Appendix A **Cumulative Impacts Analysis For Avian Resources From Proposed Wind Projects In Sherman County, Washington**

CUMULATIVE IMPACTS ANALYSIS FOR AVIAN RESOURCES FROM PROPOSED WIND PROJECTS IN SHERMAN COUNTY, WASHINGTON

FINAL REPORT

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION AND BACKGROUND

In recent years there has been a surge of interest in wind power development in Sherman County, Oregon. A central issue for wind power developments is the potential impacts to avian resources, and in particular direct impacts such as avian fatalities. Wind power proposals are commonly reviewed by natural resource agencies and private conservation groups. Frequently, baseline studies are conducted that are designed to estimate avian use and occurrence at proposed development sites and gather site specific information used in the overall impact assessment and siting of the project.

Currently, at least two different developers have constructed and/or propose construction of several wind projects in Sherman County. The projects include: (1) the Klondike Wind Projects, which include three phases Klondike I, II (KIWP), and III (KIIIWP); and (2) the Biglow Canyon Wind Project (BCWP), which also included study on a Reference Area (BCRA) (Figure 1). Details of the individual wind projects such as the number and size of turbines, turbine locations, roads, and project timing can be found in the various permitting documents. Provided all the proposed projects are constructed, Sherman County could support up to 440 turbines and produce up to 690 MW of energy. The actual number of turbines developed could vary based on a number of factors including turbine model selected, electricity markets, transmission constraints, and results of site surveys and permitting requirements.

The total study area using the lease area boundaries of the three projects is approximately 41,345 acres (64.6 mi^2). The total study area used in the analysis was larger than this due to the Biglow Canyon reference area to the south of the proposed wind projects (see Figure 1). Over the past four to five years the avian resources at each of these sites has been studied using fairly detailed sampling protocols. A one-year baseline study for the KIWP which included the area for Klondike Phase II was completed in April 2002 (Johnson et al. 2002). A one-year fatality monitoring study was conducted at the KIWP turbines in 2002 (Johnson et al. 2003). The KIIIWP site was studied from November 2004 to May 2005 (Mabee et al. 2005). Studies of the BCWP and BCRA sites took place from March 2004 to March 2005 (WEST 2005). While the three studies varied in duration, year, and location, similar field survey methods were used for the avian surveys providing comparable data from each site. Point count stations were established on all four sites from which approximately weekly surveys were conducted during the respective study periods. Detailed descriptions of the methods and data analyses for each project-specific study are reported in the respective baseline study reports (see Johnson et al. 2002, Mabee et al. 2005, and WEST 2005).

To supplement the environmental impact analysis being conducted by BPA for their decisions in the Klondike III and Biglow Canyon projects, it was determined that a cumulative effects analysis that incorporated all the avian survey data conducted for the various projects would be useful. Because all the projects are relatively close together (see Figure 1), it could be reasonably argued that once all the projects are complete, northern Sherman County will host one very large wind project. This cumulative effects analysis takes the general approach of considering the data from the individual projects and combining them as they were one large project. Because the surveyed areas are relatively close together (Figure 1), the predominant vegetation type for all projects was cultivated agriculture (see below), and the avian survey data

was all collected using similar methods, the analysis treats all of the studies as one to estimate impacts and risk to avian resources. This report provides this cumulative effects analysis for avian resources. In addition a summary of impacts to bats from other wind projects that have been monitored is included that provides a basis for a cumulative effects analysis for bats.

2.0 METHODS

This report is intended to provide a broader analysis utilizing the combined data sets from all four project areas and thus provide a cumulative impact analysis of potential impacts to avian resources. This report does not reiterate results from the individual project reports. Additional details about each study, results and methods of the data analyses, and an estimate of potential avian impacts from each individual project are provided in the project specific reports. The data sets analyzed in this report were all collected using similar methods, and were collected from the same general geographical area (northern Sherman County), which provides a useful basis for the cumulative effects analysis presented in this report.

The general approach was to combine the data sets from the individual projects as if the four combined project areas were one large project. The results of this analysis could then be used in the impact assessment for all the projects combined. For this report, when more than one data set existed for a season, each data set was analyzed separately and then averaged for that season. For the flight height and exposure index tables, the four data sets were combined into one database. The overall use estimates and exposure indices are used to estimate potential impacts for all the projects combined based primarily on other monitoring studies within the northeast Oregon and southeast Washington region.

To standardize the data for comparison between sites, points, seasons, and other studies; avian use, frequency of occurrence, and species composition were calculated from observations within 800 m (~1/2 mile) of the survey point. Avian use by species was calculated as the mean number of observations per 20-minute survey[1]. Because individual birds were not marked, counts do not distinguish between individuals; rather, they provide an estimate of avian use of the study area. For example, if one red-tailed hawk was observed during five surveys, it is unknown if this was the same bird seen five times or five different birds seen once. Use estimates provide an index of the relative abundance of a species in the study area and therefore the risk of that species being affected by the proposed project. Because of this, references to abundance are use estimates and are not absolute density or numbers of individuals. Species composition is represented by the mean use for a species divided by the total use for all species and multiplied by 100 to provide percent composition. Frequency of occurrence was calculated as the percent of surveys where a particular species was observed.

[1] Fixed-point surveys at KIWP, BCWP, and BCRA were conducted for 30 minutes. For the purposes of this report and analysis, the surveys were standardized to a 20-minute count for all project sites and only those observations recorded within the first 20 minutes of the observation period were included.

2.1 Study Area

The data included in the analyses were from the following studies:

- Klondike I and II (KIWP): bird surveys conducted from April 2001 to April 2002 (Johnson et al. 2002)
- Klondike III (KIIIWP): bird surveys conducted between November 2004 and May 2005 (Mabee et al. 2005)
- Biglow Canyon (BCWP): bird surveys conducted between March 2004 and March 2005 (WEST 2005)
- Biglow Canyon Reference Area (BCRA): bird surveys conducted between March 2004 and March 2005 (WEST 2005)

For each of the individual study areas the predominant vegetation type was agriculture. The Biglow Canyon project area was described as greater than 90% cultivated agriculture (WEST 2005). The Klondike project areas were also primarily agriculture and described as having very little acreage of native plant communities (Mabee et al. 2005, Johnson et al. 2002). Throughout the entire study area there are some fields of Conservation Reserve Program (CRP) land which are generally previously cultivated areas that have been seeded back to grasslands to minimize soil erosion. For all projects, nearly all the turbines will occur in either cultivate agriculture (mostly wheat) or CRP pastures.

3.0 RESULTS

While the dates of surveys varied among the studies, all of the data sets are fairly contemporary and provide replication for the different seasons within the last five years. In addition, the study areas are located within a contiguous block of land with similar vegetation types and habitat. Over all, the combination of the data sets are believed to provide a reasonable picture of the bird resources throughout the agriculture setting of northern Sherman County.

3.1 Avian Fixed-point Surveys

The KIWP (Klondike I and II) surveys were conducted at 7 fixed-point count stations located within the study area (Figure 1). For the KIIIWP, surveys were conducted at 16 fixed-point stations (Figure 1). For the BCWP and BCRA, surveys were conducted at 22 fixed-point stations, 9 within the study area (BCWP) and 13 south of the study area in the reference area (BCRA) (Figure 1). At each site, each point was surveyed on an approximately weekly basis during the respective study periods but some surveys were missed due to bad weather. For all of the sites, a total of 1,195 individual 20-minute point count surveys were conducted.

For all study areas combined, a total of 75 avian species and an additional 13 unidentified bird types (best possible identification, e.g., unidentified buteo) were observed during the fixed-point surveys (Table 1). Over all studies, 25,262 total observations in 3,612 different groups[2] were recorded during the fixed-point surveys (Table 1). These are raw counts of observations, that are not

[2] Group is defined as an observation of a species of bird regardless of number seen together. For example, a flock of eight American robins flying together is considered a group as well as an individual robin observed by itself.

standardized by the number of hours of observation, but do provide an overall list of what was observed. These counts likely contain duplicate sightings of the same birds. Of the 75 avian species recorded (Table 1), six species were only observed during the last ten minutes of surveys for KIWP, BCWP, or BCRA and, because the analyses are based on a standardized 20-minute point count survey, these six species do not factor into the remainder of the analysis. In most cases, only a few individuals or groups of these species were observed and it is unlikely that they would be at risk due to very low use of the project areas.

Over all three studies, passerines were by far the most numerous group comprising approximately 76.1% of all groups and 66.4% of all birds observed. For all of the study areas, horned lark (*Eremophila alpestris*) was the most numerous passerine observed, followed by unidentified blackbirds, European starling (*Sturnus vulgaris*), and western meadowlark (*Sturnella neglecta*). Raptors comprised approximately 16.1% of all groups but only 2.4% of all birds observed. For all study areas, red-tailed hawk (*Buteo jamaicensis*), rough-legged hawk (*Buteo lagopus*), and northern harrier (*Cyanus circus*) were the most common raptors observed. Waterfowl comprised 2.67% of all groups and 29.1% of all birds observed. Canada goose (*Branta canadensis*) was the most common waterfowl species seen in the fall and winter in large flocks. Upland gamebirds comprised 2.9% of all groups and 0.9% of all birds observed; doves/pigeons comprised 1.5% of all groups and 0.6% of all birds observed; and waterbirds, shorebirds, other birds, unidentified birds, and coots each comprised less than 1% of all groups and all birds observed. Within these groups the more common species seen were ring-necked pheasant, mourning dove, and sandhill crane (Table 1).

3.1.1 Avian Use

Use was calculated by season and over all surveys (Table 2). For spring, based on an average use across the four areas, the five most abundant species in the study area were horned lark (3.223 detections/20-minute survey), western meadowlark (1.308 detections), European starling (0.319 detections), Brewer's blackbird (*Euphagus cyanocephalus*) (0.285 detections), and American goldfinch (*Carduelis tristis*) (0.267 detections). Together these species comprised 76.5% of the total bird use during the spring (Table 3).

During the summer, the five most abundant species were horned lark (2.008 detections/survey), western meadowlark (0.483), barn swallow (*Hirundo rustica*) (0.285), red-winged blackbird (*Agelaius phoeniceus*) (0.248), and European starling (0.175). These species comprised 72.6% of the total bird use during the summer (Table 3).

In the fall, the five most abundant species were horned lark (4.512 detections), American pipit (*Anthus rubescens*) (0.669), western meadowlark (0.611), Brewer's blackbird (0.372), and European starling (0.355). Together these five species comprised 74.3% of the total bird use (Table 3).

Winter was the only season where the top five species were not all passerines. Horned lark (11.496) had the highest used followed by, Canada goose (5.794), European starling (2.184), unidentified blackbird (0.923), and western meadowlark (0.598). These species comprised 84.6% of the total bird use for the winter (Table 3).

Overall seasons, horned lark was the most common bird observed with 7.731 detections per survey, followed by Canada goose (2.474), European starling (0.955), western meadowlark (0.758), and unidentified blackbird (0.627) (Table 2). These five species comprised 81.9% of all bird use of the sites for the study periods (Table 3).

Averaged over all seasons and based on use, passerines were the most abundant group observed followed by waterfowl, raptors, and upland gamebirds (Table 2). Passerines as a group had the highest use in all four seasons. Waterfowl had the second highest use in the winter, raptors had the second highest use estimates in the spring and summer, and upland gamebirds had the second highest use in the fall followed closely by raptors. The high winter waterfowl use was due primarily to large flocks of Canada goose that frequented the study areas during the winter season (see Table 1).

3.1.2 Avian Diversity

Frequency of occurrence and percent composition provide relative estimates of the avian diversity of the study area. For all study areas combined, the overall number of species recorded was relatively high (see Table 1), however, as is expected for predominantly agricultural settings, the majority of avian use for the study area was confined to relatively few species. For example, one species, horned lark was observed in almost three-fourths of all surveys (72.1%) and accounted for slightly more than 50.5% of all bird use recorded during the studies (Tables 3 and 4). Three other species made up approximately 5% or more of the bird use recorded: Canada goose (16.2%), European starling (6.2%), and western meadowlark (5.0%). These four species cumulatively accounted for more than 3/4th of all the bird observations (77.9% of all observations) made during the studies (Table 3). Only seven species were seen in more than 5% of all surveys: horned lark (72.1%), western meadowlark (26.5%), common raven (*Corvus corax*) (12.1%), red-tailed hawk (6.8%), rough-legged hawk (5.9%); European starling (5.2%); and American kestrel (5.2%) (Table 4). The vast majority of species were observed in less than 1% of the surveys (Table 4).

As a group, and due primarily to the abundance of horned lark, western meadowlark, and European starling, passerines comprised 79.3% of the avian use on the sites (Table 3) and were observed in 85.6% of all surveys (Table 4). The influx of large groups of Canada geese in the fall and winter had the relative effect of lowering passerine use and raising waterfowl use in the winter (see Table 3). Raptors as a group comprised 2.0% of the total avian use of the sites (Table 3) and were observed in 22.9% of the surveys (Table 4).

3.1.3 Flight Height Characteristics and Exposure Indices

The proportion of observations of a bird species flying within the area occupied by the turbine rotors provides a rough estimate of risk to that species based on its propensity to fly within the "zone of risk" defined as the rotor swept area (Table 5). Turbines vary in dimensions such as tower height and blade length and it is likely that a variety of turbine types and sizes will be used if all of the projects are built. For this analysis, generic turbine dimensions were used to define the zone of risk that were based on the estimated maximum turbine size and tower height. The maximum tower height and rotor diameters for turbines is likely to be 80 m (262 ft). Provided an 80 m diameter rotor is placed on top of an 80 m tower the maximum height with a blade pointed straight up would be 120 m (~394 feet). A small buffer of approximately 5 m at the top and bottom of the rotor swept

area was added to account for possible variations around these maxima and the zone of risk analyzed in this report was defined as the area from approximately 25 m (~82 ft) to 125 m (~410 ft) above ground level (AGL). This range is a conservative estimate by virtue that it is larger than most turbines so leads to an over estimate of potential bird exposure.

Most of the passerines observed, with the exception of starlings, finches, corvids, warblers, and swallows, were regularly observed flying less than 82 feet (25 m) above the ground (Table 5). Larger birds tended to fly higher, and frequently flew greater than 82 feet (25 m) high, which is within the primary zone of risk for turbine blades used in this analysis. As a group, 62.4% of waterfowl observed flying were observed in the zone of risk. As a group 48.3% of raptors were observed in the rotor swept area. Raptor subgroups observed more often in the zone of risk included buteos (62.7%), eagles (87.5%), and vultures (66.7%). Flying passerines were observed within the zone of risk approximately 21.2 % of the time (Table 5). These estimates are consistent with estimates from other projects, and are an overestimate of exposure, since the zone of risk applied is slightly larger than a typical turbine.

The exposure index is a relative measure of the risk of each species coming in contact with a turbine that factors in the use estimates (measure of abundance) and the flight characteristics observed for that species. Canada goose, horned lark, and unidentified blackbird had the highest exposure indices (Table 6). These three species were commonly observed on site and often observed flying in large flocks which increased exposure indices. Of the raptors, rough-legged hawk and red-tailed hawk had the highest exposure indices. Most of the other raptors were seen less frequently (i.e., use was lower) which reduced their exposure index.

3.2 Bat Surveys

No field surveys or primary field data collection was conducted for bats for the three wind projects considered in this analysis. However, results of the monitoring study at the Klondike 1 project indicate that bats are at risk of collision with the turbines in apparently low numbers (Johnson et al. 2003). Other monitoring studies of wind projects in the Washington/Oregon region have also recorded a level of bat mortality (Table 7). The overall bat mortality estimates that are based on carcass search studies including carcass removal and searcher efficiency bias trials have indicated that approximately 1.62 bats per turbine or 1.59 bats per MW are killed annually at wind turbines in Washington and Oregon (Table 7).

4.0 DISCUSSION

In most cases of wind project development in the Pacific Northwest, baseline or pre-construction avian studies are conducted with two primary objectives: to provide information useful in addressing potential impacts from the project and to provide information that may be helpful in siting the turbines. For each of the wind projects proposed for Sherman County these baseline studies have been conducted. Under the National Environmental Policy Act (NEPA) federal agencies are charged with addressing potential impacts, including cumulative impacts, from projects that they implement, fund, or authorize. Under NEPA, the full build out of potential wind projects in Sherman County would be considered cumulative impacts. It was determined that an analysis of

all the avian survey data collected for the various wind projects in Sherman County would be helpful in analyzing these cumulative impacts. The purpose of this analysis was therefore to determine, based on the cumulative data, what the over all impacts from build out of the proposed wind projects in Sherman County would be. It was determined that combining data from all the projects was a valid approach because: (1) the proposals were all within relatively close proximity to each other; (2) all the projects fall within areas with the primary land use being agriculture; (3) all the avian survey data was collected using similar methods; and (4) the combined data sets provided some replication over years for the project area. The analysis conducted on the combined data set was very similar to that of each individual project.

Over the last five years during the same time frame as the studies in Sherman County, a number of wind projects have been constructed and monitored in the northeast Oregon and southeast Washington region (Columbia Basin Physiographic Province). These projects have been primarily east of Sherman County and include Vansycle, Umatilla County, Oregon; Stateline, Walla Walla County, Washington and Umatilla County, Oregon; Nine Canyon, Benton County Washington; and Combine Hills, Umatilla County, Oregon. In addition to these studies the 16 turbines that comprised the Klondike I project were also monitored for fatalities for a one-year period. These studies provide a regional database of avian use and mortality associated with wind developments that can provide a basis for impact predictions. Another project, the Condon wind project in Gilliam County, Oregon, was also completed in 2002; however, the monitoring effort at this project was ad hoc in nature and not standardized over the study period and the methods used were not similar enough to compare results to the other studies (see Galen 2003).

4.1 Avian Impacts

For the Sherman County projects, several common passerine species comprised the majority of avian use for the area studied. There were a few species - horned lark, western meadowlark, and European starling - that were seen either in large flocks (affecting total numbers seen) and/or observed in most of the surveys. This varied across seasons but had the effect of increasing use estimates for passerines. In contrast, raptors were observed in slightly more than 20% of the surveys but were typically seen individually or in small groups. This resulted in lower use estimates for raptors than passerines and even waterfowl and upland gamebirds. These results are typical of many wind sites studied where passerines have the highest use estimates but where a few raptor species (e.g., red-tailed hawk, American kestrel) are seen regularly. These results are expected given the low diversity of habitats across the three study areas. For most studies that have occurred in agricultural settings, a few common species make up the majority of bird observations at the site, however, a variety of other species are recorded but typically in low numbers and frequency.

4.1.1 Raptors

Based on the estimated levels of raptor use within the study areas, raptor mortality is expected to be similar to other new generation wind projects with similar turbine types located in the Oregon-Washington region. At these other projects, raptor use estimates ranged from approximately 0.2 to 0.6 per 20-minute survey compared to an average estimate of 0.3 raptors/20-minute survey for Sherman County analyzed in this report.

Considering the calculated raptor use estimates developed in each of the baseline studies, it is estimated that potential raptor mortality within the combined study area would be approximately 0.024 raptors per turbine per year. Under the assumption that raptor mortality would be similar in Sherman County as at the other projects where raptor use was similar, we would expect approximately 0.024 raptors per turbine per year or one raptor for every 40 turbines per year. Using this raptor mortality rate, the total annual raptor mortality estimate would be approximately 10-11 raptor fatalities per year for the three projects (KIWP including KIIWP, KIIIWP, and BCWP) combined if 440 turbines are constructed. It should be noted that the fatality estimates may vary from the expected range based on many factors, including the number of occupied raptor nests near the wind projects after construction, turbine size and other site specific and/or weather variables.

Red-tailed hawk, American kestrel, and northern harrier account for most of the raptor use in spring, summer and fall at the four projects areas. In the winter, rough-legged hawk and red-tailed hawk account for majority of the raptor use. These species are expected to be the raptor species with the highest risk of mortality across the projects. The potential exists for other raptor species to collide with turbines, including Swainson's hawk, ferruginous hawk, turkey vulture, golden eagle, Cooper's hawk, sharp-shinned hawk, and prairie falcon. However, the mortality risk associated with these species is expected to be much lower than the risk for red-tailed hawks and American kestrel due to the lower use estimates and exposure indices for these species. Common owl species such as great-horned owls, which are typically not effectively surveyed during the day, may also be at risk of collision. Some raptors such as turkey vultures appear less susceptible to collision than most other raptors (see Orloff and Flannery 1992, Erickson et al. 2001). In addition, there have been very few northern harrier, ferruginous hawk, and rough-legged hawk fatalities recorded at wind plants, based on recent published data (Erickson *et al.* 2002). Golden eagle use of the sites is low relative to other wind sites (e.g., Foote Creek Rim, Young et al. 2003) and mortality for golden eagles is also expected to be very low.

4.1.2 Passerines

Passerines have been the most abundant avian fatality at other wind projects studied (see Johnson *et al.* 2002, Young *et al.* 2003b, Erickson *et al.* 2000, 2001, 2002), often comprising more than 80% of the avian fatalities. Both migrant and resident passerine fatalities have been observed. Given that passerines make up the vast majority of the avian observations at the sites, it is expected passerines will make up the largest proportion of fatalities for all projects combined. Passerine species most common to the project sites will likely be most at risk, including horned lark and western meadowlark. European starling fatalities would also be expected, however, there is little concern over potential mortality of this species, an introduced non-protected species. Horned larks have been the most commonly observed fatality at several wind projects, including Vansycle, Combine Hills, and Stateline (Erickson *et al.* 2003, Young *et al.* 2005, Erickson *et al.* 2004). Nocturnal migrating species may also be affected, but it is not expected that they would be found in large numbers. Estimates for nocturnal migrant mortality at the regional wind projects have been variable and have ranged from 0.27 to 0.55 per turbine per year. Also, there have been only two multiple individual mortality events reported at new generation wind projects in the U.S. based on data collected at other wind plants. For example, at Buffalo Ridge, Minnesota, fourteen migrating passerine fatalities (vireos, warblers, flycatchers) were observed at two turbines during a single night in May 2002 (Johnson *et al.* 2002), while approximately 25 to 30 migrating passerine fatalities

(mostly warblers) were observed near one turbine and a well-lit substation at the Backbone Mountain, West Virginia, wind project (Kerns and Kerlinger 2004).

Mortality rates at other the other region wind projects for all birds combined have ranged from approximately 0.63 birds per turbine per year to 2.56 birds per turbine per year (Table 8). Based on the mortality estimates from the other wind plants studied, it is expected that all bird mortality would fall within the mid range or approximately 1-2 birds per turbine per year. Under the assumption that 440 turbines are constructed for all three projects, the total range of passerine mortality would be 440 to 880 fatalities per year. Because horned lark made up slightly more than 50% of the bird use during the studies, it is expected that approximately 50% of the fatalities would be of this species. This trend has been shown at the other regional projects in agriculture settings. For example, 50% of the fatalities at Nine Canyon; 46% of the fatalities at Stateline; and 41% of the fatalities at Combine Hills were horned larks (see Erickson *et al*. 2003, 2004; Young *et al*. 2005). Under this assumption we would expected approximately 200-400 horned lark fatalities if all the wind turbines were constructed. The level of estimated mortality is not expected to have any population level consequences for individual species, due to the expected low fatality rates for most species and the high population sizes of the common species such as horned lark, western meadowlark, and European starling.

4.2 Bat Impacts

Monitoring studies at other wind projects nationwide have shown consistent trends in impacts to bat. The species at highest risk appear to be foliage dwelling (forest, trees) fall migratory species (Johnson 2005). For the Pacific Northwest region these species are hoary bat (*Lasiurus cinereus*) and silver-haired bat (*Lasionycteris noctivagans*). These two species are by far the most common fatalities found at the regional wind projects monitored comprising more than 90% of all bat fatalities found in the studies (see Erickson *et al*. 2003, 2004; Young *et al*. 2005, Johnson *et al*. 2003). The annual period when most bat fatalities occur is in August and September (Johnson 2005). Hoary and silver-haired bats are wide spread across North America and breed into the boreal forests regions of Canada and migrate south to winter in the southern U.S., Mexico, and potentially further south in Central and South America. Many bats will migrate short distances to suitable hibernacula; however, other species do not appear to be at as great a risk based on the monitoring studies.

Bat foraging areas such as riparian zones, shrublands, streams, and other water sources are limited in the project area. At several wind projects studied in the U.S., bat collision mortality during the breeding season was far less, despite the fact that relatively large populations of resident bats of several species were documented in proximity to the wind plant (see Gruver 2002; Johnson et al., 2003, 2004; Johnson 2005). Based on these studies, it appears that wind projects, especially those in open habitats, pose little risk to non-migratory bat populations.

Based on the available monitoring information and characteristics of the sites, bat mortality at the projects proposed for northern Sherman County is not expected to vary significantly from other regional wind projects (see Table 7). The results of fatality monitoring for the regional

wind projects indicate mortality ranges from less than 1 to slightly over 3 .0 bat per turbine per year or approximately 1 to 2.5 bats per MW per year (see Table 7). Results of the Klondike I monitoring suggest that impacts in Sherman County may be on the lower end of this range.

Although future mortality of migratory bats is difficult to predict in any location, an estimate can be calculated based on levels of mortality documented at other wind projects in similar habitats. Based on these fairly consistent results, and considering the similarities in the characteristics of the project areas and other regional projects, a conservative estimate of bat mortality would fall within the mid range or approximately 1.5-2.5 bats per turbine (or per MW) per year. Provided that 440 turbines are constructed for all three projects, the total range of bat mortality would be from 660 to 1,100 fatalities per year. Actual levels of mortality are unknown and could be lower or higher, depending on factors such as regional migratory patterns of bats, patterns of local movements through the area, and the response of bats to turbines, individually and collectively. Mortality would involve primarily silver-haired and hoary bats, and no impacts to threatened or endangered bat species are anticipated. The significance of this impact on hoary and silver-haired bat populations is hard to predict, as there is very little information available regarding the overall population size and distribution of the bats potentially affected. The other regional monitoring studies suggest resident bats do not appear to be significantly affected by wind turbines and almost all mortality is observed during the fall migration period. Also, hoary bat and sliver-haired bats, which are expected to be the most common fatalities, are widely distributed in North America.

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Table 1. Avian species observed during fixed-point surveys[a] for all projects combined (KIWP, KIIIWP, BCWP, BCRA).

