
<tr>
<td>Construction Staging/Storage</td>
<td>19.5</td>
<td>-</td>
</tr>
<tr>
<td>Total Area</td>
<td>341.1</td>
<td>90.4</td>
</tr>
<tr>
<td>Percent of Project Area</td>
<td>6.5%</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

Notes:
1. Power collection system within project area (under ground) with 85 percent contained within the project access road areas.
2. Underground power collection cables linking project parcels and substation to be placed within County road rights-of-way and/or new easements.
3. Area for project access roads increased 15 percent to include curves and intersections to non-project roads.
4. Project O&M Facility to be co-located with the project substation; disturbance and permanent footprint in addition to substation area.

**2.2.3.3 Work Force**

Approximately 120 to 150 people would likely be employed at the project site at some time during the construction period. Some of these workers would be employees of Desert Claim Wind Power LLC/enXco, Inc.; while most would be workers for various construction contractors and equipment vendors who would provide construction goods and services to the project. The size of the construction work force present at any given time would vary with the schedule of tasks in the construction process. Relatively few construction workers would be present during the initial and final stages of construction activity, for example. The road/pad and tower foundation construction tasks are likely to be the project activities with the greatest labor requirements. Based on the nature and sequence of construction activity, the peak work force at any given time would not likely exceed 60 to 75 workers.
The applicant has indicated that it would use local construction contractors and suppliers to the extent possible. Based on experience with other wind energy projects in the Northwest, it is likely that local firms and workers would be available for tasks such as surveying, site clearing and grading, road and turbine foundation construction, and site restoration/cleanup. Tasks such as transmission line and substation construction, turbine assembly, installing safety and control systems, and project testing require more specialized skills that are less likely to be available locally, and would presumably be performed by non-local firms and workers.

2.2.3.4 Erosion and Sedimentation Control

Erosion and sedimentation control would be standard practice during active construction and during the restoration and cleanup stage of the construction process. The applicant would accomplish this objective through development and implementation of a Temporary Erosion and Sedimentation Control Plan (TESCP). This design-level plan would prescribe the use of Best Management Practices that are standard features of such plans. The project TESCP would be based on and comply with Kittitas County standards and the Washington Department of Ecology (WDOE) Stormwater Management Manual for Eastern Washington. The TESCP would also address the erosion control and water quality conditions of the National Pollutant Discharge Elimination System (NPDES) temporary stormwater discharge permit that would be required for project construction.

Based on the applicable standards, the TESCP would include using coverings for exposed soils (e.g., straw, jute netting, or soil stabilizers), stormwater detention ponds, sediment control basins and traps, and other well-established measures. Surface water runoff would be directed away from cut-and-fill slopes and other disturbed areas, and into ditches that drain to natural drainage features. Exposed areas would be re-vegetated as soon as possible following completion of the corresponding construction task.

The TESCP would be submitted in conjunction with construction approvals. Erosion and sedimentation control measures would be implemented at the beginning of the construction process, following the survey and staking task. Areas of native shrub-steppe habitat and other environmental features to be avoided (based on the County’s Critical Areas review) would also be marked at this time. Provisions for restoration of temporarily disturbed areas would be determined through consultations with WDFW and Kittitas County.

2.2.3.5 Roads and Turbine Pads

Heavy construction activity for the project would start with clearing and grading for the project access roads and turbine pads. In some locations existing private farm roads would be used as segments of the project access road system. These existing road segments would be improved as necessary to comply with the design standards for the project roads. Improvement activities could include grading to modify the road geometry, filling in low spots, replacing culverts and other drainage features, replacing cattle guards as needed, and applying new gravel to the road surface. Improvements to existing roads would be coordinated with the landowners to minimize crop damage and ensure suitable access for the landowners.

New graveled roads would be constructed in areas where existing roads could not be used for access to the turbines. As discussed in Section 2.2.2.5, these roads would vary in width; having 15-foot travel surface widths for straight sections and 20-foot travel surface widths for curved sections. Project access roads would have turnouts at the turbine pads and other selected locations. The temporary disturbance area along the Project access road routes is assumed to be approximately 35 to 50 feet wide under typical circumstances, with a wider area needed in locations where cuts and fills are required to construct and
Topsoil removed during grading for access road and turbine pad construction would be stockpiled onsite adjacent to the disturbed areas. The removed topsoil would be re-spread in cut-and-fill slopes, and these areas would be re-vegetated as soon as possible after road construction was completed. No offsite deposition of excavated material would be needed. A spoils plan would be submitted for review to the Community Development Services Department to ensure compliance with KCC 17A, Critical Areas Ordinance. Once grading for the roads and pads in a given sector of the project had been completed, fill materials (gravel, soil and sand) needed for road and pad bases and road surfaces would be hauled to the construction site, deposited, graded and compacted as needed. Native materials from the project area would be used to the greatest extent possible to meet fill material needs and achieve a cut-and-fill balance within the project area. If fill must be imported, gravel and/or crushed rock provided by local permitted sources would be used. Quantities of filling and grading for the project have not yet been estimated because they are dependent on the mix of tower foundations to be used, and the type of foundation for each of the 120 turbine locations would be determined in the future based on site-specific geotechnical investigation. These quantities would be estimated after the type of tower foundation is determined for each turbine. Based on information developed for other wind energy projects of a comparable scale, however, the total volume of cut and fill quantities for the project could be in the range of approximately 250,000 to 300,000 cubic yards. Gravel and other construction materials purchased by the road construction contractor from existing, permitted local sources would be trucked to the construction site via public roads.

2.2.3.6 Staging Areas

Temporary laydown or staging areas would be established in the project area to support various construction functions. These include temporary storage of tower sections, nacelles and other turbine components; temporary storage of other equipment and supplies; parking of construction vehicles and equipment; parking of construction workers’ personal vehicles; and possible installation of portable fuel tanks surrounded by earthen berms for spill control. Staging area locations and dimensions have not yet been determined. The application notes that one or more staging area approximately 10 acres in size would be needed, and that these temporary facilities would be placed near existing roads and on previously disturbed land (e.g., heavily grazed and/or crop or pasture lands). Staging area locations would be selected in consultation with the County during development of the Construction Traffic Plan and the County’s Critical Areas review.

2.2.3.7 Batch Plants

Desert Claim Wind Power LLC would contract with one or more local construction companies to install the tower foundations and pads and the transformer pads. These facilities would require sizable volumes of concrete. The construction contractor would be responsible for obtaining the aggregate and concrete necessary to build these features. The contractor could elect to purchase the construction materials from local suppliers, in which case concrete would be manufactured at an existing local plant and trucked to the project.
Alternatively, the contractor could choose to construct one or more temporary concrete batch plants within or near the project area, to minimize the cost impact of transporting concrete to the project. In this event, the location and characteristics of the batch plant(s) would be determined by the contractor, in consultation with Kittitas County and Desert Claim Wind Power LLC, and the contractor would be responsible for obtaining any land use or environmental permits required to develop the facilities.