Seasons	Spring		Summer		Fall		Winter		Totals	
Group/Species	**obs**	**grp**	**obs**	**grp**	**obs**	**grp**	**obs**	**grp**	**obs**	**grp**
Waterbirds	**81**	**5**	**1**	**1**	**0**	**0**	**2**	**2**	**84**	**8**
great blue heron	1	1	0	0	0	0	2	2	3	3
ring-billed gull[c]	2	1	0	0	0	0	0	0	2	1
sandhill crane	75	2	0	0	0	0	0	0	75	2
unidentified gull	3	1	1	1	0	0	0	0	4	2
Waterfowl	**60**	**7**	**40**	**1**	**551**	**9**	**6698**	**76**	**7349**	**93**
American wigeon	0	0	0	0	0	0	1	1	1	1
Canada goose	53	4	40	1	551	9	6662	70	7306	84
green-winged teal	0	0	0	0	0	0	1	1	1	1
hooded merganser[b]	2	2	0	0	0	0	0	0	2	2
Mallard	0	0	0	0	0	0	24	2	24	2
trumpeter swan	0	0	0	0	0	0	10	2	10	2
unidentified duck[c]	5	1	0	0	0	0	0	0	5	1
Shorebirds	**15**	**8**	**0**	**0**	**1**	**1**	**8**	**6**	**24**	**15**
Killdeer	7	5	0	0	1	1	8	6	16	12
long-billed curlew	8	3	0	0	0	0	0	0	8	3
Rails/Coots										
American coot[b]	6	1	0	0	0	0	0	0	6	1
Raptors/Vultures	**188**	**178**	**97**	**88**	**62**	**55**	**268**	**262**	**615**	**583**
Accipiters	*1*	*1*	*0*	*0*	*2*	*2*	*0*	*0*	*3*	*3*
Cooper's hawk	0	0	0	0	1	1	0	0	1	1
sharp-shinned hawk	1	1	0	0	1	1	0	0	2	2
Buteos	*109*	*101*	*46*	*41*	*38*	*35*	*181*	*178*	*374*	*355*
Swainson's hawk	23	21	11	10	4	3	0	0	38	34
ferruginous hawk	0	0	1	1	0	0	1	1	2	2
red-tailed hawk	48	45	30	26	21	21	36	35	135	127
rough-legged hawk	14	13	0	0	3	3	117	116	134	132
unidentified buteo	24	22	4	4	10	8	27	26	65	60
Northern Harriers										
northern harrier	39	39	21	21	7	7	38	38	105	105
Eagles	*3*	*3*	*1*	*1*	*0*	*0*	*4*	*4*	*8*	*8*
golden eagle	2	2	1	1	0	0	2	2	5	5
unidentified eagle	1	1	0	0	0	0	2	2	3	3
Falcons	*30*	*29*	*25*	*23*	*15*	*11*	*26*	*25*	*96*	*88*
American kestrel	24	23	24	22	15	11	18	17	81	73
prairie falcon	5	5	1	1	0	0	7	7	13	13
unidentified falcon	1	1	0	0	0	0	1	1	2	2
Other Raptors										
unidentified raptor	3	2	0	0	0	0	19	17	22	19
Vultures										
turkey vulture	3	3	4	2	0	0	0	0	7	5
Passerines	**2428**	**1040**	**595**	**318**	**1465**	**352**	**12298**	**1037**	**16786**	**2747**
American crow	6	1	0	0	1	1	1	1	8	3
American goldfinch	64	5	4	2	56	8	44	7	168	22
American pipit	189	9	0	0	77	9	157	7	423	25
American robin	14	9	3	3	4	3	15	6	36	21
barn swallow	16	11	31	8	9	3	0	0	56	22
black-billed magpie	0	0	1	1	4	2	14	5	19	8
Brewer's blackbird	114	13	7	5	45	7	114	6	280	31

Table 1. Avian species observed during fixed-point surveys[a] for all projects combined (KIWP, KIIIWP, BCWP, BCRA).

Seasons	Spring		Summer		Fall		Winter		Totals	
Group/Species	**obs**	**grp**	**obs**	**grp**	**obs**	**grp**	**obs**	**grp**	**obs**	**grp**
brown-headed cowbird	0	0	8	2	0	0	3	1	11	3
Cassin's finch	0	0	0	0	9	1	0	0	9	1
cliff swallow	10	2	25	9	0	0	0	0	35	11
common raven	88	55	11	9	56	36	152	103	307	203
common redpoll	0	0	0	0	0	0	7	1	7	1
common yellowthroat[b]	0	0	1	1	0	0	0	0	1	1
dark-eyed junco	0	0	0	0	3	2	25	3	28	5
European starling	91	14	18	4	61	8	770	32	940	58
golden-crowned kinglet[b]	0	0	0	0	1	1	0	0	1	1
golden-crowned sparrow	0	0	0	0	1	1	0	0	1	1
grasshopper sparrow	10	10	3	2	0	0	0	0	13	12
horned lark	1144	576	320	188	909	189	8800	656	11173	1609
house finch	8	4	1	1	7	2	75	5	91	12
lapland longspur	0	0	0	0	0	0	53	7	53	7
lark sparrow	2	1	0	0	1	1	0	0	3	2
Lincoln's sparrow	0	0	0	0	1	1	0	0	1	1
loggerhead shrike	1	1	8	7	0	0	1	1	10	9
N .rough-winged swallow	6	4	14	3	1	1	0	0	21	8
northern shrike	0	0	0	0	0	0	3	3	3	3
orange-crowned warbler	0	0	0	0	1	1	0	0	1	1
pine siskin	0	0	0	0	0	0	2	1	2	1
red-breasted nuthatch	0	0	0	0	2	2	0	0	2	2
red-winged blackbird	27	5	36	4	31	6	222	10	316	25
rock wren[b]	0	0	0	0	2	1	0	0	2	1
rusty blackbird	11	2	0	0	0	0	0	0	11	2
savannah sparrow	13	9	4	2	4	2	0	0	21	13
Say's phoebe	37	32	5	4	3	3	13	9	58	48
song sparrow	11	5	6	2	2	2	17	7	36	16
spotted towhee	2	2	0	0	1	1	3	3	6	6
tree swallow	5	2	0	0	0	0	0	0	5	2
unidentified blackbird	1	1	0	0	0	0	1056	6	1057	7
unidentified finch	1	1	0	0	0	0	33	3	34	4
unidentified passerine	48	17	1	1	38	10	352	23	439	51
unidentified shrike	0	0	0	0	0	0	1	1	1	1
unidentified sparrow	2	1	2	2	4	2	1	1	9	6
unidentified swallow	43	3	2	1	8	5	0	0	53	9
varied thrush[b]	0	0	0	0	0	0	1	1	1	1
vesper sparrow	2	2	3	1	1	1	0	0	6	4
violet-green swallow	25	4	0	0	0	0	0	0	25	4
western kingbird	8	5	13	9	3	3	0	0	24	17
western meadowlark	416	231	68	47	95	31	321	121	900	430
white-crowned sparrow	13	3	0	0	11	3	33	5	57	11
yellow-rumped warbler	0	0	0	0	13	3	9	2	22	5
Upland Gamebirds	**75**	**60**	**12**	**12**	**47**	**10**	**104**	**22**	**238**	**104**
California quail	7	3	1	1	4	1	62	5	74	10
Chukar	11	7	0	0	13	2	27	8	51	17
gray partridge	4	2	0	0	0	0	0	0	4	2
ring-necked pheasant	53	48	11	11	30	7	15	9	109	75

Table 1. Avian species observed during fixed-point surveys[a] for all projects combined (KIWP, KIIIWP, BCWP, BCRA).

Seasons	Spring		Summer		Fall		Winter		Totals	
Group/Species	**obs**	**grp**	**obs**	**grp**	**obs**	**grp**	**obs**	**grp**	**obs**	**grp**
Doves/Pigeons	**30**	**12**	**30**	**14**	**43**	**17**	**47**	**10**	**150**	**53**
mourning dove	23	11	30	14	35	14	25	7	113	46
rock pigeon	7	1	0	0	8	3	22	3	37	7
Other Birds	**0**	**0**	**0**	**0**	**7**	**5**	**2**	**2**	**9**	**7**
Vaux's swift	0	0	0	0	3	1	0	0	3	1
northern flicker	0	0	0	0	4	4	2	2	6	6
Unidentified Birds										
unidentified large bird[c]	0	0	0	0	0	0	1	1	1	1
Overall Total	**2883**	**1311**	**775**	**434**	**2176**	**449**	**19428**	**1418**	**25262**	**3612**

[a] Includes all observations even those in the last ten minutes of surveys.
[b] Only observed in the last ten minutes of either the KIWP, BCWP, or BCRA surveys.
[c] Only observed outside 800m.

Table 2. Estimated mean use (number of observations per 20-minute survey) for each species observed within 800 m of the survey point for all projects combined (KIWP, KIIIWP, BCWP, BCRA).

Group/Species	Spring	Summer	Fall	Winter	Overall
Waterbirds	**0.013**	**0.004**	**0.000**	**0.003**	**0.005**
great blue heron	0.002	0.000	0.000	0.003	0.002
sandhill crane	0.011	0.000	0.000	0.000	0.003
unidentified gull	0.000	0.004	0.000	0.000	0.001
Waterfowl	**0.000**	**0.000**	**0.119**	**5.877**	**2.505**
American wigeon	0.000	0.000	0.000	0.003	0.001
Canada goose	0.000	0.000	0.119	5.794	2.474
green-winged teal	0.000	0.000	0.000	0.003	0.001
Mallard	0.000	0.000	0.000	0.073	0.025
trumpeter swan	0.000	0.000	0.000	0.004	0.003
Shorebirds	**0.018**	**0.000**	**0.005**	**0.011**	**0.011**
Killdeer	0.014	0.000	0.005	0.011	0.010
long-billed curlew	0.004	0.000	0.000	0.000	0.001
Raptors/Vultures	**0.354**	**0.392**	**0.232**	**0.309**	**0.306**
Accipiters	*0.000*	*0.019*	*0.000*	*0.000*	*0.003*
Cooper's hawk	0.000	0.000	0.009	0.000	0.001
sharp-shinned hawk	0.000	0.000	0.009	0.000	0.001
Swainson's hawk	0.036	0.018	0.010	0.000	0.016
Buteos	*0.168*	*0.133*	*0.206*	*0.180*	*0.177*
ferruginous hawk	0.000	0.004	0.000	0.000	0.001
red-tailed hawk	0.108	0.139	0.096	0.053	0.083
rough-legged hawk	0.026	0.000	0.013	0.146	0.067
unidentified buteo	0.009	0.007	0.014	0.007	0.010
Harriers					
northern harrier	0.097	0.029	0.014	0.045	0.048
Eagles	*0.004*	*0.000*	*0.003*	*0.002*	*0.003*
golden eagle	0.000	0.004	0.000	0.002	0.002
unidentified eagle	0.002	0.000	0.000	0.002	0.002
Falcons	*0.165*	*0.066*	*0.051*	*0.068*	*0.068*
American kestrel	0.061	0.162	0.066	0.032	0.058
prairie falcon	0.007	0.004	0.000	0.018	0.009
unidentified falcon	0.000	0.000	0.000	0.001	0.001
Other Raptors					
unidentified raptor	0.000	0.000	0.000	0.003	0.002
Vultures					
turkey vulture	0.007	0.026	0.000	0.000	0.005
Passerines	**6.402**	**3.792**	**7.922**	**18.147**	**12.139**
American crow	0.033	0.000	0.000	0.001	0.009
American goldfinch	0.267	0.026	0.285	0.122	0.145
American pipit	0.050	0.000	0.669	0.554	0.314
American robin	0.035	0.011	0.024	0.031	0.025

Table 2. Estimated mean use (number of observations per 20-minute survey) for each species observed within 800 m of the survey point for all projects combined (KIWP, KIIIWP, BCWP, BCRA).

Group/Species	Spring	Summer	Fall	Winter	Overall
Brewer's blackbird	0.285	0.049	0.372	0.191	0.230
Cassin's finch	0.000	0.000	0.083	0.000	0.013
European starling	0.319	0.175	0.355	2.184	0.955
Lincoln's sparrow	0.000	0.000	0.006	0.000	0.001
Say's phoebe	0.104	0.018	0.019	0.028	0.046
barn swallow	0.043	0.285	0.028	0.000	0.048
black-billed magpie	0.000	0.004	0.028	0.054	0.025
brown-headed cowbird	0.000	0.000	0.000	0.003	0.002
cliff swallow	0.032	0.018	0.000	0.000	0.009
common raven	0.201	0.042	0.301	0.208	0.192
common redpoll	0.000	0.000	0.000	0.006	0.004
dark-eyed junco	0.000	0.000	0.006	0.001	0.002
golden-crowned sparrow	0.000	0.000	0.006	0.000	0.001
grasshopper sparrow	0.021	0.028	0.000	0.000	0.010
horned lark	3.223	2.008	4.512	11.496	7.731
house finch	0.007	0.009	0.053	0.339	0.135
lapland longspur	0.000	0.000	0.000	0.164	0.059
lark sparrow	0.011	0.000	0.005	0.000	0.004
loggerhead shrike	0.003	0.026	0.000	0.001	0.005
northern rough-winged swallow	0.019	0.115	0.005	0.000	0.018
northern shrike	0.000	0.000	0.000	0.004	0.001
orange-crowned warbler	0.000	0.000	0.006	0.000	0.001
pine siskin	0.000	0.000	0.000	0.008	0.003
red-breasted nuthatch	0.000	0.000	0.016	0.000	0.002
red-winged blackbird	0.098	0.248	0.192	0.535	0.273
rusty blackbird	0.037	0.000	0.000	0.000	0.011
savannah sparrow	0.029	0.050	0.026	0.000	0.019
song sparrow	0.038	0.054	0.006	0.051	0.036
spotted towhee	0.004	0.000	0.006	0.007	0.004
tree swallow	0.020	0.000	0.000	0.000	0.003
unidentified blackbird	0.002	0.000	0.000	0.923	0.627
unidentified finch	0.002	0.000	0.000	0.010	0.007
unidentified passerine	0.063	0.000	0.182	0.496	0.284
unidentified shrike	0.000	0.000	0.000	0.001	0.001
unidentified sparrow	0.000	0.016	0.026	0.005	0.008
unidentified swallow	0.069	0.000	0.019	0.000	0.025
vesper sparrow	0.002	0.048	0.000	0.000	0.006
violet-green swallow	0.006	0.000	0.000	0.000	0.001
western kingbird	0.015	0.079	0.005	0.000	0.015
western meadowlark	1.308	0.483	0.611	0.598	0.758
white-crowned sparrow	0.058	0.000	0.069	0.090	0.058
yellow-rumped warbler	0.000	0.000	0.000	0.036	0.013

Table 2. Estimated mean use (number of observations per 20-minute survey) for each species observed within 800 m of the survey point for all projects combined (KIWP, KIIIWP, BCWP, BCRA).

Group/Species	Spring	Summer	Fall	Winter	Overall
Upland Gamebirds	**0.189**	**0.045**	**0.282**	**0.312**	**0.214**
California quail	0.000	0.009	0.026	0.225	0.086
chukar	0.019	0.000	0.071	0.061	0.040
gray partridge	0.022	0.000	0.000	0.000	0.006
ring-necked pheasant	0.147	0.036	0.186	0.027	0.082
Doves/Pigeons	**0.084**	**0.173**	**0.186**	**0.147**	**0.123**
mourning dove	0.084	0.173	0.123	0.070	0.087
rock pigeon	0.000	0.000	0.063	0.077	0.037
Other Birds	**0.000**	**0.000**	**0.030**	**0.004**	**0.006**
Vaux's swift	0.000	0.000	0.019	0.000	0.003
northern flicker	0.000	0.000	0.011	0.004	0.003

Table 3. Estimated percent composition (mean use divided by total use for all species) for each species observed within 800 m of the survey point all projects combined (KIWP, KIIIWP, BCWP, BCRA).

Group/Species	Spring	Summer	Fall	Winter	Overall
Waterbirds	**0.18**	**0.08**	**0.00**	**0.01**	**0.03**
great blue heron	0.02	0.00	0.00	0.01	0.01
sandhill crane	0.16	0.00	0.00	0.00	0.02
unidentified gull	0.00	0.08	0.00	0.00	0.00
Waterfowl	**0.00**	**0.00**	**1.36**	**23.69**	**16.36**
American wigeon	0.00	0.00	0.00	0.01	0.01
Canada goose	0.00	0.00	1.36	23.35	16.16
green-winged teal	0.00	0.00	0.00	0.01	0.01
mallard	0.00	0.00	0.00	0.29	0.17
trumpeter swan	0.00	0.00	0.00	0.02	0.02
Shorebirds	**0.25**	**0.00**	**0.05**	**0.05**	**0.07**
killdeer	0.20	0.00	0.05	0.05	0.07
long-billed curlew	0.06	0.00	0.00	0.00	0.00
Raptors	**5.01**	**8.89**	**2.64**	**1.24**	**2.00**
Accipiters	*0.00*	*0.00*	*0.21*	*0.00*	*0.02*
Cooper's hawk	0.00	0.00	0.11	0.00	0.01
sharp-shinned hawk	0.00	0.00	0.11	0.00	0.01
Buteos	*2.55*	*3.81*	*1.51*	*0.83*	*1.15*
ferruginous hawk	0.00	0.08	0.00	0.00	0.00
rough-legged hawk	0.37	0.00	0.15	0.59	0.44
red-tailed hawk	1.53	3.15	1.10	0.22	0.54
Swainson's hawk	0.52	0.42	0.11	0.00	0.11
unidentified buteo	0.13	0.17	0.16	0.03	0.06
Northern Harrier					
northern harrier	1.37	0.67	0.16	0.18	0.32
Eagles	*0.02*	*0.08*	*0.00*	*0.01*	*0.02*
golden eagle	0.00	0.08	0.00	0.01	0.01
unidentified eagle	0.02	0.00	0.00	0.01	0.01
Falcon	*0.96*	*3.75*	*0.75*	*0.21*	*0.44*
American kestrel	0.87	3.67	0.75	0.13	0.38
prairie falcon	0.10	0.08	0.00	0.07	0.06
unidentified falcon	0.00	0.00	0.00	0.00	0.00
Other Raptors					
unidentified raptor	0.00	0.00	0.00	0.01	0.01
Vultures					
turkey vulture	0.10	0.58	0.00	0.00	0.03
Passerines	**90.69**	**86.06**	**90.27**	**73.14**	**79.29**
American crow	0.47	0.00	0.00	0.00	0.06
American goldfinch	3.79	0.59	3.25	0.49	0.95
American pipit	0.71	0.00	7.63	2.23	2.05
American robin	0.50	0.25	0.27	0.13	0.17

Table 3. Estimated percent composition (mean use divided by total use for all species) for each species observed within 800 m of the survey point all projects combined (KIWP, KIIIWP, BCWP, BCRA).

Group/Species	Spring	Summer	Fall	Winter	Overall
barn swallow	0.60	6.48	0.32	0.00	0.31
black-billed magpie	0.00	0.08	0.32	0.22	0.16
brown-headed cowbird	0.00	0.00	0.00	0.01	0.01
Brewer's blackbird	4.03	1.12	4.24	0.77	1.50
Cassin's finch	0.00	0.00	0.95	0.00	0.09
cliff swallow	0.45	0.42	0.00	0.00	0.06
common raven	2.84	0.94	3.43	0.84	1.26
common redpoll	0.00	0.00	0.00	0.02	0.03
dark-eyed junco	0.00	0.00	0.07	0.00	0.01
European starling	4.52	3.96	4.05	8.80	6.24
golden-crowned sparrow	0.00	0.00	0.07	0.00	0.01
grasshopper sparrow	0.29	0.63	0.00	0.00	0.06
house finch	0.11	0.21	0.61	1.37	0.88
horned lark	45.66	45.58	51.42	46.34	50.50
lapland longspur	0.00	0.00	0.00	0.66	0.38
lark sparrow	0.16	0.00	0.05	0.00	0.02
Lincoln's sparrow	0.00	0.00	0.07	0.00	0.01
loggerhead shrike	0.05	0.60	0.00	0.00	0.03
northern rough-winged swallow	0.27	2.62	0.05	0.00	0.11
northern shrike	0.00	0.00	0.00	0.02	0.01
orange-crowned warbler	0.00	0.00	0.07	0.00	0.01
pine siskin	0.00	0.00	0.00	0.03	0.02
red-breasted nuthatch	0.00	0.00	0.18	0.00	0.02
rusty blackbird	0.52	0.00	0.00	0.00	0.07
red-winged blackbird	1.38	5.63	2.19	2.16	1.78
Say's phoebe	1.47	0.40	0.21	0.11	0.30
savannah sparrow	0.41	1.14	0.29	0.00	0.12
song sparrow	0.54	1.23	0.07	0.20	0.24
spotted towhee	0.06	0.00	0.07	0.03	0.03
tree swallow	0.28	0.00	0.00	0.00	0.02
unidentified blackbird	0.02	0.00	0.00	3.72	4.10
unidentified finch	0.02	0.00	0.00	0.04	0.05
unidentified passerine	0.89	0.00	2.08	2.00	1.86
unidentified shrike	0.00	0.00	0.00	0.00	0.00
unidentified sparrow	0.00	0.36	0.29	0.02	0.05
unidentified swallow	0.98	0.00	0.22	0.00	0.16
vesper sparrow	0.02	1.08	0.00	0.00	0.04
violet-green swallow	0.08	0.00	0.00	0.00	0.01
white-crowned sparrow	0.82	0.00	0.78	0.36	0.38
western kingbird	0.21	1.78	0.05	0.00	0.10
western meadowlark	18.53	10.96	6.96	2.41	4.95
yellow-rumped warbler	0.00	0.00	0.00	0.14	0.09

Table 3. Estimated percent composition (mean use divided by total use for all species) for each species observed within 800 m of the survey point all projects combined (KIWP, KIIIWP, BCWP, BCRA).

Group/Species	Spring	Summer	Fall	Winter	Overall
Upland Gamebirds	**2.68**	**1.03**	**3.21**	**1.26**	**1.40**
California quail	0.00	0.21	0.29	0.91	0.56
chukar	0.28	0.00	0.80	0.24	0.26
gray partridge	0.31	0.00	0.00	0.00	0.04
ring-necked pheasant	2.09	0.82	2.12	0.11	0.54
Doves/Pigeons	**1.19**	**3.93**	**2.11**	**0.59**	**0.80**
mourning dove	1.19	3.93	1.40	0.28	0.57
rock pigeon	0.00	0.00	0.71	0.31	0.24
Other Birds	**0.00**	**0.00**	**0.35**	**0.02**	**0.04**
northern flicker	0.00	0.00	0.13	0.02	0.02
Vaux's swift	0.00	0.00	0.22	0.00	0.02

Table 4. Estimated frequency of occurrence (average percent of surveys species/group is recorded) for each species observed within 800 m of the survey point for all projects combined (KIWP, KIIIWP, BCWP, BCRA).

Group/Species	Spring	Summer	Fall	Winter	Overall
Waterbirds	**0.73**	**0.37**	**0.00**	**0.30**	**0.37**
great blue heron	0.17	0.00	0.00	0.30	0.16
sandhill crane	0.56	0.00	0.00	0.00	0.15
unidentified gull	0.00	0.37	0.00	0.00	0.07
Waterfowl	**0.00**	**0.00**	**0.48**	**5.91**	**2.52**
American wigeon	0.00	0.00	0.00	0.30	0.10
Canada goose	0.00	0.00	0.48	4.87	2.12
green-winged teal	0.00	0.00	0.00	0.30	0.10
mallard	0.00	0.00	0.00	0.65	0.23
trumpeter swan	0.00	0.00	0.00	0.09	0.06
Shorebirds	**1.26**	**0.00**	**0.48**	**0.78**	**0.78**
killdeer	0.87	0.00	0.48	0.78	0.71
long-billed curlew	0.40	0.00	0.00	0.00	0.07
Raptors/Vultures	**27.57**	**25.88**	**16.69**	**23.58**	**22.94**
Accipiters	*0.00*	*0.00*	*1.85*	*0.00*	*0.29*
Cooper's hawk	0.00	0.00	0.93	0.00	0.15
sharp-shinned hawk	0.00	0.00	0.93	0.00	0.15
Buteos	*14.28*	*11.21*	*10.58*	*16.95*	*13.99*
ferruginous hawk	0.00	0.37	0.00	0.00	0.07
rough-legged hawk	2.25	0.00	1.28	12.72	5.90
red-tailed hawk	8.82	9.01	8.35	5.04	6.78
Swainson's hawk	2.60	1.47	0.95	0.00	1.23
unidentified buteo	0.95	0.73	0.95	0.59	0.86
Northern Harrier					
northern harrier	8.59	2.56	1.43	4.12	4.37
Eagles	*0.17*	*0.37*	*0.00*	*0.33*	*0.35*
golden eagle	0.00	0.37	0.00	0.16	0.18
unidentified eagle	0.17	0.00	0.00	0.16	0.17
Falcon	*6.80*	*13.59*	*5.19*	*4.73*	*6.06*
American kestrel	6.11	13.22	5.19	3.17	5.16
prairie falcon	0.69	0.37	0.00	1.78	0.95
unidentified falcon	0.00	0.00	0.00	0.08	0.06
Other Raptors					
unidentified raptor	0.00	0.00	0.00	0.33	0.23
Vultures					
turkey vulture	0.52	0.85	0.00	0.00	0.26
Passerines	**92.71**	**79.30**	**86.18**	**83.31**	**85.59**
American crow	0.56	0.00	0.00	0.08	0.20
American goldfinch	1.90	1.29	2.35	2.04	1.74
American pipit	0.56	0.00	5.82	2.12	1.80
American robin	1.97	1.10	1.88	1.22	1.38
barn swallow	2.78	6.31	1.40	0.00	1.66
black-billed magpie	0.00	0.37	0.93	1.70	0.84
brown-headed cowbird	0.00	0.00	0.00	0.09	0.06

Table 4. Estimated frequency of occurrence (average percent of surveys species/group is recorded) for each species observed within 800 m of the survey point for all projects combined (KIWP, KIIIWP, BCWP, BCRA).