If the batch plant option were selected, it is likely that the contractor would use a portable unit that could be moved to different locations within the project area as needed. The batch plant(s) would be set up in a temporary staging area, as described previously, and would use cement, aggregate and water purchased from local sources and delivered to the temporary site by truck. A diesel generator would likely be used to power the plant. The area required to support a typical temporary batch plant and support facilities would be approximately 2 to 3 acres. The site would include approximately 1 acre for the plant itself, 1 acre for raw material stockpiles, and 1 acre for parking, equipment storage and a settling pond.

Portable concrete batch plants, defined as plants that operate at a site for less than 1 year, are permitted under the State of Washington’s Sand and Gravel General NPDES Permit. The general permit specifies discharge limits and requires the operator to develop plans for monitoring, stormwater pollution prevention plan, erosion and sediment control, and spill prevention and control. The permit requires restoration of the site after the portable plant is removed. Best management practices for concrete truck washout require that a settling pond be built to catch the washdown runoff and stormwater runoff. A water storage tank could be used at the plant site to store water hauled from an off-site source if water was not available at the batch plant site.

2.2.3.8 Turbine Foundations

Once the project roads are constructed, excavation would begin for turbine foundations. As described in Section 2.2.2.1, inverted-T and pile-type foundations are likely to be used, with selection of the foundation design depending on site-specific conditions at each turbine location. In either case, construction of the foundation typically requires 3 days per tower with foundation construction activities expected to occur for approximately 4 to 5 months during the Desert Claim construction process.

The inverted-T foundation requires a circular excavation approximately 8 feet deep and 42 feet in diameter (see Figure 2-6A). Construction for this design involves excavation with a backhoe; placement of a layer of compacted fill at the bottom of the hole; pouring an octagonal-shaped, reinforced-concrete (concrete poured over steel rebar) footing up to 4 feet deep on top of the fill; pouring a 4-foot deep reinforced-concrete pedestal on top of the footing; and covering the footing and pedestal with compacted backfill and topsoil. Steel anchor bolts extending through the pedestal to near the base of the footing would be used in a subsequent step to fix the tower to the foundation.

The pile foundation requires excavating a hole ranging from 25 feet to 35 feet deep (depending on site-specific subsurface conditions) and approximately 18 feet in diameter (see Figure 2-6B). A cylindrical, corrugated metal form approximately 16 feet in diameter would be inserted in the hole, and another cylindrical corrugated form several feet smaller in diameter would be placed inside the larger form. The space between the two forms would be filled with reinforced concrete and two rings of anchor bolts, and the space inside the inner metal form would be filled with compacted backfill.

If bedrock were encountered at any turbine location, rock anchors would likely be used to secure the base of the foundation. Rock anchors would be used in conjunction with either foundation design. Use of explosives (blasting) might be required for installation of rock anchors.
Desert Claim would engage a geotechnical specialist to prepare a geotechnical report for the project that would be used to determine the appropriate foundation design for each turbine location. The applicant would also engage a licensed civil engineer during construction to inspect each foundation pour and prepare a quality assurance report for each foundation.

2.2.3.9 Collection System

The power collection system for the project would be installed using underground cable, except where it is not feasible to do so and avoid sensitive environmental features as discussed in Section 2.2.2.5. The cable would follow existing utility rights-of-way where possible, or would be located within the disturbance area for construction of the project road system, or in easements obtained by Desert Claim. Underground cable would be installed using a trenched or plowed-in method. The trenching method requires excavating a trench approximately 3 to 5 feet wide and approximately 2 to 4 feet deep, laying the electrical cables in a part of the trench, partially backfilling the trench, laying parallel communication cables, and backfilling the entire trench. Under the plowed method, the power collection and communication cables would be installed without the need to excavate an open trench; instead, the cables are directly plowed into the ground. In either case, topsoil would be replaced on the surface of the disturbed area and would be reseeded with native plants.

Overhead 34.5-kV collector lines would be used in areas where underground cable was not feasible, as discussed in Section 2.2.2.5. Overhead collection cables would be mounted on new or existing wooden poles of approximately 37 feet in height. Construction for these facilities would require heavy equipment access within a corridor approximately 8 to 12 feet wide along each overhead line, plus a temporary laydown and work area around the base of each pole. The poles would be placed in holes excavated by augur, and minimal or no clearing and grading would be required for constructing overhead lines.

2.2.3.10 Transmission Connection

Developing the project transmission interconnection would require constructing an overhead transmission line from the project substation to the existing transmission line selected as the reception point for power generated by the project. The transmission interconnection is expected to be a 230-kV line that would be supported on wood-pole structures approximately 76 feet in height and spaced at intervals of approximately 500 to 800 feet (depending on the overall length of the connection). Standard industry construction practices would be used for this facility and would include surveying, right-of-way preparation, materials hauling, structure assembly and erection, ground wire and conductor stringing, and cleanup and restoration.

A licensed surveyor would survey the transmission line route and stake structure locations. Holes for the transmission structures would be drilled or augured, typically to a depth of 4 to 6 feet and a width of 2 feet. Construction materials would be hauled by truck to the route and the structures would be assembled on site. Conductor stringing equipment would be placed at either end of the transmission connection; additional areas might be needed for angle locations along the route. Construction activity would be concentrated at staging areas and around structure locations. Cleanup and restoration of disturbed areas would occur following stringing and testing of the line. Excess topsoil would be tamped around poles or spread on the right-of-way, and disturbed areas would be reseeded with native plants or agricultural crops, depending on the adjacent use.
2.2.3.11 Substation and Operation and Maintenance Facility

The project substation would be constructed while the electrical system components were being installed. Construction activities would include clearing and grading the substation site, which would occupy up to approximately 2 acres; constructing concrete pads for transformers, the control building and other equipment; installing the electrical equipment; assembling the control building; covering the remainder of the site with gravel; and constructing a chain-link fence around the perimeter of the substation site.

The project operation and maintenance facility would be constructed on a 2-acre site located adjacent to the project substation. It would involve conventional building construction techniques including site clearing and grading, constructing a concrete pad for the building, framing and finishing the building, installing electrical wiring and plumbing, and constructing a septic system and drain field (unless the site were connected to existing utility services).

2.2.3.12 Turbine Equipment

Once a sufficient number of tower foundations were in place and finished, the first turbine towers, nacelles and blades would be brought to the project site for placement. The turbine components would be transported to the project area by truck and trailer. The towers would have three sections, each approximately 65 to 75 feet long. They would be delivered to the site by trailers, each carrying one tower section. Large cranes would be brought on site to lift the multiple tower sections into place. The bottom section would be bolted to the circular ring(s) of anchor bolts on the foundation pedestal, and the upper sections would be sequentially bolted in place.