Group/Species	Spring	Summer	Fall	Winter	Overall
Brewer's blackbird	2.58	4.01	4.06	0.74	2.10
Cassin's finch	0.00	0.00	0.93	0.00	0.15
cliff swallow	0.40	1.47	0.00	0.00	0.34
common raven	12.02	3.30	18.86	13.56	12.15
common redpoll	0.00	0.00	0.00	0.08	0.06
dark-eyed junco	0.00	0.00	0.64	0.08	0.15
European starling	5.30	3.44	3.13	7.50	5.21
golden-crowned sparrow	0.00	0.00	0.64	0.00	0.10
grasshopper sparrow	1.57	0.93	0.00	0.00	0.59
house finch	0.57	0.93	1.57	2.00	1.20
horned lark	80.74	58.16	68.95	69.71	72.10
lapland longspur	0.00	0.00	0.00	2.10	0.75
lark sparrow	0.56	0.00	0.48	0.00	0.21
Lincoln's sparrow	0.00	0.00	0.64	0.00	0.10
loggerhead shrike	0.35	1.78	0.00	0.09	0.36
northern rough-winged swallow	0.97	1.78	0.48	0.00	0.46
northern shrike	0.00	0.00	0.00	0.40	0.15
orange-crowned warbler	0.00	0.00	0.64	0.00	0.10
pine siskin	0.00	0.00	0.00	0.40	0.15
red-breasted nuthatch	0.00	0.00	1.57	0.00	0.24
rusty blackbird	0.67	0.00	0.00	0.00	0.20
red-winged blackbird	1.90	2.71	3.21	1.91	1.95
Say's phoebe	9.43	1.78	1.85	1.92	3.89
savannah sparrow	1.57	2.51	1.28	0.00	0.97
song sparrow	1.77	1.78	0.64	1.61	1.39
spotted towhee	0.40	0.00	0.64	0.74	0.45
tree swallow	0.79	0.00	0.00	0.00	0.14
unidentified blackbird	0.17	0.00	0.00	0.42	0.34
unidentified finch	0.17	0.00	0.00	0.08	0.11
unidentified passerine	1.91	0.00	5.18	3.17	2.86
unidentified shrike	0.00	0.00	0.00	0.08	0.06
unidentified sparrow	0.00	1.60	1.28	0.51	0.60
unidentified swallow	0.35	0.00	1.43	0.00	0.32
vesper sparrow	0.17	1.59	0.00	0.00	0.24
violet-green swallow	0.57	0.00	0.00	0.00	0.12
white-crowned sparrow	1.20	0.00	1.76	1.23	1.04
western kingbird	0.73	4.67	0.48	0.00	0.86
western meadowlark	49.30	23.29	16.23	18.35	26.51
yellow-rumped warbler	0.00	0.00	0.00	0.79	0.29
Upland Gamebirds	**13.41**	**4.54**	**3.97**	**4.66**	**6.46**
California quail	0.00	0.93	0.64	1.82	0.86
chukar	1.25	0.00	0.64	1.50	1.07
gray partridge	1.11	0.00	0.00	0.00	0.29

Table 4. Estimated frequency of occurrence (average percent of surveys species/group is recorded) for each species observed within 800 m of the survey point for all projects combined (KIWP, KIIIWP, BCWP, BCRA).

Group/Species	Spring	Summer	Fall	Winter	Overall
ring-necked pheasant	11.61	3.61	3.33	1.33	4.48
Doves/Pigeons	**3.59**	**4.17**	**6.68**	**2.44**	**3.33**
mourning dove	3.59	4.17	4.47	1.79	2.76
rock pigeon	0.00	0.00	2.21	0.65	0.57
Other Birds	**0.00**	**0.00**	**1.76**	**0.38**	**0.42**
northern flicker	0.00	0.00	1.12	0.38	0.32
Vaux's swift	0.00	0.00	0.64	0.00	0.10

Table 5. Flight height characteristics of bird species and groups observed during the fixed-point surveys at KIWP, KIIIWP, BCWP, and BCRA.

				% w/i Height Categories		
Group/Species	**Number groups flying**	**Number birds flying**	**Percent of birds flying**	**<25 m**	**25-125m**	**> 125 m**
Waterbirds	**2**	**2**	**25.00**	**50.00**	**50.00**	**0.00**
great blue heron	1	1	50.00	0.00	100.00	0.00
sandhill crane	0	0	0.00	N/A	N/A	N/A
unidentified gull	1	1	25.00	100.00	0.00	0.00
Waterfowl	**54**	**4847**	**86.54**	**32.14**	**62.41**	**5.45**
American wigeon	0	0	0.00	N/A	N/A	N/A
Canada goose	52	4837	87.00	32.21	62.33	5.46
green-winged teal	0	0	0.00	N/A	N/A	N/A
mallard	0	0	0.00	N/A	N/A	N/A
trumpeter swan	2	10	100.00	0.00	100.00	0.00
unidentified duck	0	0	0.00	N/A	N/A	N/A
Shorebirds	**10**	**18**	**78.26**	**83.33**	**16.67**	**0.00**
killdeer	8	11	73.33	81.82	18.18	0.00
long-billed curlew	2	7	87.50	85.71	14.29	0.00
Raptors/Vultures	**359**	**383**	**81.14**	**41.78**	**48.30**	**9.92**
Accipiters	*2*	*2*	*100.00*	*100.00*	*0.00*	*0.00*
Cooper's hawk	1	1	100.00	100.00	0.00	0.00
sharp-shinned hawk	1	1	100.00	100.00	0.00	0.00
Buteos	*219*	*233*	*78.72*	*25.75*	*62.66*	*11.59*
Swainson's hawk	20	22	73.33	22.73	50.00	27.27
ferruginous hawk	1	1	100.00	0.00	0.00	100.00
red-tailed hawk	72	79	73.15	32.91	51.90	15.19
rough-legged hawk	86	88	83.81	25.00	72.73	2.27
unidentified buteo	40	43	82.69	16.28	69.77	13.95
Northern Harriers						
northern harrier	63	63	94.03	87.30	11.11	1.59
Eagles	*8*	*8*	*100.00*	*0.00*	*87.50*	*12.50*
golden eagle	5	5	100.00	0.00	100.00	0.00
unidentified eagle	3	3	100.00	0.00	66.67	33.33
Falcons	*44*	*49*	*69.01*	*73.47*	*24.49*	*2.04*
American kestrel	31	36	62.07	77.78	22.22	0.00
prairie falcon	11	11	100.00	63.64	27.27	9.09
unidentified falcon	2	2	100.00	50.00	50.00	0.00
Other Raptors						
unidentified raptor	19	22	100.00	22.73	40.91	36.36
Vultures						
turkey vulture	4	6	100.00	33.33	66.67	0.00
Passerines	**1609**	**13107**	**85.64**	**78.70**	**21.16**	**0.14**
American crow	1	1	14.29	0.00	100.00	0.00

Table 5. Flight height characteristics of bird species and groups observed during the fixed-point surveys at KIWP, KIIIWP, BCWP, and BCRA.

				% w/i Height Categories		
Group/Species	Number groups flying	Number birds flying	Percent of birds flying	<25 m	25-125m	> 125 m
American goldfinch	12	124	86.11	50.81	49.19	0.00
American pipit	11	226	94.17	99.56	0.44	0.00
American robin	9	15	48.39	80.00	20.00	0.00
Brewer's blackbird	20	200	75.47	60.50	39.50	0.00
Cassin's finch	1	9	100.00	0.00	100.00	0.00
European starling	38	691	78.52	45.88	54.12	0.00
Lincoln's sparrow	1	1	100.00	100.00	0.00	0.00
Say's phoebe	18	24	57.14	100.00	0.00	0.00
barn swallow	18	46	100.00	97.83	2.17	0.00
black-billed magpie	4	14	82.35	50.00	50.00	0.00
brown-headed cowbird	1	3	100.00	100.00	0.00	0.00
cliff swallow	5	13	100.00	100.00	0.00	0.00
common raven	129	197	85.28	56.35	37.06	6.60
common redpoll	1	7	100.00	100.00	0.00	0.00
dark-eyed junco	2	2	100.00	100.00	0.00	0.00
golden-crowned sparrow	0	0	0.00	N/A	N/A	N/A
grasshopper sparrow	2	2	16.67	100.00	0.00	0.00
horned lark	1037	9315	89.49	88.32	11.68	0.00
house finch	9	82	95.35	95.12	4.88	0.00
lapland longspur	2	34	70.83	50.00	50.00	0.00
lark sparrow	2	3	100.00	100.00	0.00	0.00
loggerhead shrike	5	5	100.00	100.00	0.00	0.00
northern rough-winged swallow	7	20	100.00	60.00	40.00	0.00
northern shrike	0	0	0.00	N/A	N/A	N/A
orange-crowned warbler	0	0	0.00	N/A	N/A	N/A
pine siskin	1	2	100.00	100.00	0.00	0.00
red-breasted nuthatch	0	0	0.00	N/A	N/A	N/A
red-winged blackbird	8	46	17.16	100.00	0.00	0.00
rusty blackbird	0	0	0.00	N/A	N/A	N/A
savannah sparrow	8	15	75.00	100.00	0.00	0.00
song sparrow	4	8	23.53	100.00	0.00	0.00
spotted towhee	2	2	40.00	100.00	0.00	0.00
tree swallow	2	5	100.00	20.00	80.00	0.00
unidentified blackbird	7	1057	100.00	5.39	94.61	0.00
unidentified finch	2	13	100.00	100.00	0.00	0.00
unidentified passerine	37	406	99.27	90.64	7.88	1.48
unidentified shrike	1	1	100.00	100.00	0.00	0.00
unidentified sparrow	3	5	71.43	100.00	0.00	0.00
unidentified swallow	5	44	100.00	97.73	2.27	0.00
vesper sparrow	1	3	75.00	100.00	0.00	0.00
violet-green swallow	2	2	100.00	50.00	50.00	0.00

Table 5. Flight height characteristics of bird species and groups observed during the fixed-point surveys at KIWP, KIIIWP, BCWP, and BCRA.

				% w/i Height Categories		
Group/Species	**Number groups flying**	**Number birds flying**	**Percent of birds flying**	**<25 m**	**25-125m**	**> 125 m**
western kingbird	10	15	93.75	100.00	0.00	0.00
western meadowlark	174	405	49.33	99.01	0.99	0.00
white-crowned sparrow	5	35	70.00	100.00	0.00	0.00
yellow-rumped warbler	2	9	100.00	44.44	55.56	0.00
Upland Gamebirds	**25**	**101**	**49.75**	**100.00**	**0.00**	**0.00**
California quail	2	48	71.64	100.00	0.00	0.00
chukar	6	13	30.23	100.00	0.00	0.00
gray partridge	1	2	50.00	100.00	0.00	0.00
ring-necked pheasant	16	38	42.70	100.00	0.00	0.00
Doves/Pigeons	**38**	**102**	**82.93**	**62.75**	**37.25**	**0.00**
mourning dove	32	72	77.42	88.89	11.11	0.00
rock pigeon	6	30	100.00	0.00	100.00	0.00
Other Birds	**4**	**6**	**85.71**	**33.33**	**66.67**	**0.00**
Vaux's swift	1	3	100.00	0.00	100.00	0.00
northern flicker	3	3	75.00	66.67	33.33	0.00
Unidentified Birds						
unidentified large bird	1	1	100.00	100.00	0.00	0.00
Overall	2102	18567	85.40	65.80	32.47	1.73

Table 6. Exposure indices calculated for species observed during fixed-point surveys at KIWP, KIIIWP, BCWP, and BCRA.

Group/Species	Mean use	Percent flying	Percent flying within RSA	Exposure Index
Waterbirds	**0.005**	**25.00**	**50.00**	**0.001**
great blue heron	0.002	50.00	100.00	0.001
sandhill crane	0.003	0.00	N/A	N/A
unidentified gull	0.001	25.00	0.00	0.000
Waterfowl	**2.505**	**86.54**	**62.41**	**1.353**
American wigeon	0.001	0.00	N/A	N/A
Canada goose	2.474	87.00	62.33	1.342
green-winged teal	0.001	0.00	N/A	N/A
mallard	0.025	0.00	N/A	N/A
trumpeter swan	0.003	100.00	100.00	0.003
unidentified duck	N/A	0.00	N/A	N/A
Shorebirds	**0.011**	**78.26**	**16.67**	**0.001**
killdeer	0.010	73.33	18.18	0.001
long-billed curlew	0.001	87.50	14.29	0.000
Raptors	**0.306**	**81.14**	**48.30**	**0.120**
Accipiters	*0.003*	*100.00*	*0.00*	*0.000*
Cooper's hawk	0.001	100.00	0.00	0.000
sharp-shinned hawk	0.001	100.00	0.00	0.000
Buteos	*0.177*	*78.72*	*62.66*	*0.087*
Swainson's hawk	0.016	73.33	50.00	0.006
ferruginous hawk	0.001	100.00	0.00	0.000
red-tailed hawk	0.083	73.15	51.90	0.031
rough-legged hawk	0.067	83.81	72.73	0.041
unidentified buteo	0.010	82.69	69.77	0.006
Northern Harriers				
northern harrier	0.048	94.03	11.11	0.005
Eagles	*0.003*	*100.00*	*87.50*	*0.003*
golden eagle	0.002	100.00	100.00	0.002
unidentified eagle	0.002	100.00	66.67	0.001
Falcon	*0.068*	*69.01*	*24.49*	*0.011*
American kestrel	0.058	62.07	22.22	0.008
prairie falcon	0.009	100.00	27.27	0.003
unidentified falcon	0.001	100.00	50.00	0.000
Other Raptors				
unidentified raptor	0.002	100.00	40.91	0.001
Vultures				
turkey vulture	0.005	100.00	66.67	0.003
Passerines	**12.139**	**85.64**	**21.16**	**2.200**
American crow	0.009	14.29	100.00	0.001
American goldfinch	0.145	86.11	49.19	0.062

Table 6. Exposure indices calculated for species observed during fixed-point surveys at KIWP, KIIIWP, BCWP, and BCRA.

Group/Species	Mean use	Percent flying	Percent flying within RSA	Exposure Index
American pipit	0.314	94.17	0.44	0.001
American robin	0.025	48.39	20.00	0.002
Brewer's blackbird	0.230	75.47	39.50	0.069
Cassin's finch	0.013	100.00	100.00	0.013
European starling	0.955	78.52	54.12	0.406
Lincoln's sparrow	0.001	100.00	0.00	0.000
Say's phoebe	0.046	57.14	0.00	0.000
barn swallow	0.048	100.00	2.17	0.001
black-billed magpie	0.025	82.35	50.00	0.010
brown-headed cowbird	0.002	100.00	0.00	0.000
cliff swallow	0.009	100.00	0.00	0.000
common raven	0.192	85.28	37.06	0.061
common redpoll	0.004	100.00	0.00	0.000
dark-eyed junco	0.002	100.00	0.00	0.000
golden-crowned sparrow	0.001	0.00	N/A	N/A
grasshopper sparrow	0.010	16.67	0.00	0.000
horned lark	7.731	89.49	11.68	0.808
house finch	0.135	95.35	4.88	0.006
lapland longspur	0.059	70.83	50.00	0.021
lark sparrow	0.004	100.00	0.00	0.000
loggerhead shrike	0.005	100.00	0.00	0.000
northern rough-winged swallow	0.018	100.00	40.00	0.007
northern shrike	0.001	0.00	N/A	N/A
orange-crowned warbler	0.001	0.00	N/A	N/A
pine siskin	0.003	100.00	0.00	0.000
red-breasted nuthatch	0.002	0.00	N/A	N/A
red-winged blackbird	0.273	17.16	0.00	0.000
rusty blackbird	0.011	0.00	N/A	N/A
savannah sparrow	0.019	75.00	0.00	0.000
song sparrow	0.036	23.53	0.00	0.000
spotted towhee	0.004	40.00	0.00	0.000
tree swallow	0.003	100.00	80.00	0.003
unidentified blackbird	0.627	100.00	94.61	0.593
unidentified finch	0.007	100.00	0.00	0.000
unidentified passerine	0.284	99.27	7.88	0.022
unidentified shrike	0.001	100.00	0.00	0.000
unidentified sparrow	0.008	71.43	0.00	0.000
unidentified swallow	0.025	100.00	2.27	0.001
vesper sparrow	0.006	75.00	0.00	0.000
violet-green swallow	0.001	100.00	50.00	0.001
western kingbird	0.015	93.75	0.00	0.000
western meadowlark	0.758	49.33	0.99	0.004

Table 6. Exposure indices calculated for species observed during fixed-point surveys at KIWP, KIIIWP, BCWP, and BCRA.

Group/Species	Mean use	Percent flying	Percent flying within RSA	Exposure Index
white-crowned sparrow	0.058	70.00	0.00	0.000
yellow-rumped warbler	0.013	100.00	55.56	0.007
Upland Gamebirds	**0.214**	**49.75**	**0.00**	**0.000**
California quail	0.086	71.64	0.00	0.000
chukar	0.040	30.23	0.00	0.000
gray partridge	0.006	50.00	0.00	0.000
ring-necked pheasant	0.082	42.70	0.00	0.000
Doves/Pigeons	**0.123**	**82.93**	**37.25**	**0.038**
mourning dove	0.087	77.42	11.11	0.007
rock pigeon	0.037	100.00	100.00	0.037
Other Birds	**0.006**	**85.71**	**66.67**	**0.004**
Vaux's swift	0.003	100.00	100.00	0.003
northern flicker	0.003	75.00	33.33	0.001
Unidentified Birds				
unidentified large bird	N/A	100.00	0.00	N/A

Table 7. Summary of Bat Mortality for Newer Generation Wind Plant Monitoring Studies in the Western U.S.

Project Name [state]	No. Bats /turbine/year	Approx. Bats per MW[1]	Reference
Washington/Oregon Sites			
Stateline [OR/WA]	1.12	1.70	Erickson et al. 2003
Vansycle [OR]	0.74	1.12	Erickson et al. 2000
Klondike [OR]	1.16	0.77	Johnson et al. 2003
Nine Canyon [WA]	3.21	2.46	Erickson et al. 2003
Combine Hills [OR]	1.88	1.88	Young et al. 2006
Average	1.62	1.59	
Other West and Midwest Sites			
Foote Creek Rim I [WY]	1.34	2.23	Young et al. 2003a
Foote Creek Rim II [WY]	0.79	1.05	Young et al. 2003b
Buffalo Ridge [MN]	2.05	3.10	Johnson et al. 2000
Wisconsin [WI]	4.30	6.51	Howe et al. 2002
Overall Average	1.84	2.31	

[1] Most reports do not provide number of birds per MW of energy produced so this number was calculated based on the mortality per turbine and capacity of turbines studied.

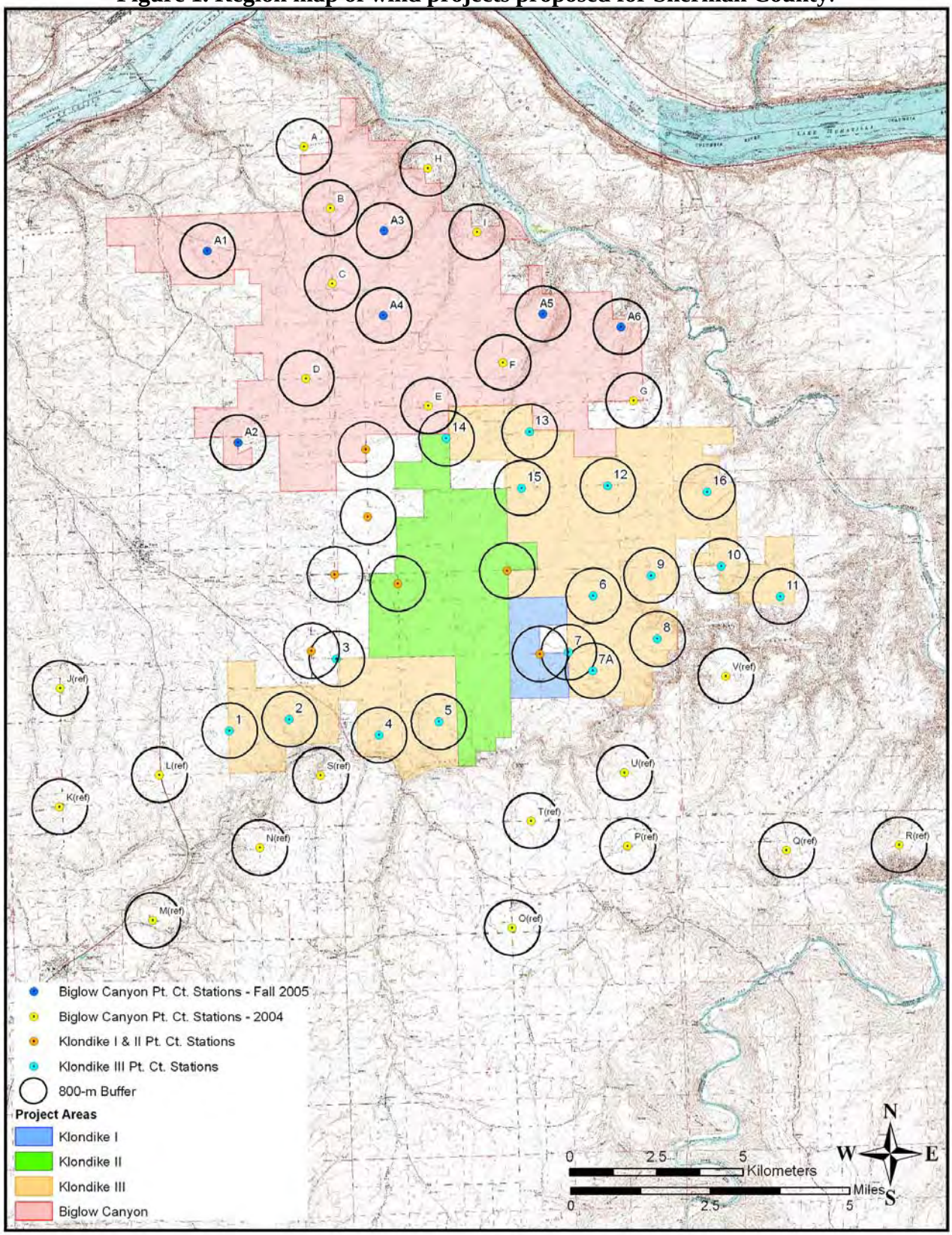
Table 8. Mean raptor use estimates standardized to 20-min surveys and raptor mortality estimates based on fatality studies at region wind projects.

Project	Raptor Use Estimate (#/20-min survey)	Raptor Mortality (#/turbine/year)	References
Vansycle, OR	0.51	0	URS&WEST 2001; Erickson et al. 2000
Stateline, OR	0.41	0.053	URS&WEST 2001; Erickson et al. 2004
Combine Hills, OR	0.61	0	Young et al. 2003 Young et al. 2005
Nine Canyon, WA	0.27	0.065	Erickson et al. 2001 Erickson et al. 2003
Klondike I, OR	0.42	0	Johnson et al. 2002; Johnson et al. 2003
Average	0.44	0.024	

Table 9. Mean bird use estimates standardized to 20-min surveys and all bird mortality estimates based on fatality studies at region wind projects.

Project	All Bird Use Estimate (#/20-min survey)	All Bird Mortality (#/turbine/year)	References
Vansycle, OR	7.06	0.63	URS&WEST 2001; Erickson et al. 2000
Stateline, OR	8.77	1.93	URS&WEST 2001; Erickson et al. 2004
Combine Hills, OR	4.11	2.56	Young et al. 2003 Young et al. 2005
Nine Canyon, WA	6.28	3.59	Erickson et al. 2001 Erickson et al. 2003
Klondike I, OR	9.34	1.42	Johnson et al. 2002; Johnson et al. 2003
Average		2.03	

Figure 1. Region map of wind projects proposed for Sherman County.



Visual Resources
Technical Memorandum

Klondike III/Biglow Canyon Wind Integration Project

Prepared for Bonneville Power Administration, Portland, OR
Prepared by David Evans and Associates, Inc., Portland, OR
January 2006

1 INTRODUCTION

David Evans and Associates, Inc. (DEA) prepared this visual resources technical memorandum for the Bonneville Power Administration (BPA) to support an Environmental Impact Statement for the Klondike III/Biglow Canyon Wind Integration Project.

The project would occur in rural, northeast Sherman County (Figure 1, Appendix A) and generally involves the development of a new transmission line, substation expansion, and appurtenances to integrate proposed private energy facilities (i.e., Klondike III Wind Project and Biglow Canyon Wind Farm) into BPA's transmission system. The transmission line begins roughly one mile south of the Columbia River at the John Day Substation to a point approximately four and a half miles east of Wasco, Oregon, and lies roughly three miles southwest of the John Day River at its closest point.

The Klondike III Wind Project, which would be built by PPM Energy, would consist of an approximately 273 megawatt (MW) wind generation project. The proposed project is adjacent to PPM Energy's Klondike I (24 MW) and Klondike II (75 MW) wind projects. It would be constructed on privately-owned land and be connected to the BPA Klondike Schoolhouse Substation. Klondike III Wind Project facilities would consist of up to 165 wind turbines and towers, approximately 19 miles of new roads, an operations and maintenance (O&M) facility, and two substations.

The Biglow Canyon Wind Farm facility, proposed by Orion Energy, would be an approximately 450 MW wind generation project. The Biglow Canyon Wind Farm will be connected to BPA's transmission system at one of two alternative substations on the Biglow Canyon Wind Farm site. Orion Energy is responsible for selecting its substation alternative. Orion Energy is responsible for selecting the option to be implemented. The Biglow Canyon Wind Farm would consist of up to 225 wind turbines and towers, approximately 40 miles of new roads, an O&M facility, and a substation.

Unless otherwise stated, all figures referenced herein are included in Appendix A; all photographs are in Appendix B.

1.1 METHODS

The analysis area (Figure 1) for visual resources extends approximately 30 miles beyond the transmission alignments. DEA conducted a site visit December 29 and 30, 2005, for the Klondike III/Biglow Canyon Wind Integration Project. DEA also reviewed recent documents from the Klondike III Wind Project Application for Site Certificate (ASC) (DEA, 2005) and the Biglow Canyon Wind Farm ASC (CH2M Hill 2005) and field-verified the findings of these documents to the extent practical. The findings of this memorandum are based upon information gathered during the field investigation, review of reference materials, and DEA's knowledge of visual and aesthetic resource management. DEA staff used a compilation of evaluation techniques prescribed by US Bureau of Land Management (BLM) and US Forest Service (USFS) to identify and assess potential impacts.

Spatial analyses and computer simulations were prepared using Geographic Information System (GIS) software and a suite of graphic software applications. The visibility analysis was conducted using US Geological Survey (USGS) Digital Elevation Models (DEMs). Visibility analysis and modeling techniques were used to determine areas from which the proposed facility would potentially be visible. The DEMs used in the analyses have 30-meter and 10-meter resolutions, meaning the ground is represented by a grid of squares that are 30m x 30m or 10m x 10m, and each square is assigned a single elevation. As such, the resolution of the DEMs is a limiting factor in the precision of these analyses. The models used in the analyses also do not include vegetation or structures, and do not account for attenuating climatic conditions such as distance, haze, humidity, weather, or background landscape. Therefore, it should be noted that these analyses generally overestimate areas of visibility.

Methods specific to the Klondike III Wind Project and Biglow Canyon Wind Farm visual analyses are described in detail in the respective ASCs for those projects.

2 PROPOSED ACTION AND ALTERNATIVES

BPA is considering two action alternatives and a No Action Alternative. The action alternatives consist of: 1) The Proposed Action – signing interconnection agreements with two wind developers, expanding an existing substation, building a new substation, and building a new double-circuit 230-kV transmission line along a northerly route alignment; and 2) The Middle Alternative, which includes the same elements of the Proposed Action but the transmission line alignment is different. Under the No Action Alternative, BPA would not build any new facilities, or sign any interconnection agreements.

The proposals for two wind projects, Klondike III Wind Project and Biglow Canyon Wind Farm, are also described in this section. The two wind projects would utilize the proposed BPA facilities and interconnection agreement to tie into BPA's power grid.

2.1 BPA PROPOSED ACTION

In the Proposed Action, BPA would build and operate a new double-circuit 230-kilovolt (kV) transmission line, build a new 230-kV substation, and expand its existing John Day 500-kV Substation. The double-circuit 230-kV transmission line would be built from BPA's new John Day 230-kV Substation to the Klondike III Wind Project's West Collector Substation. The line would carry 600 MW of capacity in each circuit. The Biglow Canyon Wind Farm project would be looped into one of the circuits located in between Klondike and the new John Day 230-kV Substation.

BPA would expand its existing John Day 500-KV Substation by about 0.3 acre inside the existing yard to include a new 500-kV bay with two transformers. The south fence would be extended and a dead end tower on the southwest corner would be built to connect to a new 230-kV substation.

BPA would build a new 230-kV substation adjacent to and south of John Day 500-kV Substation. The new substation would include a transformer, ring bus and other typical substation equipment. The new substation would encompass about 5 acres.

In addition, BPA proposes to analyze a new substation site in the vicinity of the Klondike III West Collector substation, not needed now, but possibly needed in the future.

2.1.1 Proposed Double-Circuit 230-kV Transmission Line

BPA proposes to build a double-circuit 230-kV transmission line. The proposed route for this line is the North Alternative, which is about 12 miles long.

2.1.1.1 Transmission Structures

Steel tubes and lattice steel transmission towers would be used to suspend the 230-kV transmission line in the air. Steel tubes would be used for tangent and small angle structures. Steel tubes average about 110 feet tall, with the average span 900 to 1,000 feet. Steel tubes are usually preferred in agricultural areas because they do not disrupt farming practices as much as other types of structures.

BPA would use lattice steel towers for the dead-end structures needed for the lines. Deadend structures equalize tension of the conductors between two segments of transmission line where the line makes a turn. Lattice steel towers would be used because they are more cost effective than steel tubes. Lattice steel towers average about 120 feet tall, with the average span 1,000-1,200 feet.

The steel tubes would be embedded in the ground about 20 to 25 feet, in a hole about 5 feet in diameter. The lattice steel towers would be attached to the ground on plate or grillage footings. Plate footings are 6 foot x 6 foot steel plates buried about 10 feet deep. Grillage footings are a 10 foot x 10 foot assembly of steel I-beams that have been welded together and buried 10-12 feet deep.

A trackhoe would be used to excavate an area for the footings. The excavation sidewalls would be sloped or shored to prevent collapse. All the soil and rock materials removed would later be used to backfill the excavated area once the footings are installed.

Transmission structures are normally assembled in sections at a structure site and lifted into place by a large crane (30-100 ton capacity). The construction of a tower and its footings could disturb an area of about an acre (200 feet x 200 feet) using plate and grillage footings.

2.1.1.2 Conductors and Insulators

The wires that carry electrical current in a transmission line are called conductors. The conductor proposed for this project would be about 1.3-1.6 inches in diameter. Conductors are suspended from tubes and towers with insulators. Insulators are made of nonconductive materials (rubber, porcelain or fiberglass) that prevent electric current from passing through the towers to the ground. Insulator strings of non-reflective material for BPA's line would be 10 inches in diameter, and 7 feet long.

Conductors and insulators are installed after the tubes and towers have been built. A pulling cable called a "sock line" is placed on pulleys or travelers that are attached to the insulators on the structures. The sock line is pulled through the pulleys, usually by helicopter. The end of the sock line is attached to a conductor on large reels mounted on trucks equipped with a brake system that allows the conductor to be unwound under tension. The sock line is used to pull the conductors through the series of pulleys mounted on the structures. Conductor tensioning sites are usually located every 2-3 miles.

About 10 tensioning sites would be required for this project. Conductor tensioning sites typically disturb an area of about 1 acre. Disturbance is temporary. Any disturbed area would be restored to pre-construction conditions.

At the dead-end structures, BPA uses two methods to attach the conductor to the structure. The first method, hydraulic compression fittings, uses a large press and pump that closes a metal clamp or sleeve onto the conductor. This method requires heavy equipment and is time consuming. The second method, implosive fittings, uses explosives to compress the metal together. The implosive fittings do a better job of compressing the sleeve onto the conductor and actually weld the metals together. Implosive fittings do not require heavy equipment, but do create noise similar to a loud explosion when the primer is struck. BPA is proposing to use implosive fittings on this project.

Two smaller wires, called ground wires, would also be attached to the top of the transmission structures. Ground wires are used for lightning protection. There is also a series of wires and/or grounding rods (called counterpoise) buried in the ground at each structure. These wires are used to establish a low resistance path to earth, usually for lightning protection.

A fiber optic cable would also be strung on the structures. The fiber optic cable would have up to 36 fibers. The fibers would be used for communications as part of the power system. Fiber optics technology uses light pulses instead of radio or electrical signals to transmit messages. This communication system can gather information about the system (such as the transmission lines in service and the amount of power being carried, meter readings at interchange points, and status of equipment and alarms).

2.1.1.3 Right-of-Way

BPA would acquire easements to build, operate and maintain the transmission line across private properties. The Proposed Action would require new right-of-way 125 feet wide over about 12 miles.

2.1.1.4 Right-of-Way Clearing

Tall trees cannot be allowed to grow into or near the lines because electricity can arc, which can start a fire or injure or kill someone nearby. Most of the land along the right-of-way is in wheat production or has other low-growing vegetation compatible with transmission lines. There are few tall trees along the proposed route and no trees would likely be removed.

2.1.1.5 Access Roads

BPA would use the existing road system as much as possible for construction. However, access would be necessary for construction to each structure site. Any roads needed in farmed fields would be about 14-feet wide, would be temporary and would be removed after construction. If construction were scheduled during the dry season, little or no rock would be necessary on the roads. Access roads would be used by cranes, excavators, supply trucks, boom trucks, and line trucks for construction of the transmission line.

Ground disturbed for temporary roads would be restored to its pre-construction condition after the transmission lines would be built. If crop damage were to occur during construction or maintenance, landowners would be compensated. The exact location of temporary roads, if any would be needed, would not be known until a construction contractor defines their access needs. Access road locations would be coordinated with landowners, to the extent practical, to minimize impacts on property.

2.1.1.6 Stream Crossings

The transmission line would occasionally span across waters of the State or US. The majority of the drainages mapped as intermittent streams on USGS maps did not meet criteria for regulation as jurisdictional waters. The USGS typically bases its mapping of intermittent streams on topography rather than field observation. During the site visit, DEA determined that many of the historically mapped drainages had been plowed through and no longer displayed bed and bank characteristics or other characteristics necessary for indicating the presence of a jurisdictional water body.

Six drainage features containing waters of the state and US (i.e., jurisdictional) were identified during the site visit. They are displayed in Figure 2, and are described separately in the Affected Environment section below.

2.1.1.7 Gates

Some landowners/land managers have policies regarding public access to their properties. Locked gates are commonly used to restrict public access. BPA cooperates with landowners on a case-by-case basis on permanent access, gates and locks.

2.1.1.8 Staging Areas

During transmission line construction, steel, electrical conductors, insulators and hardware are often stockpiled at a site called a staging area or material yard. The contractor(s) hired to construct the line would secure temporary rights to establish a staging area. One 5-acre staging area would be needed for this project. To facilitate construction efficiency, staging areas tend to be located next to highways and main roads. Staging areas are only used prior to and during construction.

2.1.2 Substations

Substations contain electrical equipment that enables BPA to interconnect several different transmission lines, disconnect lines for maintenance or outage conditions, and regulate voltage.

BPA proposes to expand its existing John Day 500-KV Substation by about 0.3 acre inside the existing yard to include a new 500-kV bay with two transformers. The south fence would be extended and a dead end tower on the southwest corner would be built to connect to a new 230-kV substation.

BPA would build a new 230-kV substation adjacent to and south of John Day 500-kV Substation. The new substation would include a transformer, ring bus and other typical substation equipment. The new substation would encompass about 5 acres.

BPA also intends to consider the impacts of building another substation in the area. Because more local wind generation projects are expected to be constructed in the coming years, a substation is likely to be needed in the vicinity to integrate them into BPA's transmission system; however, another substation is not needed at this time.

2.1.3 Communication Facilities

Microwave communication sites and fiber-optic communication lines connect BPA's high-voltage substations to system control centers located in Vancouver and Spokane, Washington. Dispatchers within the control centers remotely monitor meters and gauges on electric power equipment within each substation and receive alarm signals if an emergency were to occur. Dispatchers have the ability to disconnect lines and electrical equipment when transmission failures do occur.

Communications between the wind farm collector facilities and the proposed new 230-kV substation would be accomplished with fiber optic cables. Redundant fiber optics cables with alternate routes would be installed between the new substation and the existing 500-kV substation to ensure that no single failure would disable communications. The circuits would be connected to the existing BPA communication system.

2.1.4 Maintenance

During the life of the project, BPA would perform routine, periodic maintenance and emergency repairs to the transmission line. Maintenance usually involves replacing insulators. Twice a year, a

helicopter would fly over the line to look for hot spots (areas where electricity may not be flowing correctly) or other problems indicating that a repair may be needed.

Vegetation is also maintained along the line for safe operation and to allow access to the line. The project area would need little vegetation maintenance because it is mostly farmed.

If vegetation maintenance is needed, BPA would use an integrated vegetation management strategy for controlling vegetation along its transmission line rights-of-way. The strategy involves choosing the appropriate method for controlling the vegetation based on the type of vegetation and its density, the natural resources present at a particular site, landowner requests, regulations, and costs. BPA may use a number of different methods: manual (hand-pulling, chainsaws), mechanical (roller-choppers, brush-hogs), biological (insects or fungus for attacking noxious weeds), and herbicides.

Prior to controlling vegetation, BPA sends notices to landowners and requests information that might help in determining appropriate methods and mitigation measures (such as herbicide-free buffer zones around springs or wells). Noxious weed control is also part of BPA's vegetation maintenance program and BPA works with the county weed boards and landowners on area-wide plans for noxious weed control.

2.2 MIDDLE ALTERNATIVE

The Middle Alternative would originate from the same location north of PPM's Klondike Schoolhouse Substation as the Proposed Action, but would follow a different route to the new 230-kV substation. This alternative would be approximately 12.5 miles long.

The Middle Alternative has all the components of the Proposed Action, but uses a different alignment.

2.3 NO ACTION ALTERNATIVE

Under the No Action Alternative, no interconnection agreements would be signed with PPM and Orion, and no new substation, substation expansion or transmission line would be constructed.

2.4 KLONDIKE III WIND PROJECT

The Klondike III Wind Project, which would be built by PPM Energy, would consist of an approximately 273 megawatt (MW) wind generation project in northern Sherman County, Oregon. The proposed project is adjacent to PPM Energy's Klondike I (24 MW) and Klondike II (75 MW) wind projects. It would be constructed on privately-owned land and be connected to the BPA Klondike Schoolhouse Substation.

All Klondike III project facilities would be on private agricultural land upon which PPM Energy has negotiated long-term wind energy leases with the landowners. The wind energy leases allow PPM Energy to permit, construct, and operate wind energy facilities for a defined period. In exchange, the landowners receive compensation. The terms of the wind energy leases allow landowners to continue

their farming operations in and around the wind turbine generators and other facilities where the farming activities would not impact operation and maintenance of the wind generation equipment.

Klondike III Wind Project facilities would consist of up to 165 wind turbines and towers, approximately 19 miles of new roads, an operations and maintenance (O&M) facility, and two substations. Wind turbines and roads would be built within 900-foot-wide corridors. Project facilities would occupy approximately 70 acres of land.

2.4.1 Turbines and Towers

Wind turbines consist of two primary components: a tubular tower, and the nacelle, which rests on the tower. The nacelle houses equipment such as the gearbox and supports the turbine blades and hub. The turbines are interconnected with an underground power collection system and linked to the project substation.

The wind turbines would be grouped in linear strings, some of which would include aviation warning lights required by the Federal Aviation Administration (FAA). The number of turbines with lights and the lighting pattern of the turbines would be determined in consultation with the FAA.

One of two turbine types may be used for the project; PPM Energy has not yet made a selection. However, both types would have similar environmental effects and power generation capabilities. The analysis in this technical memorandum is based on a "worst-case" situation; e.g., for the visual assessment, the taller of the two turbines was analysed, and for the noise evaluation, the louder was analyzed.

The blade diameter of the turbines would range from 77 to 82 meters. The height at the hub would be up to 80 meters. The swept area of the rotor would be from 4,658 to 5,281 square meters, and the rotor speed could be between 10 and 18 revolutions per minute (rpm).

The tower supporting each wind turbine would be a tapered monopole, roughly 80 meters tall. It would be supported by a spread footer concrete foundation. The underground footprint of each foundation would be approximately 2,000 square feet. The actual foundation design would be determined based on site-specific geotechnical information and structural loading requirements of the selected turbine model. The towers would be uniformly painted a neutral gray or white color. Each tower would have a locked entry door at ground level and an internal access ladder with safety platforms for access to the nacelle. A controller cabinet would be inside each tower at its base. Towers are typically fabricated in three sections that are assembled on-site, and they are designed to withstand the maximum wind speeds expected at the project – typically 60 meters per second (m/s) (134 miles per hour [mph]) at hub height.

A generator step-up (GSU) transformer would be installed at the base of each wind turbine to increase the output voltage of the wind turbine to the voltage of the power collection system (typically 34.5 kV). Small concrete slab foundations would support the GSU transformers.

2.4.2 Power Collection System

A network of underground power lines would be installed within the prism of new and existing roads at the project to collect power generated by the individual wind turbines and route the power to a collector substation for delivery into the utility grid. The power collection system would operate at 34.5 kV. Where geotechnical conditions or other engineering considerations require, the collector system may be aboveground.

Power from the eastern section of the project would be routed to a collector substation near Webfoot. From that substation, aboveground power lines, hung on single wood or steel poles of a type similar to other power lines in the area, would carry the power approximately 3.5 miles to the BPA Klondike Schoolhouse Substation. The poles would be approximately 110 feet tall, sunk 30 feet deep. They would be spaced approximately 500 to 700 feet apart. All poles would conform to raptor protection guidelines.

2.4.3 Interconnection/Substations

Additional substation equipment near the existing BPA Klondike Schoolhouse Substation would be constructed to accommodate and step up the additional power entering the grid. The additional substation equipment would include foundations, circuit breakers, power transformer(s), bus and insulators, disconnect switches, relaying, battery and charger, surge arrestors, AC and DC supplies, control house, metering equipment, SCADA provision, grounding, fence, and associated control wiring. The facilities would conform to all applicable Oregon and BPA regulations and standards, as required.

The proposed collector substation would occupy approximately four acres of land.

A collector substation would also be built on a four-acre parcel near Webfoot. The O&M facility would be on the same parcel.

2.4.4 Operations and Maintenance Facility

An approximately 5,000-square-foot O&M building would be built on the Klondike III project site, on a four-acre parcel near Webfoot. A water supply (on-site well of <5000 gallons/day) and sanitary facilities would be constructed at the new O&M site to serve the Klondike III project. Power to the new O&M building would be supplied by Wasco Electric Cooperative and would be carried from the existing O&M building one mile east on the poles of the aboveground collection system

2.4.5 SCADA System

A supervisory, control and data acquisition (SCADA) system to be installed at the project would collect operating and performance data from each wind turbine and the project as a whole, and provide remote operation of the wind turbines. The wind turbines would be linked to a central computer via a fiber optic network. The host computer is expected to be located in the operations and maintenance (O&M) facility at the project site.

2.4.6 Meteorological Towers

Three permanent, un-guyed, meteorological towers would also be part of the facility. They would collect wind resource data.

2.4.7 Roads

Within the project, approximately 19 miles of new roads would be constructed to access turbines. The roads would be 20 feet wide and constructed with crushed gravel.

Existing roads in the project vicinity would be upgraded and widened, where necessary, to accommodate construction and O&M equipment.

Temporary access roads may also be built during construction. They would be removed after construction.

2.4.8 Construction Laydown Areas

Approximately 55 acres of temporary disturbance would occur in 19 laydown areas that would be used to stage construction and store supplies and equipment during construction. A 2-acre laydown area would be adjacent to each proposed turbine string, and four 4-acre laydown areas would be located throughout the project site. The laydown areas would have a crushed gravel surface. After construction, the laydown areas would be removed, and the disturbed areas would be restored to their pre-construction conditions.

2.5 BIGLOW CANYON WIND FARM

The Biglow Canyon Wind Farm facility, proposed by Orion Energy, would be an approximately 450 MW wind generation project in northern Sherman County. The Biglow Canyon Wind Farm will be connected to BPA's transmission system at one of two alternative substations on the Biglow Canyon Wind Farm site. Orion Energy is responsible for selecting its substation alternative.

The project would be built on private land. Orion Energy has negotiated long-term wind energy leases with the landowners in which the energy facilities would be constructed and operated in exchange for compensation to the landowners.

The Biglow Canyon Wind Farm would consist of up to 225 wind turbines and towers, approximately 40 miles of new roads, an O&M facility, and a substation. Wind turbines and roads would be built within 500-foot-wide corridors. Project facilities would occupy approximately 177 acres of land.

2.5.1 Turbines and Towers

Generally, the turbines and towers for the Biglow Canyon Wind Farm project would be similar to those described for the Klondike III Wind Project. As with the Klondike III project, the specific turbine type has not yet been selected. The blade diameter of the turbines would likely be up to 100

meters, and the tower height would be up to 85 meters. The analysis in this technical memorandum is based on a "worst-case" scenario, as described for the Klondike III project.

2.5.2 Power Collection System

A transformer would be placed next to each turbine tower to increase the output voltage to 34.5 kV. Each transformer would be placed on a concrete slab. From the transformer, power would be transmitted via electric cables, some of which would be buried. In areas where collector cables from several turbine strings follow the same alignment (e.g., near the facility substation), multiple sets of cables could be installed within a single trench. There would be approximately 700,000 feet of underground electric cables.

In some areas, collector lines may be installed above ground on pole or tower structures. Aboveground lines would allow the collector lines to span terrain such as canyons, native grasslands, wetlands, and intermittent streams, thereby reducing environmental impacts, or to span cultivated areas and reduce impacts to farming. Overhead structures would generally be between 23 and 28 feet tall.

2.5.3 Substation and Interconnection to BPA

The Biglow Canyon Wind Farm will be connected to BPA's transmission system at one of two alternative substations on the Biglow Canyon Wind Farm site. Orion Energy is responsible for selecting its substation alternative. With either option, the proposed substation site would be a graveled, fenced area of up to 6 acres, with transformer and switching equipment and a parking area. Transformers would be non-PCB (polychlorinated biphenyl), oil-filled types.

2.5.4 Operations and Maintenance Facility

A permanent O&M facility would include approximately 5,000 square feet of enclosed space, including office and workshop areas, control room, kitchen, bathroom, shower, utility sink, and other facilities. Water would come from a well that would be constructed on the site. Water use is not expected to exceed 1,000 gallons per day. Domestic wastewater would drain to an on-site septic system. A graveled parking area for employees, visitors, and equipment would be built in the vicinity of the building. The O&M facility may be built adjacent to the proposed substation on the Biglow Canyon project site.

2.5.5 SCADA System

A SCADA system, similar to that described for the Klondike III project, would be installed and linked to a central computer in the O&M building.

2.5.6 Meteorological Towers

Up to 10 meteorological towers would be placed throughout the Biglow Canyon project site. The towers, which would be up to 279 feet tall, would collect wind resource data.

2.5.7 Roads

Existing roads in the project vicinity are typically 16 to 20 feet wide. Some existing roads would be widened—up to 35 feet wide for construction, and up to 16 or 18 feet wide for operation, including an additional 5 to 6 feet of shoulders. Roads would be improved, where necessary, by adding an all-weather surface.

New access roads would be constructed where there are no roads near proposed turbine strings. Approximately 40 miles of new access roads would be built. They would be approximately 16 to 18 feet wide for operation, including an additional 5 to 6 feet of shoulders.

Temporary access roads may also be built during construction. They would be removed after construction.

2.5.8 Construction Laydown Areas

Up to six principal, temporary laydown areas for construction staging would be located on site. Each laydown area would comprise up to five acres and would be covered with gravel. After construction, the gravel would be removed and the area restored.

In addition to the principal laydown areas, temporary laydown areas would be located at each turbine location and at each turbine string. Each turbine laydown area would temporarily disturb approximately 4,000 square feet. Placement of blades in the laydown areas is expected to result in little or no soil disturbance.

In total, construction activities (e.g., laydown areas and collector system trenches) would disturb approximately 375 acres.

3 AFFECTED ENVIRONMENT

3.1 GENERAL LANDSCAPE CHARACTER

The general landscape character within the analysis area typically features rolling hills in dry land winter wheat production or grasses dedicated to conservation easements through the Conservation Reserve Program (CRP) administered by the Natural Resources Conservation Service (NRCS). Most of the project area is in wheat production. Very little acreage of native plant communities remain, occurring in small patches along tributaries and unnamed drainages to the Columbia, John Day, and Deschutes rivers. These communities consist of shrublands dominated by sagebrush (*Artemisia tridentata*) and rabbitbrush (*Chrysothamnus* sp.), and native bunchgrass grasslands (various spp.), which generally have a high percent cover of invasive species such as cheatgrass (*Bromus tectorum*) mixed with sparse cover of native grasses such as bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg bluegrass (*Poa secunda*), and Idaho fescue (*Festuca idahoensis*) where fire and human disturbance has not eliminated them from the landscape. Agricultural areas dominate the plateau to the east. Agricultural areas that are enrolled under the CRP are located mainly in the western portion of the project corridor. CRP areas have been planted with a mix of native and non-native bunch grasses with the primary intent of increasing wildlife habitat in the area.

The Deschutes River Canyon and John Day River Canyon are important features draining to the Columbia River. Basalt cliffs and rock outcrops are typical within the river canyons and are important visual elements. Where vegetation is not in agricultural production or conservation, it is characterized by shrub-steppe habitat typical to central Oregon. Trees are very sparse, usually occurring in ravines or near the few homesites as shelter belts. The Cascade Mountains, including views of Mount Hood and other peaks and ridgelines, are visible in the distant background in clear conditions when not blocked by local topography. Elevations along the plateau, within the project area, range from approximately 1,250 feet to 1,500 feet. Elevations at the western end of the project corridor drop to roughly 800 feet at the bottom of the Gerking Canyon drainage. Photos 1 through 4 (Appendix B) provide typical images of the landscape in the project area including existing wind turbines and substation facilities.

Multiple transmission and distribution lines cross the project area as well as transportation corridors including the Columbia River, Interstate 84 (I-84), US Highway 97, Oregon Route (OR) 206, and Washington State Route 14 (SR-14).

3.2 IMPORTANT VISUAL RESOURCES

Several important visual resources have been identified in the analysis area. These resources, described below, are summarized in Table 1 and identified in Figures 2 and 3.

Table 1. Important Visual Resources within the Analysis Area and Their Approximate Minimum Distance from the Proposed Facilities

Visual Resource	Direction/Distance (miles) from		
	BPA	Klondike III	Biglow
Columbia River Gorge National Scenic Area	W, 9	NW, 12.2	W, 10
John Day River Canyon	E, 2.5	E, 0.8	W, 23
Oregon National Historic Trail High Potential Sites:			
Fourmile Canyon	E, 25	E, 20.0	E, 23
John Day River Crossing (a.k.a. McDonald Ferry)	SE, 4	E, 2.0	SE, 6
Biggs Junction	W, 7	NW, 11.0	W, 8
Deschutes River Crossing	W, 10	NW, 13.5	W, 11
The Dalles Complex	W, 24	W, 28.0	W, 25
Lower Deschutes River Canyon	W, 9	W, 8.0	W, 10
Lower Klickitat River Canyon	W, 25	NW, 27.5	W, 26
Journey Through Time Scenic Byway	SW, 1.5	W, 0.5	W, 2

3.2.1 Columbia River Gorge National Scenic Area

The Columbia River Gorge National Scenic Area (CRGNSA) is managed for an "unparalleled combination of scenery, geology, plants, wildlife, and multicultural history" (Columbia River Gorge

Commission and USFS, 1992). The exceptional beauty of this region is largely derived from its diverse character. Key viewing areas (KVAs) are important viewpoints open to the public offering opportunities to view the Gorge. KVAs within the analysis area include Historic Columbia River Highway, I-84, Washington SR-14, the Columbia River, and Rowena Plateau (i.e., Tom McCall Preserve). Designated Scenic Travel Corridors in the analysis area include the Historic Columbia River Highway, I-84, SR-14, and Washington State Route 142 (SR-142), and I-84. A view from the eastern boundary of the CRGNSA along SR-14 to the project area is shown in Photo 5.

3.2.2 John Day River Canyon

The John Day River system includes more than 500 river miles and is one of the longest free-flowing river systems in the continental United States (USDI Bureau of Land Management [BLM], 2001). The landscape within the analysis area features high desert communities of sagebrush and juniper with intermingled private ranches adding visual interest along the river (BLM, 2000). The John Day River Canyon (i.e., the area from rim to rim) is identified as an "area of high visual quality" (BLM, 1986). The BLM manages its lands in this area as a Visual Resource Management (VRM) Class II resource, meaning management activities resulting in changes to the existing character of the landscape may be allowed, provided they do not attract the attention of the casual observer (USDI 2000). A typical view of the John Day River corridor near McDonald Crossing is shown in Photo 6.

Beginning at Tumwater Falls near river mile 10 upstream through the analysis area, the river is a designated Federal Wild and Scenic River and classified as Recreational, meaning that at the time of designation, the segment was readily accessible by road or railroad, may have some shoreline development, and may have undergone some impoundment or diversion in the past. Outstanding remarkable values in this segment include "scenic, recreation, fish, wildlife, geological, paleontological, and archaeological" values. Botanical and ecological values are also deemed important (BLM, 2001). The segment is designated as a State Scenic Waterway pursuant to the Oregon State Scenic Waterways Act, ORS 390.805-390.925.

The Two Rivers Resource Management Plan Record of Decision (BLM, 1986) identifies two Special Management Areas relevant to this project: the Oregon Trail Historic Sites at Fourmile Canyon and McDonald Crossing, and the John Day River Canyon. For the trail sites, "the unusual qualities of these sites will be maintained and protected" (BLM, 1986). For the canyon, "areas of high visual and natural quality will continue to be protected while allowing other compatible uses in the same area" (BLM, 1986).

3.2.3 Oregon National Historic Trail

In 1978, Congress authorized the Oregon National Historic Trail to commemorate the historic Oregon Trail and to promote its preservation, interpretation, public use, and appreciation. The Management and Use Plan Update Final Environmental Impact Statement Oregon National Historic Trail and Mormon Pioneer National Historic Trail (USDI, National Park Service [NPS], 1999), is a coordinating document that provides broad-based polices, guidelines, and standards for administering the trail to guide its protection, interpretation, and continued use.

Within the analysis area, the plan identifies five High-Potential Sites based on "historic significance, the presence of visible historic remnants, scenic quality, and relative freedom from intrusion" (USDI 1999). These sites include Fourmile Canyon, John Day River Crossing (a.k.a. McDonald Ferry), Biggs Junction, Deschutes River Crossing, and The Dalles Complex. The plan does not identify specific scenic or aesthetic values in the analysis area beyond these five sites. Intact segments or other visual evidence (e.g., wagon ruts, scars) of the trail are not known to exist within the project area. Nearly all evidence of the trail within the analysis area has been destroyed through agricultural practices. Photo 7 depicts typical conditions along the trail alignment in the project vicinity.