Following foundation construction, the nacelles, rotors and other components would be delivered to the tower locations. At each site the nacelle would be hoisted to the top of the tower by crane and bolted to the tower. The rotor hub and blades would be assembled on the ground, and the assembly would be lifted by crane and secured to the nacelle.

The permanent met towers would also be installed during this stage of the construction process. The tower components would be transported to the construction site in sections, hoisted by crane and anchored to the met tower foundations.

2.2.3.13 Final Grading and Restoration

Final grading of disturbed surfaces within the project area would occur following completion of the heavy construction activities, and any additional gravel needed would be placed on the project access roads. All areas temporarily disturbed by project construction would be restored to their original condition and reseeded with native vegetation. Areas subject to construction activity would be inspected for the presence of noxious weeds and treated as necessary. Long-term stormwater management and erosion control measures outlined in the WDOE stormwater manual would be implemented. A final site cleanup would be made before shifting responsibility for the project area to the project operations and maintenance crew, including collection and disposal of all construction debris and other waste materials that could not be reused. County roads would be restored to their pre-project condition, as determined through inspection by the Kittitas County Public Works Department.
2.2.3.14 Testing

Following completion of construction activities on the first group of wind turbines, approximately a month of testing would occur before commercial operation of the project would begin. Testing would involve inspections of the mechanical, electrical and communication systems to ensure they were working properly and performing according to their respective specifications. The testing process would include checks of each wind turbine and the overall project control system. Technicians qualified for the specific systems would perform all inspections.

2.2.3.15 Transportation and Access Management

Management of construction access and traffic would be a specific focus during the construction process, primarily because of the roadway and traffic considerations associated with transportation of construction materials and turbine components to the project area. Desert Claim, in coordination with the Kittitas County Community Development Services, Public Works and Sheriff’s Departments, the Washington State Department of Transportation and the Washington State Patrol, would develop a Construction Traffic Management Plan that would address transportation and access concerns during the construction period. The plan would define access routes and procedures to be used by various types of construction equipment and material shipments, approved hours of operation for construction traffic, safety provisions and other management requirements.

2.2.4 Operation and Maintenance

Desert Claim Wind Power LLC staff would operate and maintain the project once construction was complete and the project began commercial operation. Electricity generated by the project would be sold to power marketing entities, such as the Bonneville Power Administration; local and regional public utilities, such as the Kittitas County PUD and the Grant County PUD; and/or regional investor-owned utilities, such as Puget Sound Energy and Avista. Power from the project would ultimately be distributed by utilities to their customers. Section 2.2.4 summarizes the activities associated with long-term operation and maintenance of the Desert Claim Wind Power Project.

2.2.4.1 Functions

Long-term operation and maintenance activities for the project would include the following functions:

- round-the-clock monitoring of project output, the project’s safety and control system and the performance of individual wind turbines;
- controlling turbine operations as necessary to meet scheduled power deliveries and implement scheduled outages for scheduled turbine maintenance;
- performing periodic, routine testing and maintenance of the turbines as needed to maximize performance and detect potential mechanical difficulties;
- on-site repairs of project equipment in response to malfunctions or scheduled maintenance;
- patrolling the project area to ensure project security and monitor on-site conditions, including inspection for erosion, re-vegetation success, unauthorized uses and potential wildlife impacts;
- periodic maintenance of project access roads, including grading and application of additional gravel, as necessary; and
- implementing the project noxious weed control plan, in consultation with the Kittitas County Noxious Weed Control Board.
Through the life of the project, Desert Claim Wind Power LLC would follow a project operations and maintenance protocol that would specify the timing of routine turbine maintenance and inspection. Such a protocol typically adheres to a program developed by the turbine manufacturer, similar to the way automobile manufacturers define recommended maintenance. Scheduled maintenance would be conducted approximately every 6 months on each wind turbine. On average, each turbine would require 40 hours to 50 hours of scheduled mechanical and electrical maintenance per year.

Most servicing of the turbines would be performed within the nacelle via access through the tower, rather than using a crane to remove the turbine from the tower. The use of a crane and equipment transport vehicles for turbine adjustments, larger repairs or replacement of rotors or nacelle equipment would be needed on an occasional basis. Routine maintenance would include replacing lubricants and hydraulic fluids at specified intervals. The towers would need to be repainted on a longer-term periodic basis. All lubricants, hydraulic fluids, paints, solvents and other potential hazardous substances would be carefully stored, used and disposed of in accordance with applicable laws and regulations.

2.2.4.2 Work Force

The project would employ approximately 10 full-time staff for long-term operations and maintenance. This staff would include a project operations manager, technicians specializing in maintenance and repair of the turbines, and field staff responsible for other project functions. Most of the O&M staff could likely be hired from the local work force.

2.2.4.3 Access Management

All project access roads would be posted and maintained as private roads, with locked gates to minimize unauthorized access. Desert Claim would supply a limited number of access keys to emergency service providers to allow their use of the project access road extending east from Smithson Road to the eastern-most project area boundary for emergency access. Public roads within and adjacent to the project area would remain open to public use, as in their current condition.

2.2.4.4 Safety Measures

The wind turbines would be monitored continuously by a supervisory control and data acquisition (SCADA) system. Each turbine would be equipped with monitors that communicate operation conditions through communication lines (installed in the same trench as the power collection system). Alarm systems would be triggered if operational characteristics fell outside set limits. Each turbine would have an automatic braking system to shut down the rotor in the event of malfunctions or excessive wind speeds.

The turbines would use synthetic oil as a lubricant in the gearboxes and hydraulic fluid for the blade pitch actuators. Each turbine would contain approximately 80 gallons of oil. Turbine oil would be tested regularly and replaced as needed. Waste oil and fluid collected during maintenance would be transferred to an approved waste facility.

enXco has developed and implemented standard safety plans at the wind energy facilities that it operates. The safety plans include key components that are specific to wind energy facilities, such as fire safety and emergency tower rescue programs. These programs define hazards that could be present, prescribe procedures to be followed by operations and maintenance personnel, identify equipment needed to implement the programs, and specify applicable training requirements (enXco, 2001a, 2001b). These
safety plans would be employed for the Desert Claim project, with project-specific modifications as necessary.

2.2.4.5 Expected Operating Patterns

The Desert Claim wind turbines would not operate during all hours of the year because the wind does not blow at sufficient speeds to operate the turbines all of the time. Desert Claim collected nearly 3 years of meteorological data within the project area. These data were correlated with existing public data collected at Bowers Field. Based on the combined wind data, Desert Claim expects the project to operate approximately 60 percent of the time annually. Of the 8,760 hours in a year, the turbines are expected to operate approximately 5,300 hours, while during the remaining 3,500 hours the turbines would not be operating (i.e., the turbine blades would be idle and the generators would not produce electricity).