3.2.4 Lower Deschutes River Canyon

The Lower Deschutes River is a designated Federal Wild and Scenic River and Oregon State Scenic Waterway. The Lower Deschutes Canyon "contains a diversity of landforms, vegetation and color" (BLM 2001) where the river has carved a dramatic canyon through rugged Columbia River basalt flows. Riparian vegetation provides stark contrast against the broken reddish brown canyon walls. Transportation corridors (roads and railroad), and rural development occur in several areas throughout the canyon.

3.2.5 Lower Klickitat River Canyon

The lower ten miles of the Klickitat River from its confluence with Wheeler Creek, near the town of Pitt, to its confluence with the Columbia River is designated a Federal Wild and Scenic River with a Recreational classification. Outstandingly remarkable resources include the river's free-flowing nature, resident and anadromous fish and their habitats, Native American dip-net fishing, and the geology of the lower gorge (USFS, 1991). A small area in the Wahkiacus drainage of the Klickitat River canyon is designated as a wildflower viewing area (Priebe, 2005).

3.2.6 Journey Through Time Scenic Byway

The Journey Through Time Scenic Byway is administered through the Oregon Department of Transportation Scenic Byway Program. The Journey Through Time Management Plan speaks to the rural heritage and history of the 286-mile route through north central Oregon. The plan establishes four goals: create jobs; maintain rural lifestyles (i.e., support traditional industries of agriculture and timber); protect important values (e.g., historical attractions); and build identity for the north central Oregon region. The plan identifies the communities of Wasco, Moro, and Grass Valley, the Historic Oregon Trail and Barlow Road, and the Sherman County Museum as points of interest within the analysis area. Photos 8 and 9 illustrate typical views from the byway at milepost 12 approximately three miles south of Wasco.

3.2.7 Local Site Features

In addition to the Deschutes and John Day rivers, Sherman County identifies rock outcroppings and trees as important landscape features (Sherman County, 2003). Gilliam County identifies "rock outcroppings marking the rim and walls of steep canyon slopes as an important characteristic of the county's landscape" as well as the John Day River (Gilliam County, 2000).

3.3 BPA'S PROPOSED ACTION

The transmission line alignment for BPA's Proposed Action does not occur within the boundary of any important visual resources (e.g., John Day Wild and Scenic River boundary); however, the transmission line would cross the Oregon National Historic Trail alignment. Segments of the Proposed Action alignment would likely be visible from small portions of the Journey Through Time Scenic Byway, the John Day River corridor, and the CRGNSA, including SR-14. The transmission line and substation facilities would be visible from (and often adjacent to) several roads in the project vicinity. Portions of the alignment would likely be visible from private residences in the project vicinity.

3.4 MIDDLE ALTERNATIVE

The Middle Alternative would be visible or not visible from the same general areas as the Proposed Action.

3.5 KLONDIKE III WIND PROJECT

The Klondike III Wind Project would not occur within the boundary of any important visual resources. The project would likely be visible from portions of the John Day River corridor, the CRGNSA, including SR-14; and the Journey Through Time Scenic Byway. Turbine strings would cross the Oregon National Historic Trail alignment in several locations. Turbines would be visible from local roads and private residences in the project vicinity.

3.6 BIGLOW CANYON WIND FARM

The Biglow Canyon Wind Farm would be visible or not visible from the same general areas as the Klondike III Wind Project.

4 ENVIRONMENTAL CONSEQUENCES

4.1 IMPACT LEVELS

Impacts would be considered **high** where actions would:

- Become the dominant feature or focal point of the view, especially from residences or schools.
- Become the dominant feature or focal point of the view and adversely affect the existing character and quality of views from parks, recreation facilities, public trails, and public lands and waters used for dispersed recreation where the appreciation of natural and scenic resources is a valued part of the use, such as the Columbia Gorge National Scenic Area.
- Affect a large number of sensitive viewers in predominantly the foreground and middle ground of the view.

- Become the dominant feature or focal point of view from major travel corridors along which existing scenic quality is high and/or policies have been applied to preserve and enhance aesthetic values.

Impacts would be considered **moderate** where actions would:

- Be clearly visible in the view but not the dominant feature of the view.
- Affect a large number of sensitive viewers mostly in the middleground of their view.
- Not become the dominant view but are in view from parks, recreation facilities, public trails, and public lands and waters used for dispersed recreation where the appreciation of natural and scenic resources is a valued part of the use.
- Not become the dominant view but would be in view from major travel corridors along which existing scenic quality is high and/or policies have been applied to preserve and enhance aesthetic values.
- Not become the dominant view but would be in view from locally important roads along which visual quality is not high and which have not been designated for scenic protection.

Impacts would be considered **low** where actions would:

- Be somewhat visible but not obtrusive in the view.
- Be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view.

No impact would occur if:

- The facilities would be isolated, screened, not noticed in the view, or seen from a distance greater than 3 miles.
- No visually sensitive resources would be affected.

Table 2 summarizes potential impacts to visual resources within the analysis area. Descriptions of impacts to the general project vicinity and important visual resources are provided below.

Table 2. Summary of Impacts to Visual Resources within the Analysis

Visual Resource	Level of Impact		
	BPA	Klondike III	Biglow

Visual Resource	Level of Impact		
	BPA	Klondike III	Biglow
General Project Vicinity	Mod	Mod to High	Mod to High
Columbia River Gorge National Scenic Area	Low to none	Low to none	Low to none
John Day River Canyon	None	Low to Mod	Low to Mod
Oregon National Historic Trail High Potential Sites:			
Fourmile Canyon	None	None	None
John Day River Crossing (a.k.a. McDonald Ferry)	None	Low to Mod	None
Biggs Junction	None	None	None
Deschutes River Crossing	None	None	None
The Dalles Complex	None	None	None
Lower Deschutes River Canyon	None	None	Low to none
Lower Klickitat River Canyon	None	None	None
Journey Through Time Scenic Byway	Low	Low to Mod	Low to Mod

4.2 BPA'S PROPOSED ACTION

4.2.1 Impacts

A visibility analysis (Figures 4 and 5) was conducted for the proposed transmission line alignment to determine areas from which the alignment would likely be visible. The analysis conservatively assumed towers would occur at angle points and at 900-foot intervals along the alignment and would be 120 feet tall. The substation facilities were not modeled because they are of similar nature and adjacent to existing facilities and would not likely increase the visual effect of the existing facilities.

The visibility analysis indicates the Proposed Action would likely be visible from portions of the CRGNSA, including SR-14; the John Day River corridor; and the Journey Through Time Scenic Byway. The Proposed Action alignment would cross the Historic Oregon Trail alignment, but not in the vicinity of any intact trail segments. The transmission alignment would not be visible from known intact trail segments or from the High Potential Sites identified in the trail's management plan (NPS, 1999).

General Project Vicinity

The proposed facility would be visible from many locations in the analysis area at distances ranging from the immediate foreground (less than 100 feet) to the distant background (greater than 20 miles).

The proposed facility would be highly visible in the foreground from local roads, local residences and agricultural lands in rural Sherman County.

Within the general project vicinity (excluding the John Day River Corridor which is discussed below), the Proposed Action would result in moderate impacts because the transmission lines, towers, and substation facilities generally would be clearly visible in the view but not the dominant feature of the view. It is important to note, however, that the local project vicinity includes few sensitive viewers, lacks Key Viewing Areas (KVAs), and lacks important visual resources with the exception of the John Day River Canyon. Further, local land use policy supports the development of wind energy in Sherman County (Sherman County, 2003).

Columbia River Gorge National Scenic Area

The visibility analysis indicates some portion of the proposed facility would potentially be visible from the CRGNSA. A site visit to I-84 and SR-14 within the CRGNSA boundary indicate the proposed facility would not be visible from I-84 and may be intermittently visible from SR-14. Visibility would occur at such great distances (approximately nine miles) that impacts, if any, would be low. Photo 5 illustrates views from the CRGNSA east boundary at SR-14 toward the project area. Almost without exception, topography or vegetation would screen the proposed facility from view.

The visibility analysis also suggests portions of the proposed facility would be visible within the CRGNSA in Oregon nearer the Deschutes River. Access to these areas is very limited, so opportunities to view the proposed facility are low. The proposed facility would be subordinate to the existing landscape character, which includes multiple transmission lines of similar character to the Proposed Action.

In summary, topography and vegetation would substantially screen the proposed facility from the majority of the CRGNSA. It is possible that the proposed facility would be visible in the distant background from some areas with limited to very limited access and opportunities for viewing. In those areas, the proposed facility would be subordinate to the landscape setting that typically includes substantial human development such as interstate and rail transportation corridors, transmission lines, and urban and rural development in the foreground, middleground, and background.

Impacts to the CRGNSA would be low to none because the proposed facility would be somewhat visible, but not obtrusive; would be seen by few sensitive viewers in the background; and would be seen from a distance of greater than three miles.

John Day River Canyon

The BLM administers the majority of public lands within the John Day River Canyon and has indicated that its concern would be visual impacts seen from the John Day River (Mottl H., 2005). The proposed facility may be visible from higher portions of the John Day River Canyon (i.e., near the canyon rim), but it would not be visible from the river.

No impacts would occur to the John Day River Canyon because the Proposed Action would not be seen from the river.

Oregon National Historic Trail

The Proposed Action alignment would cross the trail alignment in areas where previous agricultural activities have destroyed any evidence of the trail. The proposed facility would not be visible at Fourmile Canyon, Biggs Junction, the Deschutes River Crossing, McDonald Ferry, or The Dalles Complex. Therefore, there would be no impact to these resources.

Lower Deschutes River Canyon

The proposed facility would not be visible from the Lower Deschutes River Canyon. Therefore, there would be no impact to this resource.

Lower Klickitat River Canyon

The proposed facility would not be visible from the Lower Klickitat River Canyon. Therefore, there would be no impact to this resource.

Journey Through Time Scenic Byway

Portions of the proposed facility would likely be visible from the Byway. However, the proposed facility would be compatible with the Journey Through Time Management Plan's stated goals. The communities of Wasco and Moro have no stated scenic or visual management goals or objectives and the Sherman County Comp Plan Goal XVIII supports the development of wind energy (Sherman County, 2003).

The proposed facility would have low impacts on the Journey Through Time Scenic Byway because it would be somewhat visible but not obtrusive in the view and would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view.

4.2.2 Mitigation

Impacts to the general project vicinity would be moderate and would be compatible with applicable management plans and land use policies Impacts to important visual resources would be low to none. Since the Proposed Action would be compatible with applicable management plans and land use policies, no mitigation would be necessary to compensate for project impacts. However, the following best management practices would be implemented to further reduce potential impacts:

- Use of steel tubes (vs. steel lattice) for towers to the extent possible
- Use of non-reflective gray paint on tower structures

- Use of non-specular conductors (i.e., a conductor that has been modified to reduce the amount of reflected light from its surface)

4.3 MIDDLE ALTERNATIVE

4.3.1 Impacts

Impacts would be similar for the Middle Alternative as for the Proposed Action and would result in moderate impacts to the general project vicinity and low to no impacts to important visual resources. The visibility analysis (Figures 4 and 5) shows the areas from which the Middle Alternative and Proposed Action may be visible. See Section 4.2.1.

4.3.2 Mitigation

Mitigation measures would not be required since impacts would be compatible with applicable management plans and land use policies. The same best management practices would be incorporated in the Middle Alternative as in the Proposed Action to further reduce potential impacts.

4.4 KLONDIKE III WIND POWER PROJECT

4.4.1 Impacts

A visibility analysis using GIS software and USGS 30-meter and 10-meter DEMs was conducted for the proposed Klondike III Wind Project to determine areas from which the project may be visible. The visibility analysis indicates the project would be highly visible in the general project vicinity and would likely be visible from portions of the CRGNSA including SR-14, John Day River Canyon, and the Journey Through Time Scenic Byway, and from the vicinity of McDonald Crossing, an Oregon National Historic Trail High Potential Site. The discussion on potential impacts to important visual resources has been taken from the Klondike III Wind Project ASC (DEA, 2005).

General Project Vicinity

The proposed Klondike III Wind Power Project would be visible from many locations in the analysis area at distances ranging from the immediate foreground (less than 100 feet) to the distant background (greater than 20 miles). The proposed facility would be highly visible in the foreground from local roads and agricultural lands in rural Sherman County. Turbines would be visible in the middleground and background from portions of US 97 and SR-14 in Washington near Maryhill and other similar locations.

Within the general project vicinity (excluding the John Day River Corridor which is discussed below), the facility would result in moderate to high impacts because the turbines and appurtenances would become the dominant feature or focal point of the view and would be clearly visible in the view but not the dominant feature of the view. It is important to note, however, that the general project vicinity includes few sensitive viewers, lacks Key Viewing Areas (KVAs), and lacks important visual resources with the exception of the John Day River Canyon. Further, local land use policy supports the development of wind energy in Sherman County (Sherman County, 2003).

Columbia River Gorge National Scenic Area

The visibility analyses for Oregon and Washington indicate some portion of the proposed facility would potentially be visible from the CRGNSA. The principal investigator visited several locations to ground-truth the models. Site visits to the Wasco County Museum, I-84, US Highway 30, and Cherry Heights Road (west of The Dalles) indicate the proposed facility would not be visible as indicated by the visibility analysis results, or would be visible at such great distances (approximately 20 miles or greater) that impacts, if any, would be negligible. Almost without exception, topography or vegetation would screen the proposed facility from view. The model also suggests portions of the proposed facility would be visible within the CRGNSA in Oregon near the Deschutes River. Access to those areas is very limited, so opportunities to view the proposed facility are not substantial.

In Washington, the proposed facility would not be visible from SR-142 in the analysis area, and may be intermittently visible from SR-14 near the east end of CRGNSA. Further, access to the other areas within the CRGNSA from which the proposed facility would be visible is very limited, if existent at all. Opportunities to view the proposed facility are not substantial.

In summary, topography and vegetation would substantially screen the proposed facility from the majority of the CRGNSA. It is possible that the proposed facility would be visible in the distant background from some areas with limited to very limited access and opportunities for viewing. In those areas, the proposed facility would be subordinate to the landscape setting that typically includes substantial human development such as interstate and rail transportation corridors, transmission line corridors, and urban and rural development in the foreground and middleground.

Impacts to the CRGNSA would be low to none because the proposed facility would be somewhat visible, but not obtrusive; would be seen by few sensitive viewers in the background; and would be seen from a distance of greater than three miles.

John Day River Canyon

The BLM administers the majority of public lands within the John Day Canyon and has indicated that its concern would be visual impacts seen from the John Day River (Mottl H., 2005). Therefore, the following assessment keys on impacts to the river and its shoreline and does not consider impacts to the canyon walls that have very limited access. Portions of the proposed facility would be visible from locations along the upper portions of the canyon walls with the highest likelihood occurring downstream of McDonald Ferry (approximately river mile 20.7).

The computer modeling and analyses indicate portions of the proposed facility would be visible from two river segments: one near McDonald Ferry, the other between approximate river miles 15.9 and 16.8.

From the vicinity of McDonald Ferry, visibility analyses and simulations indicate the blade tips of three turbines would be visible. The nacelle and blades of another turbine would be visible. The turbines would not be visible from the nearby BLM interpretive facility for the Historic Oregon Trail

or its access road. From a boater's perspective, viewing the turbines would require looking back up the canyon. Assuming a floating speed of four miles per hour (mph), the turbines would be in view for approximately one and one-half minutes. The turbines would appear small in scale in the background compared to other human development impacts in the canyon (e.g., irrigated pasture, farm and irrigation equipment, farm houses, trailers, fences, livestock, power lines) that are visible in the foreground and middleground from the river. Other factors contributing to the minimal contrast of the proposed facility include viewing distance, angle of observation, light conditions, and atmospheric conditions, which have the effect of making the turbines less visible when the sun is in the west or when views are obscured by precipitation, haze, dust, smoke, or fog.

The proposed facility as seen from McDonald Ferry would have a weak contrast and would therefore be compatible with BLM's VRM Class II management objective: "management activities resulting in changes to the existing character of the landscape may be allowed, provided they do not attract the attention of the casual observer" (BLM, 2000).

The second area of impact would occur between approximate river miles 15.9 and 16.8. Visibility analyses and simulations indicate that the blade tips of six turbines would be visible at different times for different durations through the approximately one-mile segment. Most turbines would be visible for much less of the one-mile segment. Assuming a floating speed of four mph, the viewer would move through this one-mile segment in approximately 14 minutes.

In many cases, the turbines' silhouettes would be barely discernible, if at all. Similar to the turbines' effects at McDonald Ferry, the turbines in this segment would appear small in scale compared to other development in the canyon and to the scale of the canyon in general. The distance from the viewer to the turbines, angle of observation, light conditions, and atmospheric conditions would further reduce perceived contrast and impacts. The potential impacts in this segment would be weak and would therefore be compatible with BLM's VRM Class II management objective.

Impacts resulting from the proposed facility would be low to moderate because the proposed facility would not become the dominant view but would be in view from parks, recreation facilities, public trails, public lands and waters used for dispersed recreation where the appreciation of natural and scenic resources is a valued part of the use, would be somewhat visible but not obtrusive in the view, and would be seen by few sensitive viewers because facility would be substantially screened by existing topography.

Oregon National Historic Trail

The proposed facility would not be visible at Fourmile Canyon, Biggs Junction, the Deschutes River Crossing, and The Dalles Complex (Anderson, 2005; Fitzwater, 2005). Therefore, there would be no impacts to these resources.

Portions of four turbines would be visible from the John Day River and small portions of its banks at McDonald Ferry. The proposed facility would not be visible from the BLM interpretive site near McDonald Ferry or from the road accessing the interpretive site. Factors including the limited length

of viewing time, relative small size and scale of the impact, and spatial relationships substantially limit the contrast of the proposed facility against the existing landscape. Other factors including the angle of observation, light conditions, and atmospheric conditions will also limit the significance of the impact.

The proposed facility would have moderate to low impacts on McDonald Ferry because portions of the project would not become the dominant view but would be in view from public lands and waters used for dispersed recreation where the appreciation of natural and scenic resources is a valued part of the use, would be somewhat visible but not obtrusive in the view, and would be seen by few sensitive viewers because facilities are screened by existing topography.

Lower Deschutes River Canyon

The proposed facility would not be visible from the Lower Deschutes River Canyon (Anderson, 2005; Fitzwater, 2005;, Houck, 2005; Mottl, T., 2005). Therefore, there would be no impact to this resource.

Lower Klickitat River Canyon

The proposed facility would not be visible from the Lower Klickitat River Canyon. Therefore, there would be no impact to this resource.

Journey Through Time Scenic Byway

Portions of the proposed facility would be visible from the Byway. A representation of potential impacts viewed from the intersection of US 97 and Old Sherman Highway approximately one mile south of Wasco in included in Appendix C. Although portions of some turbines would be visible, the proposed facility would be compatible with the Journey Through Time Scenic Byway stated goals. Portions of the proposed facility may be visible from Wasco and its immediate surroundings, but existing buildings and topography would likely screen most of the turbines from view. The visibility analysis indicates that the proposed facility would be visible from some areas near Moro. Field investigations suggest topography and vegetation would substantially block views from Moro and the Sherman County Museum. The proposed facility would not be visible from Grass Valley. The communities of Wasco and Moro have no stated scenic or visual management goals or objectives and the Sherman County Comp Plan Goal XVIII supports the development of wind energy (Sherman County 2003).

The proposed facility would have low to moderate impacts on the Journey Through Time Scenic Byway because portions of the project:

- would be visible in the view but not the dominant feature of the view;
- would not become the dominant view but would be in view from locally important roads along which visual quality is not high and which have not been designated for scenic protection;

- would be somewhat visible but not obtrusive in the view; and

- would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view

4.4.2 Mitigation

Impacts to the general project vicinity would be moderate to high and would be compatible with applicable management plans and land use policies. Since the proposed facility would be compatible with applicable management plans and land use policies, no mitigation would be necessary to compensate for project impacts.

Impacts to the Journey Through Time Scenic Byway would be low to moderate. Since the proposed facility would be compatible with applicable management plans and local land use policies, mitigation would not be required.

Impacts to the John Day River canyon including McDonald Ferry would be low to moderate. Since the proposed facility would be compatible with applicable management plans and local land use policies, mitigation would not be required.

Impacts to other important visual resources and to the landscape in general would be low to none, so mitigation would not be required. However, the following best management practices would be implemented to further reduce potential impacts:

- Implementation of active dust suppression measures during the construction period to minimize the creation of dust clouds.

- Use of wind turbine towers, nacelles, and rotors that are locally uniform and that conform to high standards of industrial design to present a trim, uncluttered, aesthetic appearance.

- Use of low-reflectivity, neutral gray, white, off-white, or earth tone finishes for the towers, nacelles, and rotors to minimize contrast with the sky backdrop and to minimize the reflections that can call attention to structures in the landscape.

- Use of neutral gray, white, off-white, or earth tone finishes for the small cabinets containing pad-mounted equipment that might be located at the base of each turbine, to help the cabinets blend into the surrounding ground plane.

- Restriction of exterior lighting on the turbines to the aviation warning lights required by the FAA, which will be kept to the minimum required number and intensity to meet FAA standards.

- Placement of much of the electrical collection system underground, minimizing the system's visual impacts.

- Use of a low-reflectivity finish for the exterior of the O&M facility building to maximize its visual integration into the surrounding landscape.

- Restriction of outdoor night lighting at the O&M facility and the substation to the minimum required for safety and security; sensors and switches will be used to keep lighting turned off when not required, and all lights will be hooded and directed to minimize backscatter and offsite light trespass.

- Use of a low-reflectivity finish for substation equipment.

- Use of low-reflectivity insulators in the substations.

- Use of fencing with a dull finish around the substation to reduce the fence's contrast with the surroundings.

4.5 BIGLOW CANYON WIND FARM

4.5.1 Impacts

The visual impact analysis included in the Biglow Canyon Wind Farm Association considered all facility components. However, because of the large distances from most of the designated scenic resources, the limited lines of sight from the closest designated scenic resources, and the dominance of wind turbines compared to other components of the facility in terms of visual impact, the visual appearance of the facility from all scenic areas consists almost entirely of the wind turbines. For this reason, the following discussion focuses on the turbines.

General Project Vicinity

The Biglow Canyon Wind Farm would have similar general impacts to the visual environment as the Klondike III Wind Project; that is, the proposed facility would be visible from many locations in the analysis area at distances ranging from the immediate foreground to the distant background. The proposed facility would be highly visible in the foreground from local roads and agricultural lands in rural Sherman County where viewer sensitivity is presumably low, KVAs are absent, and the nearby landscape generally lacks important visual resources with the exception of the John Day River canyon. Turbines would be visible in the middleground and background from portions of US 97 and SR-14 in Washington near Maryhill and other similar locations.

Within the general project vicinity (excluding the John Day River Corridor which is discussed below), the facility would result in moderate to high impacts because the turbines and appurtenances would become the dominant feature or focal point of the view and would be clearly visible in the view but not the dominant feature of the view. Similarly to the potential impacts that would result from the Klondike III Wind Project, it is important to note that the general project vicinity includes few sensitive viewers, lacks Key Viewing Areas (KVAs), and lacks important visual resources with the exception of the John Day River Canyon.

Columbia River Gorge National Scenic Area

Because the facility lies more than ten miles outside of the closest boundaries of the CRGNSA, it is not directly regulated by the CRGNSA's plan policies and regulations. Nonetheless, this section describes potential visual impacts of the project as seen from KVAs. The facility has the potential to be visible from portions of four KVAs: the Historic Columbia River Highway, I-84, the Columbia River, and SR-14.

Historic Columbia River Highway

A relatively short segment of the Historic Columbia River Highway lies within the facility's 30-mile radius analysis area. With the possibility of one small exception, the facility would not be visible from the Historic Columbia River Highway. The exception occurs along a small segment of the roadway located at the western edge of The Dalles where the visibility analysis suggests that the turbines might be visible along about one mile of the roadway. However, the likelihood of the facility having a noticeable effect on views from this road segment is very small. In this area, most views from the roadway toward the facility site would probably be screened by intervening trees, vegetation, and structures. Moreover, at a distance of 28 miles, the turbines would be invisible in many atmospheric and weather conditions and barely detectable under the most favorable atmospheric conditions. Finally, in this area, the roadway is not oriented in the direction of the facility site, so that to the extent that the turbines would be detectable in the view, they would not appear in the primary zone of vision of highway travelers.

Impacts to the Historic Columbia River Highway would be low to none because the proposed facility would be somewhat visible but not obtrusive in the view; would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view; and would not be noticed in the view, or seen from a distance greater than three miles.

Interstate 84

For the most part, the facility will not be visible to travelers on I-84. The only places where the facility's turbines might be seen by travelers on I-84 within the CRGNSA are in a set of short segments, adding up to approximately three and one-half miles, located in the area between The Dalles and the Deschutes River at distances ranging from 13.5 to 18 miles from the facility site. From this section of the roadway, the facility site is visible on the distant ridgeline above the point where the river fades into the distance. Because of the viewing distances involved, the turbines would appear to be small and not readily detectable elements on the distant horizon and would occupy only a small area of the overall field of view.

Impacts to I-84 within the NSA would be low to none because the proposed facility would be somewhat visible but not obtrusive in the view; would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view; and would not be noticed in the view, or seen from a distance greater than three miles.

Columbia River

The facility's visibility from the Columbia River will be restricted to segments of the river reach between Horsethief Lake and Miller Island. In this reach, the river has been turned into an artificial lake, named Lake Celilo, by The Dalles Dam. The view seen from this area is of a landscape in which there is a substantial level of human modification that is reflected by the artificial impoundment of the river's waters, the I-84 freeway, large transmission lines, and wheat fields on the distant ridgelines. Users of the river in this area include boaters, commercial barges, fishermen, and windsurfers. The facility site is approximately 14 miles away. Under clear atmospheric conditions, many of the turbines would be visible, but they would appear as very small elements in the distant landscape. On a relative scale, they would be harder to discern than the existing transmission towers visible in the middleground/background. The wind turbines would be a subordinate element of the landscape and would not bring about a substantial change in the overall character and quality of the landscape seen from this area.

Impacts to the Columbia River within the CRGNSA would be low to none because the proposed facility would be somewhat visible but not obtrusive in the view; would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view; and would not be noticed in the view, or seen from a distance greater than three miles.

Washington State Route 14

The proposed facility would likely be intermittently visible along the segment of SR-14 that lies between Highway 197 north of The Dalles and the eastern boundary of the CRGNSA near Maryhill. This highway segment lies 10 to 24 miles to the west of the facility site. Because the highway in this area is located halfway up the slope of the hills that define the northern edge of the gorge, it provides panoramic views over the Gorge and the landscapes to the south.