Based on recent historical wind data, the majority of the annual production from the project would occur from March through October. There are approximately 5,880 hours during this 8-month period. The turbines would likely be in production (i.e., the blades would be turning and producing some electricity) approximately 71 percent of the time during the spring-summer period, or approximately 4,170 hours. The turbines would be idle the remaining 29 percent of the time, or approximately 1,700 hours. Out of the approximately 2,880 hours in the fall and winter months from November through February, the turbines would be in production approximately 36 percent of the time (i.e., approximately 1,040 hours) and sitting idle the remaining 64 percent of the time (i.e., approximately 1,840 hours). During both periods of the year, the majority of the daily production and operation time would occur during daylight hours. Over the course of the year, two-thirds (67 percent) of the production and operation would likely occur from 7 a.m. to 10 p.m.

2.2.5 Decommissioning

Desert Claim Wind Power LLC proposes to operate the wind energy facility throughout the useful life of the project, which is assumed to be 30 years. New technology may become available for re-powering the project (replacing the generators and/or other major turbine components) at some time in the future. If Desert Claim decides to re-power the project, and re-powering was not permitted under the county-approved development agreement, Desert Claim would apply for all required environmental and permit reviews. At the time Desert Claim decides to terminate operation of the project, the project would be decommissioned. Decommissioning the project would involve removal of the wind turbine nacelles, blades, towers, foundations, cables, and other facilities to a depth of 4 feet below grade; regrading the areas around the project facilities; removal of project access roads (except for any roads that landowners wanted to remain); and final restoration of disturbed lands.

To ensure the future availability of resources needed for decommissioning, decommissioning funds in the form of a bond or corporate surety would be set aside as a specific project budget item. A set-aside guarantee bond or corporate surety would be executed on behalf of Desert Claim in favor of the County, with an independent administrator of such funds to cover all decommissioning costs. The guarantee bond or corporate surety would also name the project landowners as additional beneficiaries.
2.3 ALTERNATIVES TO THE PROPOSAL

2.3.1 Process for Identifying Off-Site Alternatives

This section describes Kittitas County’s approach to defining off-site alternatives for evaluation in the EIS. The County’s approach included four steps: (1) consideration of SEPA requirements for alternatives; (2) definition of site selection/suitability criteria, which are based on the physical, technological and practical requirements of wind power facilities; (3) site screening, which involved application of the site selection/suitability criteria to the characteristics of numerous potential sites; and (4) identification of sites that met the criteria and would be carried forward for more detailed consideration in the EIS. Kittitas County and its EIS consultants developed the criteria and site screening process in coordination with the Washington Energy Facility Site Evaluation Council (EFSEC). enXco and Desert Claim Wind Power LLC, the proponent for Desert Claim, and Zilkha Renewable Energy, the applicant for the Kittitas Valley and Wild Horse wind power proposals, provided information regarding potential sites. As lead agencies for SEPA compliance, both Kittitas County (Desert Claim) and EFSEC (Kittitas Valley and Wild Horse) intend to use the following discussion to document their consideration of alternative sites.

The analysis concludes that the potential alternative sites identified and reviewed in this draft EIS are not available or practicable to the Desert Claim applicant and, therefore, are not “reasonable alternatives” pursuant to SEPA. Nevertheless, two alternative sites (Whiskey Dick Mountain/Wild Horse and Springwood Ranch) are included and evaluated in the Draft EIS to provide decision makers with additional information about environmental impacts and to inform the decision making process.

2.3.1.1 SEPA Requirements

Kittitas County’s review process for wind power proposals requires approval of a site-specific rezone, a comprehensive plan land use map amendment, a development permit and a development agreement (KCC Chapter 17.61A). For private proposals that require a rezone, which applies to Desert Claim, the SEPA Rules require that an EIS consider alternative sites (WAC 197-11-440 (5)(d)). The purpose of considering off-site alternatives is to provide comparative environmental information to facilitate an informed decision concerning a proposal. Consideration of off-site alternatives is authorized, but not required, if other locations for the type of use proposed have not been considered in existing planning or zoning documents.

In general, alternatives considered under SEPA must be “reasonable,” which is defined in the SEPA Rules to mean that they can feasibly attain or approximate a proposal’s objectives at lower environmental cost (WAC 197-11-440 (5)(b)). The word reasonable also limits the number and range of alternatives, and the amount of detailed analysis required under SEPA (WAC 197-11-440 (b)(i-ii)). The lead agency may also limit alternatives to sites on which it has the authority to control impacts through the imposition of mitigation measures (WAC 197-11-440 (b)(iii)).

The applicant’s objectives are identified in Section 1.3 of the Draft EIS. They include developing a commercially viable wind energy facility with a total nameplate capacity of at least 180 MW and a maximum of 120 turbines, with associated project support facilities. To achieve this objective, the project site should be on large parcels and be free of significant environmental constraints, such as parks and recreation areas, and landowners must be willing to enter into long-term leases. Kittitas County’s objectives, identified in Section 1.4 of the Draft EIS and KCC 17.61A.010, include establishing a process to recognize and designate properties for wind power facilities in suitable areas of the County; to protect
the health, safety, welfare and quality of life; and to ensure compatible land uses in the vicinity of areas affected by wind farms.

Consideration of alternatives has been limited to sites within Kittitas County, based on the County’s authority to impose its adopted review process and to control direct and indirect environmental impacts (WAC 197-11-440 (b)(iii)).

2.3.1.2 Site Selection and Suitability Criteria

Site selection criteria were developed based on information provided by wind energy developers (enXco and Zilkha, 2003), and a review of published information regarding siting wind energy facilities (e.g., Wind Energy – How Does It Work, AWEA, 2002; 10 Steps in Building a Wind Farm, AWEA, 2002; Patrick Mazza, Wind: A New Economic Opportunity for Rural Communities, 2002; Basic Principles of Wind Energy Evaluation, AWEA, 1998; and Wind Energy Resources, National Wind Coordinating Committee, 1997). The objective of the research was to identify the actual, not hypothetical, criteria that are typically used by developers to identify and investigate potential sites and to determine their suitability for wind facilities. The following five key criteria were identified: (1) sufficient wind resource (the most important); (2) proximate/adequate transmission facilities; (3) large land area; (4) absence of significant environmental constraints; and (5) property owner interest. Each criterion is considered essential, and failure of a site with respect to any one criterion is considered to be a “fatal flaw” that would make a wind-power facility unfeasible at that site. The criteria are discussed further below; the experience of the Desert Claim and Zilkha proposals is used to provide context where appropriate.