The most important developed viewpoint along this segment of SR-14 is the one above Wishram that includes an information kiosk and interpretive panels related to Celilo Falls, an important Native American resource and cultural site that once existed in the river below this viewpoint. Celilo Falls was eliminated when Lake Celilo was created by the construction of The Dalles Dam. Visibility analyses indicate that a relatively small number of the facility's turbines would potentially be visible from this viewpoint. Given the viewpoint's 13-mile distance from the facility site, the turbines would be small elements on the distant skyline and would be less evident in the view than the existing transmission towers visible in the foreground/middleground. Although the turbines would be visible to some degree in this view, they will not dominate the view and would not create a substantial change in the view's overall character and quality.

A second developed viewpoint exists in this segment of the highway in the area just inside the CRGNSA's eastern boundary at Maryhill. The proposed turbines would be visible at a minimum distance of 10.5 miles from this viewpoint. The facility turbines would be visible but not highly evident elements in the landscape, and would not dominate the view. The turbines would be

relatively small elements occupying a small part of the view and would be visually consistent with the turbines that are now an established part of the view.

Impacts to SR-14 within the CRGNSA would be low to none because the proposed facility would be somewhat visible but not obtrusive in the view; would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view; and would not be noticed in the view, or seen from a distance greater than three miles.

Deschutes River Canyon

Visibility analyses indicate that the facility would not be visible from the areas in the Deschutes River canyon along the Deschutes Wild and Scenic River and would be visible only from a small area of the BLM lands within and adjacent to the canyon. Because none of the BLM or private lands that lie within the canyon would be directly affected by the facility and because the facility would not be visible from the interior of the canyon, the facility would be consistent with the BLM Two Rivers Plan and with the provisions of the Wasco County and Sherman County comprehensive plans that identify the Deschutes River canyon as an important landscape feature.

Impacts to the Deschutes River Canyon would be low to none because the proposed facility would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view; and would not be noticed in the view, or seen from a distance greater than 3 miles.

John Day River

Visibility analyses indicate the facility would be visible to varying degrees from sections of the BLM lands in the canyon and from the Wild and Scenic River/Oregon Scenic Waterway segment of the river and the lands extending from one-quarter to one mile on either side of the river. Most of the lands in this area are privately-owned ranch lands that are used for cattle grazing; transmission lines of various voltages can be seen on the hills along the edge of the canyon or crossing the canyon. The primary access to these lands is by primitive 4x4 trails located substantially on privately-owned lands. Access is regulated by a series of locked gates so the general public has no overland access to this area. The only public right-of-way through this area is the river channel. During high flow periods in the spring, there is some very limited use of this reach of the river by canoeists and kayakers. During the summer months, low flows and a rocky river channel make passage by watercraft infeasible. Although the John Day River has a reputation as a good river for boating and other recreational activities, these activities occur primarily in the reaches of the river that lie to the south of Cottonwood in an area where the facility would not be visible. Limited access and recreational use minimize opportunities to view the proposed facility.

In the limited areas along the river corridor from which facility's turbines would potentially be visible, few turbines would be visible from any one point, and only the blades would likely be visible from many locations. In the places where turbines would be visible, they would appear as elements on the ridgelines in the landscape's background and would have minimal direct effect on the

appearance of the walls of the canyon or the canyon floor. Although the turbines would potentially be noticeable in some of the views, because of their small numbers, their location in the background, and the viewing distance (which would range from one to three and one-half miles), they would not likely be dominant elements in the scene. To the extent to which they would be visible, the turbines would be subordinate elements of the view, and because views from the canyon already include views of transmission lines of various voltages and are thus not entirely pristine, the presence of the turbines would not substantially alter the existing character and quality of views from the river corridor.

The proposed facility would have moderate to low impacts because the proposed facility would not become the dominant view but would be in view from public lands and waters used for dispersed recreation where the appreciation of natural and scenic resources is a valued part of the use; would be somewhat visible but not obtrusive in the view; and would be seen by few sensitive viewers because facilities would be screened by existing topography.

Oregon National Historic Trail

The proposed facility would not be visible from the High Potential Sites (McDonald Ferry, Fourmile Canyon, Biggs Junction, the Deschutes River Crossing, and the Dalles Complex) within the analysis area. Therefore, there would be no impacts to those resources.

Lower Klickitat River Canyon

The proposed facility would not be visible from the Lower Klickitat River Canyon. Therefore, there would be no impact to this resource.

Journey Through Time Scenic Byway

Portions of the proposed facility would be visible from the byway; however, the proposed facility would be compatible with the Journey Through Time Scenic Byway's stated goals. The proposed facility would have moderate to low impacts on the Journey Through Time Scenic Byway because portions of the project would be visible in the view but not the dominant feature of the view; would not become the dominant view but would be in view from locally important roads along which visual quality is not high and which have not been designated for scenic protection; would be somewhat visible but not obtrusive in the view; and would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view.

4.5.2 Mitigation

Impacts resulting from development of the Biglow Canyon Wind Farm would be similar to the Klondike III Wind Project. Since impacts, if any, would be compatible with applicable management plans and land use policy, mitigation is not required. Best management practices similar to those proposed for Klondike III Wind Project would be implemented to further reduce potential impacts.

4.6 CUMULATIVE IMPACTS

Klondike I, II, and III Wind Projects, Biglow Canyon Wind Farm, BPA's Action Alternatives, future wind projects, and existing BPA and other transmission and distribution lines would result in cumulative impacts to the visual environment. These intrusions would result in moderate to high impacts to the general project vicinity, but it is important to note that the area includes no KVAs or important visual resources (except for the John Day River Canyon) and that viewer sensitivity is low. Cumulative impacts would likely be low to moderate to important visual resources such as the John Day River Canyon and the Journey Through Time Scenic Byway where facilities would potentially be visible in the foreground and middleground. Cumulative impacts would likely not occur or would be low to the remaining important visual resources in the analysis area because the projects would not be visible, or would be visible at such great distances that effects, if any, would be negligible.

4.7 UNAVOIDABLE EFFECTS, IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

Unavoidable effects would include the intrusion of approximately 470 turbines, substation and transmission facilities, and appurtenances on the visual landscape. In general, these impacts would be moderate to high. There would be no irreversible or irretrievable commitments of resources because the proposed project elements could be decommissioned and deconstructed; project development does require the commitment of visual resources.

4.8 NO ACTION ALTERNATIVE

No new impacts to visual resources would occur under the No Action Alternative.

5 ENVIRONMENTAL CONSULTATION, REVIEW, AND PERMIT REQUIREMENTS

No known permits or authorizations specific to visual resources have been identified. BLM was consulted about the wind projects. The transmission line wouldn't be visible from the John Day River, so consultation with BLM regarding the BPA Action Alternatives is not recommended.

6 LIST OF PREPARERS

Sean Sullivan, L.A., DEA Senior Landscape Architect conducted the site visit and is the author of this technical report. Mr. Sullivan has a B.L.A. from Mississippi State University, an M.L.A. from the University of Washington, and 13 years professional experience. He has been with DEA since 1996. Kristina Gifford McKenzie, DEA Environmental Planner, reviewed this memorandum for consistency with NEPA requirements. Ms. McKenzie has a Bachelor's degree in Communications and a Master's degree in Urban and Regional Planning. She has 15 years of experience as an environmental planner and has been with DEA since 1990.

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Appendix B. Klondike III/Biglow Canyon Wind Integration Project

PHOTO 1: John Day Substation looking north.

PHOTO 2: Klondike II Wind Project viewed from N. Klondike Road.

PHOTO 3: Rural Sherman County viewed from Gordon Ridge near Moro looking northeast.

PHOTO 4: Gerking Canyon viewed from Scott Canyon Road looking north.

PHOTO 5: View from east end of CRGNSA at SR-14 looking southeast toward project vicinity.

PHOTO 6: John Day River Canyon viewed from Oregon Trail interpretive site at McDonald Ferry looking northeast.

PHOTO 7: Approximate Oregon National Historic Trail alignment crossing viewed from Medler Lane looking east.

PHOTO 8: US 97 at MP 12 looking south.

PHOTO 9: US 97 at MP 12 looking north.

KLONDIKE III/BIGLOW CANYON WIND INTEGRATION PROJECT

APPENDIX C

ELECTRICAL EFFECTS

JULY 2006

Prepared by

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for

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Table of Contents

List of Tables

List of Figures

ELECTRICAL EFFECTS FROM BPA'S PORTION OF THE KLONDIKE III/BIGLOW CANYON WIND INTEGRATION PROJECT

1.0 Introduction

The Bonneville Power Administration (BPA) is proposing to build an approximately 12-mile (mi.) (19.3-kilometer [km]) 230-kilovolt (kV) double-circuit transmission line from the existing Klondike Schoolhouse Substation east of Wasco, Oregon, to a proposed BPA John Day 230-kV Substation adjacent to BPA's existing John Day 500-kV Substation near Rufus, Oregon. The proposed line is designated the Klondike - John Day 230-kV transmission line. The proposed line would be built on new right-of-way entirely within the state of Oregon. Two alternative routes are being considered for the proposed line – the North Alternative and the Middle Alternative (Table 1). There are no existing high-voltage transmission lines that parallel the proposed line routes.

The purpose of this report is to describe and quantify the electrical effects of the proposed Klondike - John Day 230-kV transmission line and the proposed substations. These effects include the following:

- the levels of 60-hertz (Hz; cycles per second) electric and magnetic fields (EMF) at 3.28 feet (ft.) or 1 meter (m) above the ground,
- the effects associated with those fields,
- the levels of audible noise produced by the line, and
- electromagnetic interference associated with the line.

Electrical effects occur near all transmission lines, including existing 230-kV lines in Oregon and the 500-kV lines that connect into the existing BPA John Day 500-kV Substation. Therefore, the levels of these quantities for the proposed line are computed and compared with those from the existing lines in Oregon.

The voltage on the conductors of transmission lines generates an *electric field* in the space between the conductors and the ground. The electric field is calculated or measured in units of volts-per-meter (V/m) or kilovolts-per-meter (kV/m) at a height of 3.28 ft. (1 m) above the ground. The current flowing in the conductors of the transmission line generates a *magnetic field* in the air and earth near the transmission line; current is expressed in units of amperes (A). The magnetic field is expressed in milligauss (mG), and is also usually measured or calculated at a height of 3.28 ft. (1 m) above the ground. The electric field at the surface of the conductors causes the phenomenon of *corona*. Corona is the electrical breakdown or ionization of air in very strong electric fields, and is the source of audible noise, electromagnetic radiation, and visible light.

To quantify EMF levels along the route, the electric and magnetic fields from the proposed transmission line were calculated using the BPA Corona and Field Effects Program (USDOE, undated). In this program, the calculation of 60-Hz fields uses standard superposition techniques for vector fields from several line sources: in this case, the line sources are transmission-line conductors. (Vector fields have both magnitude and direction: these must be taken into account when combining fields from different sources.) Important input parameters to the computer program are voltage, current, and geometric configuration of the line. The transmission-line conductors are assumed to be straight, parallel to each other, and located above and parallel to an infinite flat ground plane. Although such conditions do not

occur under real lines because of conductor sag and variable terrain, the validity and limitations of calculations using these assumptions have been well verified by comparisons with measurements. This approach was used to estimate fields for the proposed Klondike – John Day line, where minimum clearances were assumed to provide worst-case (highest) estimates for the fields.

Electric fields are calculated using an imaging method. Fields from the conductors and their images in the ground plane are superimposed with the proper magnitude and phase to produce the total field at a selected location.

The total magnetic field is calculated from the vector summation of the fields from currents in all the transmission-line conductors. Balanced (equal) currents are assumed for each three-phase circuit; the contribution of induced image currents in the conductive earth is not included.

Electric and magnetic fields for the proposed line were calculated at the standard height (3.28 ft. or 1 m) above the ground (IEEE, 1994). Calculations were performed out to 300 ft. (91 m) from the centerline of the existing corridor. The validity and limitations of such calculations have been well verified by measurements. Because maximum voltage, maximum current, and minimum conductor height above-ground are used, **the calculated values given here represent worst-case conditions:** i.e., the calculated fields are higher than they would be in practice. Such worst-case conditions would seldom occur.

The corona performance of the proposed line was also predicted using the BPA Corona and Field Effects Program (USDOE, undated). Corona performance is calculated using empirical equations that have been developed over several years from the results of measurements on numerous high-voltage lines (Chartier and Stearns, 1981; Chartier, 1983). The validity of this approach for corona-generated audible noise has been demonstrated through comparisons with measurements on other lines all over the United States (IEEE Committee Report, 1982). The accuracy of this method for predicting corona-generated radio and television interference from transmission lines has also been established (Olsen et al., 1992). Important input parameters to the computer program are voltage, current, conductor size, and geometric configuration of the line.

Corona is a highly variable phenomenon that depends on conditions along a length of line. Predictions of the levels of corona effects are reported in statistical terms to account for this variability. Calculations of audible noise and electromagnetic interference levels were made under conditions of an estimated average operating voltage of 237 kV and with the average line height along a span of 38.5 ft. (11.7 m). Levels of audible noise, radio interference, and television interference are predicted for both fair and foul weather; however, corona is basically a foul-weather phenomenon. Wet conductors can occur during periods of rain, fog, snow, or icing. In the Rufus-Wasco area of the proposed route, such conditions are expected to occur about 6% of the time during a year based on hourly precipitation records from Moro, Oregon (near Wasco) during 2000 – 2004 (NOAA, 2005). Corona activity also increases with altitude. For purposes of evaluating corona effects from the proposed line, an altitude of 1500 ft. (460 m) was assumed.

2.0 Physical Description

2.1 Proposed Line

The proposed 230-kV transmission line would be a three-phase, double-circuit line placed on mostly tubular steel structures. (Some towers would be lattice steel construction, for example where the line changed direction. The double-circuit towers would have two sets of three phases arranged vertically on either side of the structure. Each set of phase wires comprises a circuit. Voltage and current waves are

displaced by 120° in time (one-third of a cycle) on each electrical phase. The maximum phase-to-phase voltage would be 242 kV; the average voltage would be 237 kV.

The line would be operated with the load from the Biglow Canyon project on one of the circuits and the load from the Klondike III project on the other. Initially the projected peak loads for the two circuits of the proposed line are: 400 megawatts (MW) for the Biglow Canyon circuit and 300 MW for the Klondike circuit. When the Orion project is completed the peak load on the Biglow Canyon circuit would increase to 600 MW. These loads correspond to an initial maximum current per phase of 974 A on the Biglow Canyon circuit, increasing to 1462 A with the addition of the Orion load, and 731 A on the Klondike circuit. The Orion project load could be added in the future and is only considered as a cumulative impact with the proposed project.

The load factor for wind power is 0.30 (average load = peak load x load factor). Thus, the average currents on each circuit would be 30 percent of the maximum values. BPA provided the physical and operating characteristics of the proposed line.

The electrical characteristics and physical dimensions for the proposed line configuration are shown in Figure 1, and summarized in Table 2. Each phase of the proposed 230-kV line would have one 1.6-inch (in.) (4.06-centimeter [cm]) diameter conductors (AAC: all aluminum conductors).

The horizontal phase spacing between the lower and upper conductor positions would be 20.0 ft. (6.1 m). Between the middle conductors, the horizontal spacing would be 32.0 ft. (9.76 m). The vertical spacing between the conductor positions would be 18.0 ft. (5.49 m). The spacing between conductor locations would vary slightly where special towers are used, such as at angle points along the line. Short sections of the proposed line where conductor locations would change, such as upon entry to a substation, were not analyzed.

Minimum conductor-to-ground clearance would be 26.5 ft. (8.08 m) at a conductor temperature of 212°F (100°C); clearances above ground would be greater under normal operating temperatures. The average clearance above ground along a span would be approximately 38.5 ft. (11.7 m); this value was used for corona calculations. At road crossings, the ground clearance would be at least 37.5 ft. (11.4 m). The final design of the proposed line could entail larger clearances. The right-of-way width for the proposed line would be 125 ft. (38.11 m).

The electrical phasing of the proposed line would be selected to ensure that BPA criteria for electric-field and audible-noise levels are met and to minimize magnetic field to the extent practical. The results reported here for fields and corona effects assume that the electrical phasing of the two circuits would be such as to place different electrical phases on the lower conductors of each circuit and on the upper conductors of each circuit. This phasing configuration tends to minimize the fields at ground level. During the design process, BPA will verify that any changes from the phasing described here continue to meet design criteria.

2.2 Existing Lines

There are no existing transmission lines parallel to the proposed routes.

3.0 Electric Field

3.1 Basic Concepts

An electric field is said to exist in a region of space if an electrical charge, at rest in that space, experiences a force of electrical origin (i.e., electric fields cause free charges to move). Electric field is a vector quantity: that is, it has both magnitude and direction. The direction corresponds to the direction that a positive charge would move in the field. Sources of electric fields are unbalanced electrical charges (positive or negative) and time-varying magnetic fields. Transmission lines, distribution lines, house wiring, and appliances generate electric fields in their vicinity because of unbalanced electrical charge on energized conductors. The unbalanced charge is associated with the voltage on the energized system. On the power system in North America, the voltage and charge on the energized conductors are cyclic (plus to minus to plus) at a rate of 60 times per second. This changing voltage results in electric fields near sources that are also time-varying at a frequency of 60 hertz (Hz; a frequency unit equivalent to cycles per second).

As noted earlier, electric fields are expressed in units of volts per meter (V/m) or kilovolts (thousands of volts) per meter (kV/m). Electric- and magnetic-field magnitudes in this report are expressed in root-mean-square (rms) units. For sinusoidal waves, the rms amplitude is given as the peak amplitude divided by the square root of two.

The spatial uniformity of an electric field depends on the source of the field and the distance from that source. On the ground, under a transmission line, the electric field is nearly constant in magnitude and direction over distances of several feet (1 meter). However, close to transmission- or distribution-line conductors, the field decreases rapidly with distance from the conductors. Similarly, near small sources such as appliances, the field is not uniform and falls off even more rapidly with distance from the device. If an energized conductor (source) is inside a grounded conducting enclosure, then the electric field outside the enclosure is zero, and the source is said to be shielded.

Electric fields interact with the charges in all matter, including living systems. When a conducting object, such as a vehicle or person, is located in a time-varying electric field near a transmission line, the external electric field exerts forces on the charges in the object, and electric fields and currents are induced in the object. If the object is grounded, then the total current induced in the body (the "short-circuit current") flows to earth. The distribution of the currents within, say, the human body, depends on the electrical conductivities of various parts of the body: for example, muscle and blood have higher conductivity than bone and would therefore experience higher currents.

At the boundary surface between air and the conducting object, the field both in the air and perpendicular to the conductor surface is much, much larger than the field in the conductor itself. For example, the average surface field on a human standing in a 10 kV/m field is 27 kV/m; the internal fields in the body are much smaller: approximately 0.008 V/m in the torso and 0.45 V/m in the ankles.

3.2 Transmission-line Electric Fields

The electric field created by a high-voltage transmission line extends from the energized conductors to other conducting objects such as the ground, towers, vegetation, buildings, vehicles, and people. The calculated strength of the electric field at a height of 3.28 ft. (1 m) above an unvegetated, flat earth is frequently used to describe the electric field under straight, parallel transmission lines. The most important transmission-line parameters that determine the electric field at a 1-m height are conductor height above ground and line voltage.

Calculations of electric fields from transmission lines are performed with computer programs based on well-known physical principles (cf., Deno and Zaffanella, 1982). The calculated values under these conditions represent an ideal situation. When practical conditions approach this ideal model, measurements and calculations agree. Often, however, conditions are far from ideal because of variable terrain and vegetation. In these cases, fields are calculated for ideal conditions, with the lowest conductor clearances to provide upper bounds on the electric field under the transmission lines. With the use of more complex models or empirical results, it is also possible to account accurately for variations in conductor height, topography, and changes in line direction. Because the fields from different sources add vectorially, it is possible to compute the fields from several different lines if the electrical and geometrical properties of the lines are known. However, in general, electric fields near transmission lines with vegetation below are highly complex and cannot be calculated. Measured fields in such situations are highly variable.

For evaluation of EMF from transmission lines, the fields must be calculated for a specific line condition. The NESC states the condition for evaluating electric-field-induced short-circuit current for lines with voltage above 98 kV, line-to-ground, as follows: conductors are at a minimum clearance from ground corresponding to a conductor temperature of 122°F (50°C), and at a maximum voltage (IEEE, 2002). BPA has supplied the information for calculating electric and magnetic fields from the proposed transmission line: the maximum operating voltage, the estimated peak currents, and the minimum conductor clearances. The minimum clearances (100°C) provided by BPA are lower than those specified in the NESC (50°C). If the fields under the lower BPA conductor clearances meet the NESC criterion, they will also meet the criterion at the NESC specified clearance.

There are standard techniques for measuring transmission-line electric fields (IEEE, 1994). Provided that the conditions at a measurement site closely approximate those of the ideal situation assumed for calculations, measurements of electric fields agree well with the calculated values. If the ideal conditions are not approximated, the measured field can differ substantially from calculated values. Usually the actual electric field at ground level is reduced from the calculated values by various common objects that act as shields.

Maximum or peak field values occur over a small area at midspan, where conductors are closest to the ground. As the location of an electric-field profile approaches a tower, the conductor clearance increases, and the peak field decreases. A grounded tower will reduce the electric field considerably, by shielding. **Thus the assumption of minimum clearance results in peak (worst-case) fields that may be larger than what occur in practice.**

For traditional transmission lines, such as the proposed line, where the right-of-way extends laterally well beyond the conductors, electric fields at the edge of the right-of-way are not as sensitive as the peak field to conductor height. Computed values at the edge of the right-of-way for any line height are fairly representative of what can be expected all along the transmission-line corridor. However, the presence of vegetation on and at the edge of the right-of-way will reduce actual electric-field levels below calculated values.

3.3 Calculated Values of Electric Fields

Table 3 shows the calculated values of electric field at 3.28 ft. (1 m) above ground for the proposed Klondike - John Day 230-kV transmission-line operated at maximum voltage. The peak value on the right-of-way and the value at the edge of the right-of-way are given for the proposed line at minimum conductor clearance and at the estimated average clearance over a span. Figure 2 shows lateral profiles for the electric field from the proposed line at the minimum and average line heights.

The calculated peak electric field expected on the right-of-way of the proposed line is 2.5 kV/m. For average clearance, the peak field would be 1.2 kV/m or less. As shown in Figure 2, the peak values would be present only at locations directly under the 230-kV line, near mid-span, where the conductors are at the minimum clearance. The conditions of minimum conductor clearance at maximum current and maximum voltage occur very infrequently. The calculated peak levels are rarely reached under real-life conditions, because the actual line height is generally above the minimum value used in the computer model, because the actual voltage is below the maximum value used in the model, and because vegetation within and near the edge of the right-of-way tends to shield the field at ground level. Maximum electric fields on existing 230-kV corridors are typically 2.5 to 3 kV/m. On 500-kV transmission line corridors, the maximum electric fields range from 7 to 9 kV/m.

The largest value expected at the edge of the right-of-way of the proposed line is 0.3 kV/m decreasing to about 0.2 kV/m opposite conductors at average clearance.

3.4 Environmental Electric Fields

The electric fields associated with the Klondike - John Day 230-kV line can be compared with those found in other environments. Sources of 60-Hz electric (and magnetic) fields exist everywhere electricity is used; levels of these fields in the modern environment vary over a wide range. Electric-field levels associated with the use of electrical energy are orders of magnitude greater than naturally occurring 60-Hz fields of about 0.0001 V/m, which stem from atmospheric and extraterrestrial sources.

Electric fields in outdoor, publicly accessible places range from less than 1 V/m to 12 kV/m; the large fields exist close to high-voltage transmission lines of 230 kV or higher. In remote areas without electrical service, 60-Hz field levels can be much lower than 1 V/m. Electric fields in home and work environments generally are not spatially uniform like those of transmission lines; therefore, care must be taken when making comparisons between fields from different sources such as appliances and electric lines. In addition, fields from all sources can be strongly modified by the presence of conducting objects. However, it is helpful to know the levels of electric fields generated in domestic and office environments in order to compare commonly experienced field levels with those near transmission lines.

Numerous measurements of residential electric fields have been reported for various parts of the United States, Canada, and Europe. Although there have been no large studies of residential electric fields, sufficient data are available to indicate field levels and characteristics. Measurements of domestic 60-Hz electric fields indicate that levels are highly variable and source-dependent. Electric-field levels are not easily predicted because walls and other objects act as shields, because conducting objects perturb the field, and because homes contain numerous localized sources. Internal sources (wiring, fixtures, and appliances) seem to predominate in producing electric fields inside houses. Average measured electric fields in residences are generally in the range of 5 to 20 V/m. In a large occupational exposure monitoring project that included electric-field measurements at homes, average exposures for all groups away from work were generally less than 10 V/m (Bracken, 1990).

Electric fields from household appliances are localized and decrease rapidly with distance from the source. Local electric fields measured at 1 ft. (0.3 m) from small household appliances are typically in the range of 30 to 60 V/m. Stopps and Janischewskyj (1979) reported electric-field measurements near 20 different appliances; at a 1-ft. (0.3-m) distance, fields ranged from 1 to 150 V/m, with a mean of 33 V/m. In another survey, reported by Deno and Zaffanella (1982), field measurements at a 1-ft. (0.3-m) distance from common domestic and workshop sources were found to range from 3 to 70 V/m. The localized fields from appliances are not uniform, and care should be taken in comparing them with transmission-line fields.

Electric blankets can generate higher localized electric fields. Sheppard and Eisenbud (1977) reported fields of 250 V/m at a distance of approximately 1 ft. (0.3 m). Florig et al. (1987) carried out extensive empirical and theoretical analysis of electric-field exposure from electric blankets and presented results in terms of uniform equivalent fields such as those near transmission lines. Depending on what parameter was chosen to represent intensity of exposure and the grounding status of the subject, the equivalent vertical 60-Hz electric-field exposure ranged from 20 to over 3500 V/m. The largest equivalent field corresponds to the measured field on the chest with the blanket-user grounded. The average field on the chest of an ungrounded blanket-user yields an equivalent vertical field of 960 V/m. As manufacturers have become aware of the controversy surrounding EMF exposures, electric blankets have been redesigned to reduce *magnetic* fields. However, electric fields from these "low field" blankets are still comparable with those from older designs (Bassen et al., 1991).

Generally, people in occupations not directly related to high-voltage equipment are exposed to electric fields comparable with those of residential exposures. For example, the average electric field measured in 14 commercial and retail locations in rural Wisconsin and Michigan was 4.8 V/m (ITT Research Institute, 1984). Median electric field was about 3.4 V/m. These values are about one-third the values in residences reported in the same study. Power-frequency electric fields near video display terminals (VTDs) are about 10 V/m, similar to those of other appliances (Harvey, 1983). Electric-field levels in public buildings such as shops, offices, and malls appear to be comparable with levels in residences.

In a survey of 1,882 volunteers from utilities, electric-field exposures were measured for 2,082 work days and 657 non-work days (Bracken, 1990). Electric-field exposures for occupations other than those directly related to high-voltage equipment were equivalent to those for non-work exposure.