(1) Sufficient wind resource. The most important criterion for siting a wind power facility is, of course, sufficient commercially viable wind. Sites that do not possess sufficient wind are not considered further by prospective developers, regardless of other characteristics. In Washington, sites with a minimum average wind speed of 13 to 17 miles per hour (Wind Classes 3-4) are desired to support a commercially viable wind energy facility. Given the current energy market conditions in the Northwest and the characteristics of current wind energy proposals, an average wind speed of 15 to 17 mph appears to be the lower range of economic viability for a site. Sites with average speeds greater than 17 mph (Wind Classes 5 and above) are most desirable, but such sites in Washington are generally found in areas not conducive to wind power development, including mountain peaks and off-shore in the Pacific Ocean. Since the energy that can be derived for power generation from the wind is proportional to the cube of the wind speed, even a slight increase in wind speed results in a large increase in energy production; this also results in a reduction in the production cost of electricity (AWEA, 2002). Developers typically rely on published wind energy maps to initially identify regions or large areas with sufficient wind resources. They then conduct more detailed site-specific meteorological (and environmental) studies, typically over 1 to 2 years. The Wind Energy Resource Atlas of the United States (U.S. Department of Energy, 1986) identifies the Ellensburg corridor as having Class 3, 4 and 5 winds. (Also see Northwest Sustainable Energy for Economic Development, 2003).

Both enXco and Zilkha conducted additional meteorological studies and site visual surveys to further narrow their search for potential wind energy facility sites in Kittitas County to between four and five areas/sites with sufficient wind resources. Once a potential site/area was identified, meteorological data were used, along with information on natural conditions and environmental features, to determine an optimal configuration of wind turbines. A computer model aids in this siting process for each individual turbine (referred to as “micro-siting”) for a specific potential project site.
(2) **Proximity to existing transmission facilities with adequate capacity.** Wind energy projects must connect to an electric transmission line to deliver power to the regional power system. The most important transmission-related factors considered by developers in project location decisions are the adequacy of existing transmission facilities (i.e., the availability of unused capacity on existing lines), and the distance from the project site to a transmission line. The need to either upgrade a regional transmission facility or build an off-site project transmission line more than about 10 miles (or less, depending upon the capacity of the project) to interconnect to an existing line can make a site financially infeasible. Interconnection agreements with the utility that owns the transmission line(s) are typically negotiated during development of the wind project and after the land is secured.

Existing transmission facilities located in the northern portion of the Kittitas Valley are owned and operated by the Bonneville Power Administration (BPA; five 230 kV to 500 kV lines and one 115 kV line) and Puget Sound Energy (PSE; one 230 kV line and one 115 kV line). Transmission lines at voltages below 115 kV are not adequate for connection of wind energy projects generating over 100 MW of electricity.

(3) **Large land area.** Some of the factors that bear on the size of a site needed for wind energy facilities include the size of the project (in terms of power output and the size and number of turbines); separation between turbines to ensure safety and efficient operation; dispersed population; a prevalence of rural/agricultural activities (to minimize potential land use conflicts); sufficient setbacks from nearby residences, structures and public roads (to minimize potential environmental impacts); and large undivided parcels of land (greater than 100 acres). These criteria generally translate into project sites encompassing approximately 5,000 ± acres of land for a 180 MW wind project. However, developers typically begin their search by investigating very large study areas covering many thousands of acres (e.g., 20,000-50,000 acres or larger), and gradually focus in on a more defined area. In practice, a developer may be actively and simultaneously considering, and applying the criteria to, several potential sites within the larger area.

The Desert Claim (enXco) and Kittitas Valley (Zilkha) proposals each involve approximately 120 turbines producing roughly 180 MW of electric power. Each developer independently defined an initial study area that included the entire Kittitas Valley (extending generally from Lookout Mountain on the west to the Columbia River on the east, and between the National Forest lands to the north and approximately Interstate 90 to the south). Each also conducted the studies necessary to determine desirable sites within this search area, then began to focus on smaller areas.

(4) **Absence of significant environmental constraints.** Wind energy developers try to avoid sites with significant environmental constraints. The presence of constrained areas can increase construction costs and make permitting more complex, time consuming and uncertain. At the level of determining general site suitability and feasibility studies, characteristics taken into account include the presence of parks or designated recreational lands, wildlife refuges, prevalent wetlands and/or sensitive habitat/species, significant cultural and archaeological resources, and conflicting land uses. Qualified developer personnel and consultants identify these resources through research of published sources, on-site investigations and discussions with resource agency staff.

(5) **Property owner interest/property availability.** Wind energy facilities are typically constructed on lands leased from property owners. As a practical matter, property owner support, responsiveness and willingness to enter into long-term leases are essential preconditions to gaining the ability to propose a wind facility on a particular site. As to a particular private applicant (whether enXco or Zilkha in an individual case), a site that is not actually available for use would not meet that proposal’s objectives and
would not, therefore, be a real or "reasonable alternative" (as defined in the SEPA Rules) as to that applicant. As discussed previously, comparative environmental information about such sites may nevertheless be of use to decision makers, and may be included in an EIS.

2.3.1.3 Site Screening Process

The criteria identified above were applied to areas/sites within the Kittitas Valley. Sites located outside Kittitas County were not considered to be “reasonable alternatives” per WAC 197-11-440 (b)(iii), and were not considered for evaluation in the EIS.

Four broad geographic areas, shown in Figure 2-14, were defined for investigation: west of Highway 97, east of Highway 97, Whiskey Dick Mountain, and south of Whiskey Dick/Boylston Mountains. These areas coincide with those identified in published information (e.g., the U.S. Department of Energy’s Wind Energy Resource Atlas) as having potentially viable wind resources. These areas were explored by both enXco and Zilkha to identify the sites of their respective proposals. Characteristics of each area relative to the site selection and suitability criteria are summarized below.

**West of Highway 97**

The area west of Highway 97 contains four potential sites of interest for wind energy development – Springwood Ranch, the land south of Lookout Mountain, Manastash Ridge and a site (located both east and west of Highway 97) recently proposed for development as a wind farm by Zilkha Renewable Energy (the Kittitas Valley Wind Power Project).

**Springwood Ranch**

The Springwood Ranch is an approximately 3,600-acre property that has been proposed or considered for development several times over the past 15 years. A conceptual master plan for a resort on this site was developed in the late 1980s, but an application for development was never submitted. The site was considered as an off-site alternative for the MountainStar Master Planned Resort and was evaluated in the EIS for that proposal (Kittitas County, 1999).

The Springwood Ranch site satisfied some but not all of the site selection criteria for a wind energy facility, and thus does not qualify as a "reasonable alternative." Sufficient wind resource is present, the site is in single ownership and environmental constraints are not extreme. However, transmission facilities are not currently accessible to the site. Site size, configuration and terrain would also likely limit the number of turbines that could be sited; consequently, the amount of power that could be produced falls well short of the proponent’s objective as stated in Section 1.3. The property owner, a foreign corporation, did not support wind power and was not interested in discussing leasing to accommodate a wind power facility. The site would not, therefore, meet the proponent’s project objectives. Nevertheless, this site is evaluated in the Draft EIS to provide comparative environmental information to decision makers and the public.

**South of Lookout Mountain**

The area south of Lookout Mountain includes approximately 2,600 acres of the Swauk Valley Ranch. Sufficient wind resource is present and environmental constraints are not extreme. In 2001, enXco evaluated this area and met with a group of local property owners. This site failed the site selection criteria because the property owners were not interested in participating in a wind energy project.
Figure 2-14

Areas Investigated for Wind Energy Development
Manastash Ridge

The Manastash Ridge area, south of I-90 and west of the Yakima River, also has sufficient wind resource to be of interest for development. Much of this area consists of the L.T. Murray Wildlife Recreation Area, however, which encompasses approximately 106,000 acres and is managed by the Washington Department of Fish and Wildlife (WDFW). Adjacent lands include the Wenatchee National Forest on the west and the Oak Creek Wildlife Area (also managed by WDFW) on the south. The significant wildlife values and recreational use of this area would not satisfy the siting criteria related to environmental constraints. Also, this area is not adjacent to adequate transmission lines, and any project located in this area would require construction of a relatively long off-site project transmission line to reach existing transmission lines.

Kittitas Valley Site

The Kittitas Valley site is located both west and east of Highway 97. It met all defined criteria for site suitability. On January 13, 2003, Sagebrush Power Partners LLC (2003), a company wholly owned and managed by Zilkha, submitted an Application for Site Certification to the Washington Energy Facility Site Evaluation Council (EFSEC). The proposal is for approximately 120 wind turbines (at 1.5 MW each) producing a total of 180 MW of power, located on approximately 5,000 acres in mostly larger parcels. That application was the subject of an EFSEC land use hearing in May 2003. EFSEC is lead agency for an environmental impact statement, which was issued on December 12, 2003.

Given that the Kittitas Valley site is the subject of an active application by another wind developer (who has exclusive rights to wind energy development on the site through agreements with landowners), the site is not available to EnXco, does not meet their proposal’s objectives, and is not a practical or reasonable alternative. There were two additional reasons for not evaluating this alternative in the Desert Claim Draft EIS. First, the Draft EIS for the Kittitas Valley Wind Power Project was not issued at the time the Desert Claim Draft EIS was being prepared; the Kittitas Valley Draft EIS was issued on December 12, 2003, while the Desert Claim Draft EIS was issued on December 15, 2003. Thus, both EISs were available for review contemporaneously. Decision makers and the public, therefore, had the ability to review environmental information about the Kittitas Valley site and compare it to the Desert Claim, albeit in a separate document. The purpose of considering off-site alternatives in the context of SEPA was therefore satisfied. Second, the cumulative effects of the Kittitas Valley project are considered (along with those of the Wild Horse proposal) throughout this EIS. Decision makers and the public therefore, had ample information about the Kittitas Valley site and proposal, considered both as an individual project and in combination with other proposed wind facilities in Kittitas County.

East of Highway 97

The area east of Highway 97 generally satisfied all suitability criteria for wind energy development. Both EnXco and Zilkha identified respective sites (or portions of sites) within this area, and developed wind power proposals based on those sites.

A portion of the Kittitas Valley site, discussed previously, is located east of Highway 97. The Desert Claim site, proposed by Desert Claim Wind Power LLC, a Washington company wholly owned and managed by EnXco, is located approximately 8 miles northwest of Ellensburg. Desert Claim Wind Power LLC submitted an application for development of a wind energy facility on this site to Kittitas County in January 2003. The proposal is for a maximum of 120 wind turbines (at 1.5 MW each) producing a total of at least 180 MW of power, located on approximately 5,237 acres of privately-owned land in eight parcels.
Whiskey Dick Mountain

This is a large area east of Ellensburg and north of I-90, centered on Whiskey Dick Mountain. The area east and northeast of Whiskey Dick Mountain contains the Schaake, Quilomene and Colockum Wildlife Areas. The ownership of these lands by WDFW and potential conflicts with wildlife and recreational values of these lands could make them unsuitable for wind energy development. The area west of Whiskey Dick, which quickly drops to the Valley floor, shows a poor wind resource, making it not commercially viable based on historic met data for this area.

An area of approximately 26,000 acres centered on Whiskey Dick Mountain is owned by two parties controlled by the same group. This area contains sufficient wind resource, has adequate transmission facilities near the site, and is not characterized by wildlife area lands or readily apparent major environmental constraints. Zilkha Renewable Energy executed an agreement with owners of approximately 8,000 acres within this area and, through its wholly owned company, Wind Ridge Power Partners LLC, submitted a request for a Potential Site Study to EFSEC in July 2003. The proposal (as defined at the time) would include approximately 110 to 120 wind turbines and would generate approximately 180 MW of power.

South of Whiskey Dick/Boylston Mountains

The Boylston Mountains area, which is south of Whiskey Dick Mountain and east of the Yakima River, has sufficient wind resource but is comprised of lands that do not satisfy criteria related to land use or environmental constraints. The large area between the Yakima River and the Columbia River consists primarily of the Yakima Training Center, a federal military reservation administered by the U.S. Department of Defense and actively used for military training. Construction and operation of a wind farm in the Boylston Mountains would conflict with ongoing military operations on these lands and would not be allowed by the Defense Department.

2.3.1.4 Sites Carried Forward for Detailed Consideration

Based on the foregoing site screening process, two sites were selected for consideration in the EIS as off-site alternatives for the Desert Claim proposal – the Wild Horse (Whiskey Dick Mountain) and Springwood Ranch sites. The objective of considering these sites in the EIS is to provide decision makers and the public with comparative information about environmental impacts. This screening process is not intended to suggest that these are the only sites in Kittitas County with the potential for wind power development. Future proposals, if any, would not be limited to the sites identified herein.

As noted previously, neither of these sites is a practical, reasonable alternative that is available to enXco. The Wild Horse site is proposed for development by Zilkha Renewable Energy; a request for a Potential Site Study was submitted to EFSEC by Zilkha in July 2003. The Springwood Ranch site lacks accessible, adequate transmission facilities and it does not meet the proponent's objectives because it will not support a 180 MW project due to site size, configuration and terrain constraints that limit the number of turbines that could be located on this property. Also, the owner of the Springwood Ranch expressed lack of interest in discussing wind power development with enXco.

Information regarding existing conditions and potential impacts for the Wild Horse site is based on preliminary studies prepared by Zilkha, documentation that Zilkha submitted to EFSEC in conjunction with the potential site study request, and the potential site study released by EFSEC in October 2003.
Similar information regarding the Springwood Ranch site is based largely on information contained in the MountainStar EIS. Information concerning the Kittitas Valley Wind Power Project is being published in a Draft EIS contemporaneous with the publication of the Desert Claim EIS; it will, therefore, be available for consideration by decision makers. The Kittitas Valley Wind Power Project is included in the discussion of cumulative impacts contained in this Draft EIS.