Thus, except for the relatively few occupations where high-voltage sources are prevalent, electric fields encountered in the workplace are probably similar to those of residential exposures. Even in electric-utility occupations where high field sources are present, exposures to high fields are limited on average to minutes per day.

Electric fields found in publicly accessible areas near high-voltage transmission lines can typically range up to 3 kV/m for 230-kV lines, to 10 kV/m for 500-kV lines, and to 12 kV/m for 765-kV lines. Although these peak levels are considerably higher than the levels found in other public areas, they are present only in limited areas on rights-of-way.

The calculated electric fields for the proposed Klondike - John Day 230-kV transmission line are consistent with the levels reported for other 230-kV transmission lines in Oregon, Washington, and elsewhere. The electric fields on the right-of-way of the proposed transmission line, as calculated, would be much higher than levels normally encountered in residences and offices.

4.0 Magnetic Field

4.1 Basic Concepts

Magnetic fields can be characterized by the force they exert on a moving charge or on an electrical current. As with the electric field, the magnetic field is a vector quantity characterized by both magnitude and direction. Electrical currents generate magnetic fields. In the case of transmission lines, distribution lines, house wiring, and appliances, the 60-Hz electric current flowing in the conductors generates a time-varying, 60-Hz magnetic field in the vicinity of these sources. The strength of a magnetic field is measured in terms of magnetic lines of force per unit area, or magnetic flux density. The term "magnetic

field," as used here, is synonymous with magnetic flux density and is expressed in units of Gauss (G) or milligauss (mG).

The uniformity of a magnetic field depends on the nature and proximity of the source, just as the uniformity of an electric field does. Transmission-line-generated magnetic fields are quite uniform over horizontal and vertical distances of several feet near the ground. However, for small sources such as appliances, the magnetic field decreases rapidly over distances comparable with the size of the device.

The interaction of a time-varying magnetic field with conducting objects results in induced electric field and currents in the object. A changing magnetic field through an area generates a voltage around any conducting loop enclosing the area (Faraday's law). This is the physical basis for the operation of an electrical transformer. For a time-varying sinusoidal magnetic field, the magnitude of the induced voltage around the loop is proportional to the area of the loop, the frequency of the field, and the magnitude of the field. The induced voltage around the loop results in an induced electric field and current flow in the loop material. The induced current that flows in the loop depends on the conductivity of the loop.

4.2 Transmission-line Magnetic Fields

The magnetic field generated by currents on transmission-line conductors extends from the conductors through the air and into the ground. The magnitude of the field at a height of 3.28 ft. (1 m) is frequently used to describe the magnetic field under transmission lines. Because the magnetic field is not affected by non-ferrous materials, the field is not influenced by normal objects on the ground under the line. The direction of the maximum field varies with location. (The electric field, by contrast, is essentially vertical near the ground.) The most important transmission-line parameters that determine the magnetic field at 3.28 ft. (1 m) height are conductor height above ground and magnitude of the currents flowing in the conductors. As distance from the transmission-line conductors increases, the magnetic field decreases.

Calculations of magnetic fields from transmission lines are performed using well-known physical principles (cf., Deno and Zaffanella, 1982). The calculated values usually represent the ideal straight parallel-conductor configuration. For simplicity, a flat earth is usually assumed. Balanced currents (currents of the same magnitude for each phase) are also assumed. This is usually valid for transmission lines, where loads on all three phases are maintained in balance during operation. Induced image currents in the earth are usually ignored for calculations of magnetic field under or near the right-of-way. The resulting error is negligible. Only at distances greater than 300 ft. (91 m) from a line do such contributions become significant (Deno and Zaffanella, 1982). The clearance for magnetic-field calculations for the proposed line was the same as that used for electric-field evaluations.

Standard techniques for measuring magnetic fields near transmission lines are described in ANSI IEEE Standard No. 644-1994 (IEEE, 1994). Measured magnetic fields agree well with calculated values, provided the currents and line heights that go into the calculation correspond to the actual values for the line. To realize such agreement, it is necessary to get accurate current readings during field measurements (because currents on transmission lines can vary considerably over short periods of time) and also to account for all field sources in the vicinity of the measurements.

As with electric fields, the maximum or peak magnetic fields occur in areas near the centerline and at midspan where the conductors are the lowest. The magnetic field at the edge of the right-of-way is not very dependent on line height. For a double-circuit line or if more than one line is present, the peak field will depend on the relative electrical phasing of the conductors and the direction of power flow.

4.3 Calculated Values for Magnetic Fields

Table 4 gives the calculated values of the magnetic field at 3.28 ft. (1 m) height for the proposed Klondike – John Day 230-kV double-circuit transmission line. Field values on the right-of-way and at the edge of the right-of-way are given for projected maximum currents, for minimum and average conductor clearances. The maximum currents for the Biglow Canyon circuit and Klondike circuit are given in Table 2. The maximum current on the Biglow Canyon circuit is 974 A initially and 1462 A after the Orion load is added. The maximum current on the Klondike circuit is 731 A. Power on both circuits is assumed to flow from Klondike to John Day and the phasing of the conductors is selected to be different on the lower phases to produce minimum electric and magnetic fields.

The actual magnetic-field levels would vary, as currents on the lines change daily and seasonally and as ambient temperature changes. Average currents over the year would be about 30% of the maximum values. The levels shown in the figures represent the highest magnetic fields expected for the proposed Klondike - John Day 230-kV line. Average fields over a year would be considerably reduced from the peak values, as a result of reduced average currents and increased clearances above the minimum value due to conductor temperatures less than the design value of 100 C°.

Figure 3 shows lateral profiles of the magnetic field under maximum current and minimum clearance conditions for the proposed 230-kV transmission line. A field profile for average height under maximum current conditions is also included in Figure 3.

For the proposed 230-kV line, the maximum calculated 60-Hz magnetic field expected at 3.28 ft. (1 m) above ground is 132 mG for a minimum conductor height of 26.5 ft. (8.1 m). This field is calculated for maximum currents of 974 and 731 A on the Biglow Canyon and Klondike circuits, respectively. The maximum field would decrease for increased conductor clearance. For the average conductor height over a span of 38.5 ft. (11.7 m), the maximum field would be 59 mG.

For maximum currents in both circuits and minimum clearance conditions, the calculated magnetic fields at the edges of the 125-foot (38.1-m) right-of-way are 25 mG on the edge adjacent to the Biglow Canyon circuit and 12 mG adjacent to the Klondike circuit. For average conductor height the fields at the edge of the right-of-way are 19 and 10 mG for the Biglow Canyon and Klondike sides of the line, respectively.

With the Klondike circuit out of service (0 A), the fields from the two circuits would no longer cancel. In this case the maximum field due to the Biglow Canyon circuit alone would be 150 mG at the peak location on the right-of-way and 44 mG at the edge of the right-of-way.

All of these magnetic field levels averaged over a year would be about 30-percent of the above values. Thus, averaged over the year the maximum levels at the respective edges of the right-of-way would be about 7 and 4 mG.

4.4 Environmental Magnetic Fields

Transmission lines are not the only source of magnetic fields; as with 60-Hz electric fields, 60-Hz magnetic fields are present throughout the environment of a society that relies on electricity as a principal energy source. The magnetic fields associated with the proposed Klondike - John Day 230-kV line can be compared with fields from other sources. The range of 60-Hz magnetic-field exposures in publicly accessible locations such as open spaces, transmission-line rights-of-way, streets, pedestrian walkways, parks, shopping malls, parking lots, shops, hotels, public transportation, and so on range from less than 0.1 mG to about 1 G, with the highest values occurring near small appliances with electric motors. In occupational settings in electric utilities, where high currents are present, magnetic-field exposures for

workers can be above 1 G. At 60 Hz, the magnitude of the natural magnetic field is approximately 0.0005 mG.

Several investigations of residential fields have been conducted. In a large study to identify and quantify significant sources of 60-Hz magnetic fields in residences, measurements were made in 996 houses, randomly selected throughout the country (Zaffanella, 1993). The most common sources of residential fields were power lines, the grounding system of residences, and appliances. Field levels were characterized by both point-in-time (spot) measurements and 24-hour measurements. Spot measurements averaged over all rooms in a house exceeded 0.6 mG in 50% of the houses and 2.9 mG in 5% of houses. Power lines generally produced the largest average fields in a house over a 24-hour period. On the other hand, grounding system currents proved to be a more significant source of the highest fields in a house. Appliances were found to produce the highest local fields; however, fields fell off rapidly with increased distance. For example, the median field near microwave ovens was 36.9 mG at a distance of 10.5 in. (0.27 m) and 2.1 mG at 46 in. (1.17 m). Across the entire sample of 996 houses, higher magnetic fields were found in, among others, urban areas (vs. rural); multi-unit dwellings (vs. single-family); old houses (vs. new); and houses with grounding to a municipal water system.

In an extensive measurement project to characterize the magnetic-field exposure of the general population, over 1000 randomly selected persons in the United States wore a personal exposure meter for 24 hours and recorded their location in a simple diary (Zaffanella and Kalton, 1998). Based on the measurements of 853 persons, the estimated 24-hour average exposure for the general population is 1.24 mG and the estimated median exposure is 0.88 mG. The average field “at home, not in bed” is 1.27 mG and “at home, in bed” is 1.11 mG. Average personal exposures were found to be highest “at work” (mean of 1.79 mG and median of 1.01 mG) and lowest “at home, in bed” (mean of 1.11 mG and median of 0.49 mG). Average fields in school were also low (mean of 0.88 mG and median of 0.69 mG). Factors associated with higher exposures at home were smaller residences, duplexes and apartments, metallic rather than plastic water pipes, and nearby overhead distribution lines.

As noted above, magnetic fields from appliances are localized and decrease rapidly with distance from the source. Localized 60-Hz magnetic fields have been measured near about 100 household appliances such as ranges, refrigerators, electric drills, food mixers, and shavers (Gauger, 1985). At a distance of 1 ft. (0.3 m), the maximum magnetic field ranged from 0.3 to 270 mG, with 95% of the measurements below 100 mG. Ninety-five percent of the levels at a distance of 4.9 ft. (1.5 m) were less than 1 mG. Devices that use light-weight, high-torque motors with little magnetic shielding exhibited the largest fields. These included vacuum cleaners and small hand-held appliances and tools. Microwave ovens with large power transformers also exhibited relatively large fields. Electric blankets have been a much-studied source of magnetic-field exposure because of the length of time they are used and because of the close proximity to the body. Florig and Hoburg (1988) estimated that the average magnetic field in a person using an electric blanket was 15 mG, and that the maximum field could be 100 mG. New "low-field" blankets have magnetic fields at least 10 times lower than those from conventional blankets (Bassen et al., 1991).

In a domestic magnetic-field survey, Silva et al. (1989) measured fields near different appliances at locations typifying normal use (e.g., sitting at an electric typewriter or standing at a stove). Specific appliances with relatively large fields included can openers (n = 9), with typical fields ranging from 30 to 225 mG and a maximum value up to 2.7 G; shavers (n = 4), with typical fields from 50 to 300 mG and maximum fields up to 6.9 G; and electric drills (n = 2), with typical fields from 56 to 190 mG and maximum fields up to 1.5 G. The fields from such appliances fall off very rapidly with distance and are only present for short periods. Thus, although instantaneous magnetic-field levels close to small hand-held appliances can be quite large, they do not contribute to average area levels in residences.

In a study with 162 subjects, Mezei et al. (2001) employed magnetic-field exposure measurements, simultaneous record-keeping of appliance proximity, and an appliance-use questionnaire to investigate the contributions of appliances to overall exposure. They found that individual appliance use did not contribute significantly to time-weighted-average exposure, unless the use was prolonged during the day of measurements. For example, approximately 16% of exposure accumulated during periods when a subject was using a computer. For all subjects exposure during computer use accounted for on-average 9% of total exposure. Cell phones were identified as another source of relatively low fields and long use times that could contribute to overall exposure. Use of other small appliances did not contribute significantly to accumulated exposure but did contribute to the relatively short periods when high-field exposures were observed.

Although studies of residential magnetic fields have not all considered the same independent parameters, the following consistent characterization of residential magnetic fields emerges from the data:

(1) External sources play a large role in determining residential magnetic-field levels. Transmission lines, when nearby, are an important external source. Unbalanced ground currents on neutral conductors and other conductors, such as water pipes in and near a house, can represent a significant source of magnetic field. Distribution lines per se, unless they are quite close to a residence, do not appear to be a traditional distance-dependent source.

(2) Homes with overhead electrical service appear to have higher average fields than those with underground service.

(3) Appliances represent a localized source of magnetic fields that can be much higher than average or area fields. However, fields from appliances approach area levels at distances greater than 3.28 ft. (1 m) from the device.

Although important variables in determining residential magnetic fields have been identified, quantification and modeling of their influence on fields at specific locations is not yet possible. However, a general characterization of residential magnetic-field level is possible: average levels in the United States are in the range of 0.5 to 1.0 mG, with the average field in a small number of homes exceeding this range by as much as a factor of 10 or more. Average personal exposure levels are slightly higher, possibly due to use of appliances and varying distances to other sources. Maximum fields can be much higher.

Magnetic fields in commercial and retail locations are comparable with those in residences. As with appliances, certain equipment or machines can be a local source of higher magnetic fields. Utility workers who work close to transformers, generators, cables, transmission lines, and distribution systems clearly experience high-level fields. Other sources of fields in the workplace include motors, welding machines, computers, and video display terminals (VDTs). In publicly accessible indoor areas, such as offices and stores, field levels are generally comparable with residential levels, unless a high-current source is nearby.

Because high-current sources of magnetic field are more prevalent than high-voltage sources, occupational environments with relatively high magnetic fields encompass a more diverse set of occupations than do those with high electric fields. For example, in occupational magnetic-field measurements reported by Bowman et al. (1988), the geometric mean field from 105 measurements of magnetic field in "electrical worker" job locations was 5.0 mG. "Electrical worker" environments showed the following elevated magnetic-field levels (geometric mean greater than 20 mG): industrial power supplies, alternating current (ac) welding machines, and sputtering systems for electronic assembly. For secretaries in the same study, the geometric mean field was 3.1 mG for those using VDTs (n = 6) and 1.1 mG for those not using VDTs (n = 3).

Measurements of personal exposure to magnetic fields were made for 1,882 volunteer utility workers for a total of 4,411 workdays (Bracken, 1990). Median workday mean exposures ranged from 0.5 mG for clerical workers without computers to 7.2 mG for substation operators. Occupations not specifically associated with transmission and distribution facilities had median workday exposures less than 1.5 mG, while those associated with such facilities had median exposures above 2.3 mG. Magnetic-field exposures measured in homes during this study were comparable with those recorded in offices.

Magnetic fields in publicly accessible outdoor areas seem to be, as expected, directly related to proximity to electric-power transmission and distribution facilities. Near such facilities, magnetic fields are generally higher than indoors (residential). Higher-voltage facilities tend to have higher fields. Typical maximum magnetic fields in publicly accessible areas near transmission facilities can range from less than a few milligauss up to 300 mG or more, near heavily loaded lines operated at 230 to 765 kV. The levels depend on the line load, conductor height, and location on the right-of-way. Because magnetic fields near high-voltage transmission lines depend on the current in the line, they can vary daily and seasonally. To characterize fields from the distribution system, Heroux (1987) measured 60-Hz magnetic fields with a mobile platform along 140 mi. (223 km) of roads in Montreal. The median field level averaged over nine different routes was 1.6 mG, with 90% of the measurements less than about 5.1 mG. Spot measurements indicated that typical fields directly above underground distribution systems were 5 to 19 mG. Beneath overhead distribution lines, typical fields were 1.5 to 5 mG on the primary side of the transformer, and 4 to 10 mG on the secondary side. Near ground-based transformers used in residential areas, fields were 80 to 1000 mG at the surface and 10 to 100 mG at a distance of 1 ft. (0.3 m).

The magnetic fields from the proposed line would be comparable to or less than those from existing 230-kV lines in Oregon, Washington, and elsewhere. On and near the right-of-way of the proposed line, magnetic fields would be above average residential levels. However, the fields from the line would decrease rapidly and approach common ambient levels (1 mG) at a distance of about 200 feet from the edge of the right-of-way under maximum current conditions and at about 100 feet from the edge under average current conditions. Furthermore, the fields at the edge of the right-of-way would not be above those encountered during normal activities near common sources such as hand-held appliances.

5.0 Electric and Magnetic Field (EMF) Effects

Possible effects associated with the interaction of EMF from transmission lines with people on and near a right-of-way fall into two categories: short-term effects that can be perceived and may represent a nuisance, and possible long-term health effects. Only short-term effects are discussed here. The issue of whether there are long-term health effects associated with transmission-line fields is controversial. In recent years, considerable research on possible biological effects of EMF has been conducted. A review of these studies and their implications for health-related effects is provided in a separate technical report for the environmental assessment for the proposed Klondike - John Day 230-kV transmission line.

5.1 Electric Fields: Short-term Effects

Short-term effects from transmission-line electric fields are associated with perception of induced currents and voltages or perception of the field. Induced current or spark discharge shocks can be experienced under certain conditions when a person contacts objects in an electric field. Such effects occur in the fields associated with transmission lines that have voltages of 230-kV or higher. These effects could occur infrequently under the proposed Klondike - John Day 230-kV line.

Steady-state currents are those that flow continuously after a person contacts an object and provides a path to ground for the induced current. The amplitude of the steady-state current depends on the induced

current to the object in question and on the grounding path. The magnitude of the induced current to vehicles and objects under the proposed line will depend on the electric-field strength and the size and shape of the object. When an object is electrically grounded, the voltage on the object is reduced to zero, and it is not a source of current or voltage shocks. If the object is poorly grounded or not grounded at all, then it acquires some voltage relative to earth and is a possible source of current or voltage shocks.

The responses of persons to steady-state current shocks have been extensively studied, and levels of response documented (Keesey and Letcher, 1969; IEEE, 1978). Primary shocks are those that can result in direct physiological harm. Such shocks will not be possible from induced currents under the existing or proposed lines, because clearances above ground required by the NESC preclude such shocks from large vehicles and grounding practices eliminate large stationary objects as sources of such shocks.

Secondary shocks are defined as those that could cause an involuntary and potentially harmful movement, but no direct physiological harm. Secondary shocks could occur under the proposed 230-kV line when making contact with ungrounded conducting objects such as large vehicles or equipment. However, such occurrences are anticipated to be very infrequent. Shocks, when they occur under the 230-kV line, are most likely to be below the nuisance level. Induced currents would not be perceived off the right-of-way.

Induced currents are always present in electric fields under transmission lines and will be present near the proposed line. However, during initial construction, it is BPA policy to ground metal objects, such as fences, that are located on the right-of-way. The grounding eliminates these objects as sources of induced current and voltage shocks. Multiple grounding points are used to provide redundant paths for induced current flow. After construction, BPA would respond to any complaints and install or repair grounding to mitigate nuisance shocks.

Unlike fences or buildings, mobile objects such as vehicles and farm machinery cannot be grounded permanently. Limiting the possibility of induced currents from such objects to persons is accomplished in several ways. First, required clearances for above-ground conductors tend to limit field strengths to levels that do not represent a hazard or nuisance. The NESC (IEEE, 2002) requires that, for lines with voltage exceeding 98 kV line-to-ground (170 kV line-to-line), sufficient conductor clearance be maintained to limit the induced short-circuit current in the largest anticipated vehicle under the line to 5 milliamperes (mA) or less. This can be accomplished by limiting access or by increasing conductor clearances in areas where large vehicles could be present. BPA and other utilities design and operate lines to be in compliance with the NESC.

For the proposed line, conductor clearances (100°C) would be increased to at least 37.5 ft. (11.4 m) over major road crossings along the route, resulting in a maximum field of 1.2 kV/m or less at the 3.28 ft. (1 m) height. The largest truck allowed on roads in Oregon without a special permit is 14 ft. high by 8.5 ft. wide by 75 ft. long (4.3 x 2.6 x 22.9 m). The induced currents to such a vehicle oriented perpendicular to the line in a maximum field of 1.2 kV/m (at 3.28-ft. height) would be less than 1.2 mA (Reilly, 1979). For smaller trucks, the maximum induced currents for perpendicular orientation to the proposed line would be less than this value. (Larger special-permitted trucks, such as triple trailers, can be up to 105 feet in length. However, because they average the field over such a long distance, the maximum induced current to a 105-ft. vehicle oriented perpendicular to the 230-kV line at a road crossing would be less than that for the 75-foot truck.) These large vehicles are not anticipated to be off highways on the right-of-way or oriented parallel and directly under the proposed line. Thus, the NESC 5-mA criterion would be met for road crossings of the proposed line. In accordance with the NESC, line clearances would also be increased over other areas, such as over railroads, orchards and water areas suitable for sailboating.

The computed induced currents at road crossings are for worst-case conditions that occur rarely. Several factors tend to reduce the levels of induced current shocks from vehicles at road crossings and elsewhere:

(1) Activities are distributed over the whole right-of-way, and only a small percentage of time is spent in areas where the field is at or close to the maximum value.

(2) At road crossings, vehicles are aligned perpendicular to the conductors, resulting in a substantial reduction in induced current.

(3) The conductor clearance at road crossings may not be at minimum values because of lower conductor temperatures and/or location of the road crossing away from midspan.

(4) The largest vehicles are permitted only on certain highways.

(5) Off-road vehicles are in contact with soil or vegetation, which reduces shock currents substantially.

Induced voltages occur on objects, such as vehicles, in an electric field where there is an inadequate electrical ground. If the voltage is sufficiently high, then a spark discharge shock can occur as contact is made with the object. Such shocks are similar to "carpet" shocks that occur, for example, when a person touches a doorknob after walking across a carpet on a dry day. The number and severity of spark discharge shocks depend on electric-field strength and generally of concern under lines with voltages of 345-kV or higher. Nuisance shocks, which are primarily spark discharges, are not anticipated to be a problem under the proposed line.

In electric fields higher than those that would occur under the proposed line, it is theoretically possible for a spark discharge from the induced voltage on a large vehicle to ignite gasoline vapor during refueling. The probability for exactly the right conditions for ignition to occur is extremely remote. The additional clearance of conductors provided at road crossings reduces the electric field in areas where vehicles are prevalent and reduces the chances for such events. Even so, BPA recommends that vehicles should not be refueled under the proposed line unless specific precautions are taken to ground the vehicle and the fueling source (USDOE, 1995).

Under certain conditions, the electric field can be perceived through hair movement on an upraised hand or arm of a person standing on the ground under high-voltage transmission lines. The median field for perception in this manner was 7 kV/m for 136 persons; only about 12% could perceive fields of 2 kV/m or less (Deno and Zaffanella, 1982). In limited areas under the conductors at midspan, the fields at ground level would exceed the levels where field perception can occur. However it is unlikely that field perception would be common under the proposed 230-kV line because fields would generally be below the perception level. Where vegetation provides shielding, the field would not be perceived.

Conductive shielding reduces both the electric field and induced effects such as shocks. Persons inside a vehicle cab or canopy are shielded from the electric field. Similarly, a row of trees or a lower-voltage distribution line reduces the field on the ground in the vicinity. Metal pipes, wiring, and other conductors in a residence or building shield the interior from the transmission-line electric field.

The electric fields from the proposed 230-kV line would be comparable to or less than those from existing 230-kV lines in the project area and elsewhere. Potential impacts of electric fields can be mitigated through grounding policies and adherence to the NESC. Worst-case levels are used for safety analyses but, in practice, induced currents and voltages are reduced considerably by unintentional grounding. Shielding by conducting objects, such as vehicles and vegetation, also reduces the potential for electric-field effects.

5.2 Magnetic Field: Short-term Effects

Magnetic fields associated with transmission and distribution systems can induce voltage and current in long conducting objects that are parallel to the transmission line. As with electric-field induction, these induced voltages and currents are a potential source of shocks. A fence, irrigation pipe, pipeline, electrical distribution line, or telephone line forms a conducting loop when it is grounded at both ends. The earth forms the other portion of the loop. The magnetic field from a transmission line can induce a current to flow in such a loop if it is oriented parallel to the line. If only one end of the fence is grounded, then an induced voltage appears across the open end of the loop. The possibility for a shock exists if a person closes the loop at the open end by contacting both the ground and the conductor. The magnitude of this potential shock depends on the following factors: the magnitude of the field; the length of the object (the longer the object, the larger the induced voltage); the orientation of the object with respect to the transmission line (parallel as opposed to perpendicular, where no induction would occur); and the amount of electrical resistance in the loop (high resistance limits the current flow).

Magnetically induced currents from power lines have been investigated for many years; calculation methods and mitigating measures are available. A comprehensive study of gas pipelines near transmission lines developed prediction methods and mitigation techniques specifically for induced voltages on pipelines (Dabkowski and Taflove, 1979; Taflove and Dabkowski, 1979). Similar techniques and procedures are available for irrigation pipes and fences. Grounding policies employed by utilities for long fences reduce the potential magnitude of induced voltage.

The magnitude of the coupling with both pipes and fences is very dependent on the electrical unbalance (unequal currents) among the three phases of the line. Thus, a distribution line where a phase outage may go unnoticed for long periods of time can represent a larger source of induced currents than a transmission line where the loads are well-balanced (Jaffa and Stewart, 1981).

Knowledge of the phenomenon, grounding practices, and the availability of mitigation measures mean that magnetic-induction effects from the proposed 230-kV transmission line would be minimal.

Magnetic fields from transmission and distribution facilities can interfere with certain electronic equipment. Magnetic fields can cause distortion of the image on older style VDTs and computer monitors (cathode-ray tubes). The threshold field for interference depends on the type and size of monitor and the frequency of the field. Interference has been observed for certain monitors at fields at or below 10 mG (Baishiki et al., 1990; Banfai et al., 2000). The problem typically arises when computer monitors are in use near electrical distribution or transmission facilities or near the distribution system in large office buildings. Under peak current conditions fields from the proposed line would fall below this level from the edge of the right of way to about 30 ft. (9 m) beyond the right of way depending on line height. For average current conditions the field at the edge of the right-of-way and beyond would be below the 10 mG level where interference can occur.

Interference from magnetic fields does not occur for flat-screen monitors, such as used in laptop computers. If interference does occur for an older monitor, it can be eliminated by shielding the affected monitor or moving it to an area with lower fields. Similar mitigation methods could be applied to other sensitive electronics, if necessary. Interference from 60-Hz fields with computers and control circuits in vehicles and other equipment is not anticipated at the field levels found under and near the proposed 230-kV transmission line.

6.0 Regulations

Regulations that apply to transmission-line electric and magnetic fields fall into two categories. Safety standards or codes are intended to limit or eliminate electric shocks that could seriously injure or kill persons. Field limits or guidelines are intended to limit electric- and magnetic-field exposures that can cause nuisance shocks or that might cause health effects. In no case has a limit or standard been established because of a known or demonstrated health effect.