### 2.3.2 Alternative Sites Selected for EIS Analysis

As indicated in Section 2.3.1.4, Kittitas County elected to consider two off-site alternatives to the Desert Claim proposal in this EIS. This was done to meet the objective of providing decision makers with comparative information about potential environmental impacts, pursuant to the SEPA Rules. To achieve this objective, these alternatives are defined as the development of equivalent (to the extent possible) wind energy projects at plausible locations other than the Desert Claim project site. This section provides a summary description for such wind energy project development at the two selected alternative sites. Because wind turbines and associated project facilities at each site would be configured according to the wind, terrain, access and other pertinent conditions present at each site, a conceptual project layout for each site is included in the project description for the alternative. Except as specifically noted below, the project facilities, construction process and operations and maintenance program for these alternatives would be as described in Section 2.2 for the Proposed Action.

#### 2.3.2.1 Alternative 1: Wild Horse Site

Because there is an existing proposal for wind energy development at the Wild Horse site, the project description for Alternative 1 is based on the Zilkha/Wind Ridge Power Partners LLC proposal for the Wild Horse Wind Power Project, as submitted to EFSEC in July 2003. (The October 2003 potential site study for this proposal indicates the EFSEC EIS will actually consider a range of turbine numbers and capacities for the Wild Horse project, but such a range is not reflected in the description for Alternative 1.) A graphic of the proposed layout for the Wild Horse project is included in this EIS, courtesy of Zilkha, as Figure 2-15.

**Location and Site Characteristics**

The Wild Horse Wind Power Project is proposed on a site of approximately 5,000 acres located about 10 miles east of the town of Kittitas, on the eastern slopes of Whiskey Dick Mountain. Except for Whiskey Dick Mountain, much of the site consists of a relatively flat plateau with steep-sided drainages. Several creeks originate on the site (Whiskey Dick, Skookumchuck and Whiskey Jim); several other creeks and their tributaries are located on or near the project site. The majority of the site consists of shrub-steppe habitat. No wetlands occur on the site, according to National Wetland Inventory (NWI) maps.

The proposed project area is zoned Forest and Range. It consists of open range land that is currently used for grazing. There are no residences on the project site, and none within 2 miles of any proposed turbine location. The area surrounding the Wild Horse site is sparsely populated. The proposed route for the transmission feeder line passes near a few residences.

The Wild Horse project area (as proposed by Zilkha) includes three parcels of State-owned land administered by WDNR and totaling approximately 1,900 acres. Wind turbines and associated facilities would be developed on these lands, through a lease agreement with WDNR. Vehicle access to the site is via private road from Old Vantage Highway, at a point approximately 2 miles south of the project boundary and 10 miles east from Kittitas.
Figure 2-15
Project Layout for Alternative 1: Wild Horse Site
Wind Power Facilities

The presumed configuration of wind turbines on the Wild Horse site, as defined for Alternative 1, is shown in Figure 2-15. The proposal would include approximately 122 wind turbines, each with a nameplate capacity of 1.5 MW, and associated facilities. The proposal would generate up to approximately 183 MW of power. (The potential site study prepared for EFSEC [Jones and Stokes, 2003] indicates the project could actually involve from 83 to 125 turbines and a capacity ranging from 125 MW to 249 MW. To avoid unnecessary complexity, Alternative 1 for the Desert Claim EIS is defined by the 183-MW project described in the July 2003 submittal to EFSEC.) Facilities and construction techniques would generally be as described in Section 2.2 for the Proposed Action. The project would interconnect to either the existing BPA transmission line located approximately 4 miles west of the project site, or to the existing PSE transmission line located approximately 5 miles southwest of the project site. (If the interconnection were to the BPA system, the actual point of connection would be at the Schultz Substation farther to the northwest, although the BPA would build and operate the new section of line that would run parallel to the existing lines.)

The location of the project substation would depend upon the transmission system selected for interconnection, pursuant to an agreement with BPA or PSE. Figure 2-15 shows two potential substation locations. A location near the northwestern corner of the project site would be used for the substation if interconnection were to the BPA transmission system, while a substation location in the southwestern quadrant of the site would be used for a PSE interconnection. An operations and maintenance facility would be constructed near the center of the project area.

A network of graveled project access roads would be constructed to provide vehicle access to all of the turbine locations, as described for the proposed action. Minor or major improvements to existing primitive roads on the site would be implemented where possible, to minimize construction of new roads. Figure 2-15 shows the configuration of the project road system in relation to the turbines and other project facilities. Power collection cables (primarily underground) would generally follow the routes of the project access roads. Five permanent met towers and a communications tower would be constructed at various locations on the project site.

Construction for the proposed Wild Horse project would occur over a 9-12 month period and is expected to be completed by the end of 2005. Gravel and other material needed for project construction (for roads, pads, etc.) would be obtained from three quarries developed on the site. Figure 2-15 shows the location of a temporary batch plant that would be built to provide concrete for the project. Five construction laydown areas would be developed for temporary use.

The total area occupied by the turbines and associated permanent facilities would be approximately 130 acres. The total area cleared/temporarily disturbed by construction activities would be approximately 300 acres. Once construction was completed, an estimated 10 to 14 local workers would be employed to operate and maintain the facility.

2.3.2.2 Alternative 2: Springwood Ranch Site

Although wind energy companies have investigated the prospects for wind energy development in the Springwood Ranch area, there has been no specific proposal for a wind energy project on this site. The project description for Alternative 2 is based on a conceptual layout for a wind power project on the Springwood Ranch site that was prepared by enXco, at the County’s request, specifically for use in this...
EIS. A graphic of this conceptual layout is included as Figure 2-16. Because this site would not represent a viable or reasonable alternative to the Desert Claim site for enXco, Kittitas County has not requested enXco to prepare complete plans for a hypothetical project on this site. Therefore, Figure 2-16 identifies wind turbine and met tower locations, but does not include locations for access roads, power collection cables, a substation, an operations and maintenance facility, or a transmission interconnection. These facilities would be required for a wind power project at this site, and their characteristics would be similar to those defined in Section 2.2 for the same components of the proposed action.

**Location and Site Characteristics**

Springwood Ranch is an approximately 3,610-acre site located approximately one-half mile northwest from the town of Thorp and 10 miles northwest of Ellensburg. It is bounded by I-90 (or Thorp Prairie Road) on the south, and the Yakima River on the north. The western end of the property abuts the Sunlight Waters community, in the Elk Heights area. The Iron Horse State Park/John Wayne Trail runs adjacent to or through the northern and eastern edge of the site. The northern boundary of the L.T. Murray Wildlife Recreation Area, managed by WDFW, is located near the site but south of I-90.

The surrounding area is primarily rural/agricultural (designated Forest Multiple Use and Agriculture in the Kittitas County Comprehensive Plan, and zoned Agriculture-20 and Forest and Range). A small cluster of commercial uses is located at Thorp (designated an Urban Growth Node (UGN) in the Kittitas County Comprehensive Plan). A ranch house and several accessory structures are located on-site.

The topography of most of the site is gently rolling, but gives way to steep bluffs along a narrow canyon that contains the Yakima River in this location. Taneum Creek runs in a southwest/northeast direction through the eastern one-third of the site. The predominantly upland terrain on the site drops approximately 200 feet to the valley along Taneum Creek, causing a wind shadow over the eastern third of the property. Vegetation is predominantly shrub-steppe and grazed grasslands. Alfalfa and hay are grown on the site. National Wetland Inventory (NWI) maps identify 20 wetlands on the site, ranging in size from less than 3 acres to 8 acres. Most are associated with irrigation channels or excavated ponds.

Habitat on the site would support animals adapted to open grasslands or the ecotone between forest and grasslands. The Yakima River in this vicinity supports spring chinook salmon. Several species of trout, including bull and steelhead, have been reported. Lower Taneum Creek has historically been used by resident trout and anadromous fish for spawning and rearing. Taneum Creek is listed as “water quality limited” (for temperature and instream flow) under Section 303(d) of the federal Clean Water Act.

**Wind Power Facilities**

Based on site size, meteorological conditions and topography, and assuming the same sized turbines and approximate spacing between turbines as for the Proposed Action, the Springwood Ranch site could accommodate approximately 40 to 45 turbines; Figure 2-16 shows locations for 43 turbines. A smaller or greater number of turbines could potentially be accommodated based on micro-siting. Using a 1.5 MW turbine, this number of turbines would generate approximately 64.5 MW of electric power, which is less than half of the capacity of the Proposed Action.
This reduced scale raises questions whether this could be a commercially viable site; in any case, it is below the applicant’s objectives for a wind power facility (i.e., at least 180 MW) and less than the quantity of wind energy that is currently being sought by regional utilities PSE and PacifiCorp (150 MW and 100 MW, respectively). Connection to transmission facilities (for the BPA lines) would require building a transmission line approximately 5 miles long, including crossing the Yakima River. Easements would also need to be acquired to travel across private properties located between the project site and the transmission line.

Other project facilities and construction techniques would be the same as described for the Proposed Action. The project substation would be located on the property, while a switchyard would be located at the interconnect point. Project access roads would be similar in design to the proposed action, but would be proportionally less in terms of total distance and disturbance. Based on the corresponding unit factors for the various project components addressed in Section 2.2, the total area disturbed by construction for Alternative 2 would be approximately 125 acres. The total area permanently occupied by project facilities in this case would be approximately 30 acres. The labor force required for construction and for long-term operation and maintenance of a 65-MW wind project on the Springwood Ranch site would be less than for the Proposed Action, but the specific numbers or differences have not been estimated.

2.3.3 No Action Alternative

The No Action Alternative implies a decision by Kittitas County not to approve the application for the Desert Claim Wind Power Project. Under the No Action Alternative the proposed Desert Claim Wind Power Project and all associated features including the turbines, access roads, utility trenches, and substations would not be constructed. There would be no environmental impacts from development of the wind power facility within the Desert Claim project area. The No Action Alternative would eliminate the local economic effects for Kittitas County and nearby communities in the form of lease payments, tax revenues and opportunities for employment resulting from this proposal.

Under the No Action Alternative, on-site agricultural and rural residential activities would continue for the foreseeable future; current Ag-20 and Forest and Range zoning would likely continue. The potential for residential development in the project area, to the extent permitted by existing zoning, and the potential for conflicts with existing agricultural activities, would continue. For the approximately 4,000 acres zoned as Ag-20, the potential exists for development of up to 400 residential lots over this area. Conversion to rural residential uses could displace existing uses and affect rural character over time.

The No Action Alternative evaluated in this EIS is specific to the Desert Claim proposal and does not apply to any other current or potential future proposals for energy generation. Under the No Action Alternative there would be no contribution to new electrical generation from the Desert Claim Wind Power Project in response to identified electric power demands in the Pacific Northwest and adjoining regions. Other energy generation projects, using wind and other energy resources and involving other sites in Kittitas County and elsewhere in the region, have recently been proposed and could be pursued in response to a portion of those demands. The No Action Alternative for the Desert Claim project does not include or preclude any specific action with respect to those existing proposals or similar proposals that might occur in the future.
2.4 ALTERNATIVES NOT CONSIDERED IN DETAIL

2.4.1 Alternative Site(s)

Section 2.3 discusses the process used to identify alternative sites for evaluation in the EIS. This process resulted in identification of two action alternatives based on sites other than the project area proposed by Desert Claim. The discussion references other areas of Kittitas County that initially may have been considered as candidates for wind energy development, but were not selected for evaluation based on one or more of the site screening criteria. These other sites represent alternatives not considered in detail.

2.4.2 Alternative Generation Technologies

As discussed in Section 2.1.3, wind energy technology has evolved considerably over the past several decades. Various types of wind turbines have been employed to generate electricity on an experimental or a commercial basis. The applicant proposes to use three-bladed, horizontal-axis rotors mounted on the upwind side of the turbine. Other turbine configurations that have been used in the past include vertical-axis turbines (also known as the “eggbeater” design, such as the demonstration model that has been inactive on the Springwood Ranch property for several years), turbines with two-bladed rotors, and turbines with rotors mounted on the downwind side of the turbine. Desert Claim believes that the turbine technology proposed for the project is the most reliable, efficient and commercially viable wind energy technology available. Information readily available within the industry likewise indicates the three-bladed, horizontal, upwind turbine is the most proven design and is the current industry standard. Consequently, Kittitas County concluded that it would not be necessary or appropriate to include detailed evaluation of alternative types of wind turbine technology in the EIS.

The applicant proposes to use 1.5-MW wind turbines for the Desert Claim project. Larger turbines up to a capacity of at least 3 MW are currently available, as are smaller units; turbines with a capacity ranging from approximately 500 to 750 kW have been used in a number of relatively recent wind power developments. The potential use of larger (3-MW) turbine units is currently being evaluated in the EIS for the Kittitas Valley Wind Power Project proposed by Zilkha Renewable Energy (EFSEC, 2003). Because the Kittitas Valley EIS will provide an indication of the relative tradeoffs in environmental impacts through use of larger turbines, there is no need to evaluate the possible use of larger turbines for the Desert Claim project. Use of smaller turbines in the 500 to 750 kW range would result in a greater area of disturbance, a larger project footprint, approximately twice the number of turbines and a greater overall level of environmental impact for the same amount of power. Consequently, it is not necessary to evaluate the use of different turbine sizes in the EIS.

2.4.3 Alternative Transmission Interconnections

Desert Claim Wind Power LLC has indicated that it might deliver electric power from the proposed project to existing transmission lines operated by the Bonneville Power Administration or Puget Sound Energy. Determination of which transmission system would be used for the project interconnection would depend on the outcome of power sales contract negotiations. Interconnections with both the BPA system and the PSE system are evaluated in the Desert Claim EIS. The prospective connection points represent the shortest links from the project to each transmission system, and the routes for those connections would not involve unusual or notable environmental impacts. Therefore, use of alternative transmission interconnections would not result in lower environmental impacts, and there is no need to evaluate alternative transmission interconnections in the EIS.