The proposed line would be designed to meet the NESC (IEEE, 2002a), which specifies how far transmission-line conductors must be from the ground and other objects. The clearances specified in the code provide safe distances that prevent harmful shocks to workers and the public. In addition, people who live and work near transmission lines must be aware of safety precautions to avoid electrical (which is not necessarily physical) contact with the conductors. For example, farmers should not up-end irrigation pipes under a transmission or other electrical line or direct the water stream from an irrigation system into or near the conductors. In addition, as a matter of safety, the NESC specifies that electric-field-induced currents from transmission lines must be below the 5 mA ("let go") threshold deemed a lower limit for primary shock. BPA publishes and distributes a brochure that describes safe practices to protect against shock hazards around power lines (USDOE, 1995).

Field limits or guidelines have been adopted in several states and countries and by national and international organizations. Electric-field limits have generally been based on minimizing nuisance shocks or field perception. In some cases, such as the state limits in Table 5, the intent of magnetic-field limits has been to limit exposures to existing levels, given the uncertainty of their potential for health effects. In the case of international standard or guideline setting organizations, magnetic field limits have been based on thresholds for possible effects from induced internal currents or electric fields (ICNIRP, 1998; IEEE, 2002b).

There are currently no national standards in the United States for 60-Hz electric and magnetic fields. Oregon's formal rule in its transmission-line-siting procedures specifically addresses field limits. The Oregon limit of 9 kV/m for electric fields is applied to areas accessible to the public (Oregon, State of, 1980). The Oregon rule also addresses grounding practices, audible noise, and radio interference. Oregon does not have a limit for magnetic fields from transmission lines.

Besides Oregon, several states have been active in establishing mandatory or suggested limits on 60-Hz electric and (in two cases) magnetic fields. Five other states have specific electric-field limits that apply to transmission lines: Florida, Minnesota, Montana, New Jersey, and New York. Florida and New York have established regulations for magnetic fields. These regulations are summarized in Table 5, adapted from TDHS Report (1989).

Government agencies and utilities operating transmission systems have established design criteria that include EMF levels. BPA has maximum allowable electric fields of 9 and 5 kV/m on and at the edge of the right-of-way, respectively (USDOE, 1996). BPA also has maximum-allowable electric-field strengths of 5 kV/m, 3.5 kV/m, and 2.5 kV/m for road crossings, shopping center parking lots, and commercial/ industrial parking lots, respectively. These levels are based on limiting the maximum short-circuit currents from anticipated vehicles to less than 1 mA in shopping center lots and to less than 2 mA in commercial parking lots.

Electric-field limits for overhead power lines have also been established in other countries (Maddock, 1992). Limits for magnetic fields from overhead power lines have not been explicitly established anywhere except in Florida and New York (see Table 5). However, general guidelines and limits on EMF

have been established for occupational and public exposure in several countries and by national and international organizations.

The American Conference of Governmental Industrial Hygienists (ACGIH) sets guidelines (Threshold Limit Values® or TLV®) for occupational exposures to environmental agents (ACGIH, 2000). In general, a TLV represents the level below which it is believed that nearly all workers may be exposed repeatedly without adverse health effects. For EMF, the TLVs represent ceiling levels. For 60-Hz electric fields, occupational exposures should not exceed the TLV of 25 kV/m. However, the ACGIH also recognizes the potential for startle reactions from spark discharges and short-circuit currents in fields greater than 5-7 kV/m, and recommends implementing grounding practices. They recommend the use of conductive clothing for work in fields exceeding 15 kV/m. The TLV for occupational exposure to 60-Hz magnetic fields is a ceiling level of 10 G (10,000 mG) (ACGIH, 2000).

Electric and magnetic fields from various sources (including automobile ignitions, appliances and, possibly, transmission lines) can interfere with implanted cardiac pacemakers. In light of this potential problem, manufacturers design devices to be immune from such interference. However, research has shown that these efforts have not been completely successful and that a few older models of pacemakers could be affected by 60-Hz fields from transmission lines. There were also numerous models of pacemakers that were not affected by fields even larger than those found under transmission lines. Because of the known potential for interference with pacemakers by 60-Hz fields, field limits for pacemaker wearers have been established by the ACGIH. They recommend that wearers of pacemakers and similar medical-assist devices limit their exposure to electric fields of 1 kV/m or less and to magnetic fields to 1 G (1,000 mG) or less (ACGIH, 2000).

The International Committee on Non-ionizing Radiation Protection (ICNIRP), working in cooperation with the World Health Organization (WHO), has developed guidelines for occupational and public exposures to EMF (ICNIRP, 1998). For occupational exposures at 60 Hz, the recommended limits to exposure are 8.3 kV/m for electric fields and 4.2 G (4,200 mG) for magnetic fields. The electric-field level can be exceeded, provided precautions are taken to prevent spark discharge and induced current shocks. For the general public, the ICNIRP guidelines recommend exposure limits of 4.2 kV/m for electric fields and 0.83 G (830 mG) for magnetic fields (ICNIRP, 1998).

ICNIRP has also established guidelines for contact currents, which could occur when a grounded person contacts an ungrounded object in an electric field. The guideline levels are 1.0 mA for occupational exposure and 0.5 mA for public exposure.

The Institute of Electrical and Electronic Engineers (IEEE, 2002b) has also set limits for occupational and public exposure to electric and magnetic fields and to contact currents. The magnetic-field limits are based on an extensive assessment of possible neurological responses to magnetic field exposures. The limit for public exposure to 60-Hz magnetic fields are 9,040 mG.

The IEEE electric-field limits are based on thresholds for possible reactions to perceivable spark discharges that occur in electric fields. The limits for public exposure to electric fields are 5 kV/m except on power line rights-of-way, where the limit is 10 kV/m. The current limit for the general public is 0.5 mA for a touch contact.

The electric fields from the proposed 230-kV transmission line would meet the ACGIH, ICNIRP, and IEEE standards, provided wearers of pacemakers and similar medical-assist devices are discouraged from unshielded right-of-way use. (A passenger in an automobile under the line would be shielded from the electric field.) The magnetic fields from the proposed line would be below the ACGIH occupational limits, and well as below those of ICNIRP and IEEE for occupational and public exposures. The electric

fields present on the right-of-way could induce currents in ungrounded vehicles that exceeded the ICNIRP and IEEE levels of 0.5 mA.

The estimated peak electric fields on the right-of-way of the proposed transmission line would meet the limits of all states. (see Table 5). The BPA electric field criteria would be met by the proposed line. for all configurations of the proposed line. The edge-of-right-of-way electric fields from the proposed line would be below the edge-of-right-of-way limits set by all states. The magnetic field at the edge of the right-of-way from the proposed line would be below the regulatory levels of states where such regulations exist.

7.0 Audible Noise

7.1 Basic Concepts

Audible noise (AN), as defined here, represents an unwanted sound, as from a transmission line, transformer, airport, or vehicle traffic. Sound is a pressure wave caused by a sound source vibrating or displacing air. The ear converts the pressure fluctuations into auditory sensations. AN from a source is superimposed on the background or ambient noise that is present before the source is introduced.

The amplitude of a sound wave is the incremental pressure resulting from sound above atmospheric pressure. The sound-pressure level is the fundamental measure of AN; it is generally measured on a logarithmic scale with respect to a reference pressure. The sound-pressure level (SPL) in decibels (dB) is given by:

$$SPL = 20 \log (P/P_o)dB$$

where P is the effective rms (root-mean-square) sound pressure, P_O is the reference pressure, and the logarithm (log) is to the base 10. The reference pressure for measurements concerned with hearing is usually taken as 20 micropascals (Pa), which is the approximate threshold of hearing for the human ear. A logarithmic scale is used to encompass the wide range of sound levels present in the environment. The range of human hearing is from 0 dB up to about 140 dB, a ratio of 10 million in pressure (EPA, 1978).

Logarithmic scales, such as the decibel scale, are not directly additive: to combine decibel levels, the dB values must be converted back to their respective equivalent pressure values, the total rms pressure level found, and the dB value of the total recalculated. For example, adding two sounds of equal level on the dB scale results in a 3 dB increase in sound level. Such an increase in sound pressure level of 3 dB, which corresponds to a doubling of the energy in the sound wave, is barely discernible by the human ear. It requires an increase of about 10 dB in SPL to produce a subjective doubling of sound level for humans. The upper range of hearing for humans (140 dB) corresponds to a sharply painful response (EPA, 1978).

Humans respond to sounds in the frequency range of 16 to 20,000 Hz. The human response depends on frequency, with the most sensitive range roughly between 2000 and 4000 Hz. The frequency-dependent sensitivity is reflected in various weighting scales for measuring audible noise. The A-weighted scale weights the various frequency components of a noise in approximately the same way that the human ear responds. This scale is generally used to measure and describe levels of environmental sounds such as those from vehicles or occupational sources. The A-weighted scale is also used to characterize transmission-line noise. Sound levels measured on the A-scale are expressed in units of dB(A) or dBA.

AN levels and, in particular, corona-generated audible noise (see below) vary in time. In order to account for fluctuating sound levels, statistical descriptors have been developed for environmental noise. Exceedence levels (L levels) refer to the A-weighted sound level that is exceeded for a specified

percentage of the time. Thus, the L_5 level refers to the noise level that is exceeded only 5% of the time. L_{50} refers to the sound level exceeded 50% of the time. Sound-level measurements and predictions for transmission lines are often expressed in terms of exceedence levels, with the L_5 level representing the maximum level and the L_{50} level representing a median level.

Table 6 shows AN levels from various common sources. Clearly, there is wide variation. Noise exposure depends on how much time an individual spends in different locations. Outdoor noise generally does not contribute to indoor levels (EPA, 1974). Activities in a building or residence generally dominate interior AN levels.

The BPA transmission-line design criterion for corona-generated audible noise (L_{50}, foul weather) is 50 dBA at the edge of the ROW (USDOE, 2006). This criterion applies to new line construction and is under typical conditions of foul weather, altitude, and system voltage.

Audible noise from substations is generated predominantly by equipment such as transformers, reactors and other wire-wound equipment. It is characterized by a 120 Hz hum that is associated with magnetic-field caused vibrations in the equipment. Noise from such equipment varies by voltage and other operating conditions. The BPA design level for substation noise is 50 dBA at the substation property line for new construction (USDOE, 2006). The design level is met by obtaining equipment that meets specified noise limits and, for new substations, by securing a no-built buffer beyond the substation perimeter fence.

In industrial, business, commercial, or mixed use zones the AN level from substations may exceed 50 dBA but must still meet any state or local AN requirements. The design criteria also allows the 50 dBA design level to be exceeded in remote areas where development of noise sensitive properties is highly unlikely.

The EPA has established a guideline of 55 dBA for the annual average day-night level (L_{dn}) in outdoor areas (EPA, 1978). In computing this value, a 10 dB correction (penalty) is added to night-time noise between the hours of 10 p.m. and 7 a.m.

7.2 Transmission-line Audible Noise

Corona is the partial electrical breakdown of the insulating properties of air around the conductors of a transmission line. In a small volume near the surface of the conductors, energy and heat are dissipated. Part of this energy is in the form of small local pressure changes that result in audible noise. Corona-generated audible noise can be characterized as a hissing, crackling sound that, under certain conditions, is accompanied by a 120-Hz hum. Corona-generated audible noise is of concern primarily for contemporary lines operating at voltages of 345 kV and higher during foul weather. However, the proposed 230-kV line will produce some noise under foul weather conditions.

The conductors of high-voltage transmission lines are designed to be corona-free under ideal conditions. However, protrusions on the conductor surface—particularly water droplets on or dripping off the conductors—cause electric fields near the conductor surface to exceed corona onset levels, and corona occurs. Therefore, audible noise from transmission lines is generally a foul-weather (wet-conductor) phenomenon. Wet conductors can occur during periods of rain, fog, snow, or icing. Based on meteorologic records near the route of the proposed transmission line, such conditions are expected to occur about 6% of the time during the year in the Wasco area.

For a few months after line construction, residual grease or oil on the conductors can cause water to bead up on the surface. This results in more corona sources and slightly higher levels of audible noise and

electromagnetic interference if the line is energized. However, the new conductors "age" in a few months, and the level of corona activity decreases to the predicted equilibrium value. During fair weather, insects and dust on the conductor can also serve as sources of corona.

7.3 Predicted Audible Noise Levels

Corona-generated audible-noise levels are calculated for average voltage and average conductor heights for fair- and foul-weather conditions. The predicted levels of audible noise for the proposed line operated at a voltage of 237 kV are given in Table 7 and plotted in Figure 4.

The calculated median level (L_{50}) during foul weather at the edge of the proposed Klondike - John Day 230-kV line right-of-way (62.5 ft. from centerline) is 42 dBA; the calculated maximum level (L_5) during foul weather at the edge of the right-of-way is 45 dBA. During fair-weather conditions, which occur about 94% of the time in the Wasco area, audible noise levels at the edge of the right-of-way would be about 20 dBA (if corona were present). These lower levels could be masked by ambient noise on and off the right-of-way.

7.4 Discussion

The calculated foul-weather corona noise levels for the proposed line would be comparable to, or less than, those from existing 230-kV lines in Oregon. During fair weather, noise from the conductors might be perceivable on the right-of-way; however, beyond the right-of-way it would very likely be masked or so low as not to be perceived. During foul weather, when ambient noise is higher, it is also likely that corona-generated noise off the right-of-way would be masked to some extent.

On and off the right-of-way, the levels of audible noise from the proposed line during foul weather would be well below the 55-dBA level that can produce interference with speech outdoors. The distance to the nearest residence to the proposed line is about 0.25 miles (0.4 km). At this distance the AN from the line would be about 30 dBA during foul weather and probably not be perceived above background noise. During such periods ambient noise levels can be increased due to wind and rain hitting foliage or buildings.

The computed annual L_{dn} level for transmission lines operating in areas with about 6% foul weather is about $L_{dn} = L_{50} - 3$ dBA (Bracken, 1987). Therefore, assuming such conditions in the area of the proposed Klondike - John Day 230-kV line, the estimated L_{dn} at the edge of the right-of-way would be approximately 39 dBA, which is well below the EPA L_{dn} guideline of 55 dBA.

The transformers and other equipment installed at the new Klondike substation will be specified so that the BPA noise level criterion of 50 dBA for new substations will be met at the edge of the property (USDOE, 2006). This will ensure that all applicable federal, state, and local regulations are met.

For the expansion to the John Day Substation, the new equipment would be required to meet the same specifications as for new substations (USDOE, 2006). However, the new equipment would be placed in an environment with noise from existing transmission lines and existing equipment in the John Day Substation. The combined noise level from the existing and new facilities could exceed the 50 dBA design level at points on the perimeter of the expanded substation. However, the levels would be controlled to meet all applicable regulations at the edge of the property.

7.5 Conclusion

Along the proposed line route there could be increases in the perceived noise above ambient levels during foul weather at the edges of the proposed 230-kV right-of-way. The corona-generated noise during foul weather would be masked to some extent by naturally occurring sounds such as wind and rain on foliage. During fair weather, the noise off the right-of-way from the proposed line would probably not be detectable above ambient levels. The noise levels from the proposed line would be below levels identified as causing interference with speech or sleep. The audible noise from the transmission line would be below EPA guideline levels and would meet the BPA design criterion that complies with state noise regulations. Similarly the new substations would be designed and constructed to meet BPA design criteria that all federal, state and local regulations be met.

8.0 Electromagnetic Interference

8.1 Basic Concepts

Corona on transmission-line conductors can also generate electromagnetic noise in the frequency bands used for radio and television signals. The noise can cause radio and television interference (RI and TVI). In certain circumstances, corona-generated electromagnetic interference (EMI) can also affect communications systems and other sensitive receivers. Interference with electromagnetic signals by corona-generated noise is generally associated with lines operating at voltages of 345 kV or higher. This is especially true of interference with television signals. The single 1.6-in diameter conductor used in the design of the proposed 230-kV line would mitigate corona generation and keep radio and television interference levels at acceptable levels below those of many existing 230-kV lines with smaller conductors.

Spark gaps on distribution lines and on low-voltage wood-pole transmission lines are a more common source of RI/TVI than is corona from high-voltage electrical systems. This gap-type interference is primarily a fair-weather phenomenon caused by loose hardware and wires. The proposed transmission line would be constructed with modern hardware that eliminates such problems and therefore minimizes gap noise. Consequently, this source of EMI is not anticipated for the proposed line.

No state has limits for either RI or TVI. In the United States, electromagnetic interference from power transmission systems is governed by the Federal Communications Commission (FCC) Rules and Regulations presently in existence (FCC, 1988). A power transmission system falls into the FCC category of "incidental radiation device," which is defined as "a device that radiates radio frequency energy during the course of its operation although the device is not intentionally designed to generate radio frequency energy." Such a device "shall be operated so that the radio frequency energy that is emitted does not cause harmful interference. In the event that harmful interference is caused, the operator of the device shall promptly take steps to eliminate the harmful interference." For purposes of these regulations, harmful interference is defined as: "any emission, radiation or induction which endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radio communication service operating in accordance with this chapter" (FCC, 1988: Vol II, part 15. 47CFR, Ch. 1).

Electric power companies have been able to work quite well under the present FCC rule because harmful interference can generally be eliminated. It has been estimated that more than 95% of power-line sources that cause interference are due to gap-type discharges. These can be found and completely eliminated, when required to prevent interference (USDOE, 1980). Complaints related to corona-generated

interference occur infrequently. This is especially true with the advent of cable television and satellite television, which are not subject to corona-generated interference. Mitigation of corona-generated interference with conventional radio and television receivers can be accomplished in several ways, such as use of a directional antenna or relocation of an existing antenna (USDOE, 1977; USDOE, 1980; Loftness et al., 1981).

8.2 Radio Interference (RI)

Radio reception in the AM broadcast band (535 to 1605 kilohertz (kHz)) is most often affected by corona-generated EMI. FM radio reception is rarely affected. Generally, only residences very near to transmission lines can be affected by RI. The IEEE Radio Noise Design Guide identifies an acceptable limit of fair-weather RI as expressed in decibels above 1 microvolt per meter (dBμV/m) of about 40 dBμV/m at 100 ft. (30 m) from the outside conductor (IEEE Committee Report, 1971). As a general rule, average levels during foul weather (when the conductors are wet) are 16 to 22 dBμV/m higher than average fair-weather levels.

8.3 Predicted RI Levels

The predicted median (L_{50}) fair- and foul-weather RI levels at 100 ft. (30 m) from the outside conductor for the proposed line operating at 237 kV are 28 and 45 dBμV/m, respectively. This level will meet the IEEE 40 dBμV/m criterion for fair weather levels at distances greater than about 100 ft. (30 m) from the outside conductor. Predicted fair-weather L_{50} levels are comparable to, or lower than, those for existing 230-kV lines in Oregon..

8.4 Television Interference (TVI)

Corona-caused TVI occurs during foul weather and is generally of concern for transmission lines with voltages of 345 kV or above, and only for conventional receivers within about 600 ft. (183 m) of such a line. As is the case for RI, gap sources on distribution and low-voltage transmission lines are the principal observed sources of TVI. The use of modern hardware and construction practices for the proposed line would minimize such sources. TVI levels are expressed in dBμV/m at 75 MHz.

8.5 Predicted TVI Levels

The foul weather TVI level predicted at 100 ft. (30 m) from the outside conductor of the proposed line is 13 dBμV/m with the line operating at 237 kV. This is considerably below foul-weather TVI levels from existing 500-kV lines (24-27 dBμV/m), where TVI can be a problem.

Other forms of TVI from transmission lines are signal reflection (ghosting) and signal blocking caused by the relative locations of the transmission structure and the receiving antenna with respect to the incoming television signal. The steel pole towers proposed for use in the design of the proposed line are less effective in causing this type of interference than are lattice steel towers. Television systems that operate at higher frequencies, such as satellite receivers, are not affected by corona-generated TVI. Cable television systems are similarly unaffected. The distance between the proposed line route and nearby residences makes this type of interference very unlikely for the proposed line.

Since residences are 0.25 miles or more distant, corona-generated TVI, signal reflection or signal blocking are not anticipated to occur due to the proposed 230-kV line. In the unlikely event that RI or TVI is caused by the proposed line, BPA has a program to identify, investigate, and mitigate legitimate RI and TVI complaints.

8.6 Interference with Other Devices

Corona-generated interference can conceivably cause disruption on other communications bands such as the citizen's (CB) and mobile bands. However, mobile-radio communications are not susceptible to transmission-line interference because they are generally frequency modulated (FM). Similarly, cellular telephones operate at a frequency of 900 MHz or higher, which is above the frequency where corona-generated interference is prevalent. In the unlikely event that interference occurs with these or other communications, mitigation can be achieved with the same techniques used for television and AM radio interference. As digital signal processing has been integrated into communications the potential impact of corona-generated EMI has decreased substantially.

8.7 Conclusion

Predicted EMI levels for the proposed 230-kV transmission line are comparable to, or lower, than those that already exist near 230-kV lines and no impacts of corona-generated interference on radio, television, or other receptors are anticipated. Furthermore, if interference should occur, there are various methods for correcting it: BPA has a program to respond to legitimate complaints.

9.0 Other Corona Effects

Corona is sometimes visible as a bluish glow or as bluish plumes on higher voltage lines. On the proposed 230-kV line, corona levels would be very low, so it is very unlikely that it could be observed. Any corona on the conductors would be observable only under the darkest conditions and only with the aid of binoculars, if at all. Without a period of adaptation for the eyes and without intentional looking for the corona, it would probably not be noticeable.

When corona is present, the air surrounding the conductors is ionized and many chemical reactions take place, producing small amounts of ozone and other oxidants. Ozone is approximately 90% of the oxidants, while the remaining 10% is composed principally of nitrogen oxides. The corona level predicted for the proposed line is much lower than that from 500-kV lines. The levels from 500-kV lines are significantly below natural levels and fluctuations in natural levels. Consequently, any production of ozone from the proposed line would be essentially undetectable at ground level.

10.0 Summary

Electric and magnetic fields from the proposed transmission line have been characterized using well-known techniques accepted within the scientific and engineering community. The expected electric-field levels from the proposed line at minimum design clearance would be comparable to those from existing 230-kV lines in Oregon, and elsewhere. The expected magnetic-field levels from the proposed line would be comparable to those from other 230-kV lines in Oregon, and elsewhere.

The peak electric field expected under the proposed line would be 2.5 kV/m; the maximum value at the edge of the right-of-way would be about 0.3 kV/m. Clearances at road crossings would be increased to reduce the peak electric-field value to 1.2 kV/m or less.

Under maximum current conditions on both circuits, the maximum magnetic fields under the proposed line would be 132 mG; at the edge of the right-of-way of the proposed line the maximum magnetic field would be 25 mG. With only the Biglow Canyon circuit loaded to maximum current the magnetic fields

would increase to a maximum of 150 mG on the right-of-way and 44 mG at the edge. Over a year, the magnetic field levels would average to be about 30% of the above levels.

The electric fields from the proposed line would meet regulatory limits for public exposure in Oregon and all other states that have limits and would meet the regulatory limits or guidelines for peak fields established by national and international guideline setting organizations. The magnetic fields from the proposed line would be within the regulatory limits of the two states that have established them and within guidelines for public exposure established by ICNIRP and IEEE. The state of Oregon does not have limits for magnetic fields from transmission lines.

Short-term effects from transmission-line fields are well understood and can be mitigated. Nuisance shocks arising from electric-field induced currents and voltages could be perceivable on the right-of-way of the proposed line. It is common practice to ground permanent conducting objects during and after construction to mitigate against such occurrences.

Corona-generated audible noise from the proposed line could be perceivable during foul weather at the edge of the right-of-way. The levels would be comparable with, or less than, those near existing 230-kV transmission lines in Oregon, and would be in compliance with noise regulations in Oregon, and would be below levels specified in EPA guidelines.

Corona-generated electromagnetic interference from the proposed line would be comparable to or less than that from existing 230-kV lines in Oregon. Radio interference levels would be below limits identified as acceptable. Television interference, a foul-weather phenomenon usually associated with higher voltage lines, is not anticipated to occur from the proposed 230-kV line. If legitimate TVI complaints arise, BPA has a mitigation program.

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Table 1: Alternative routes for proposed Klondike - John Day 500-kV transmission line.

Route	Description	Miles (length)
North Alternative	Runs northwest from Klondike Substation; due north from the intersection with Old Wasco-Happner Highway; then northwest along Herrin Road to the John Day Substation.	12.0
Middle Alternative	Runs northwest from the Klondike Substation; due north to Medler Road; west along Medler Road; then north and westa nd north again along property lines to the John Day Substation.	12.5

Table 2: Physical and electrical characteristics of the proposed Klondike - John Day double-circuit 230-kV transmission-line. See Table 1 for descriptions of alternative routes and Figure 1 for physical layout of line.

Klondike - John Day 230-kV Double-circuit	
Voltage, kV Maximum/Average[1]	242/237
Peak current, A **Biglow Canyon circuit**[2] **Klondike circuit**	 974 (1462) 731
Electric phasing (north –- south)	C A B B A C
Clearance, ft. Minimum/Average[1]	26.5/38.5
Tower configuration	Vertical DC
Phase spacing, ft.[3]	20/32 H, 18 V
Conductor: #/diameter, in	1/1.6

[1] Average voltage and average clearance used for corona calculations.

[2] Maximum current will increase to 1462 A with addition of Orion project load.

[3] H = horizontal feet; V = vertical feet

Table 3: Calculated peak and edge-of-right-of-way electric fields for the proposed Klondike - John Day 230-kV line operated at maximum voltage.

Location	**Electric Field, kV/m**	
Line Clearance	Minimum	Average
Peak	2.5	1.2
Edge-of-ROW	0.3	0.2

Table 4: Calculated peak and edge-of-right-of-way magnetic fields for the proposed Klondike - John Day 230-kV line operated at maximum current. Average fields would be 30% of table values.

Location	**Magnetic Field, mG**	
Line Clearance	Minimum	Average
Peak	132	59
Edge-of-ROW[1]	25/12	19/10

[1] Higher value is at edge of right-of-way adjacent to circuit with Biglow Canyon load.

Table 5: States with transmission-line field limits

STATE AGENCY	WITHIN RIGHT-OF-WAY	AT EDGE OF RIGHT-OF-WAY	COMMENTS
a. 60-Hz ELECTRIC-FIELD LIMIT, kV/m			
Florida Department of Environmental Regulation	8 (230 kV) 10 (500 kV)	2	Codified regulation, adopted after a public rulemaking hearing in 1989.
Minnesota Environmental Quality Board	8	—	12-kV/m limit on the high-voltage direct-current (HVDC) nominal electric field.
Montana Board of Natural Resources and Conservation	7[1]	1[2]	Codified regulation, adopted after a public rulemaking hearing in 1984.
New Jersey Department of Environmental Protection	—	3	Used only as a guideline for evaluating complaints.
New York State Public Service Commission	11.8 (7,11)[1]	1.6	Explicitly implemented in terms of a specified right-of-way width.
Oregon Facility Siting Council	9	—	Codified regulation, adopted after a public rulemaking hearing in 1980.
b. 60-Hz MAGNETIC-FIELD LIMIT, mG			
Florida Department of Environmental Regulation	—	150 (230 kV) 200 (500 kV)	Codified regulations, adopted after a public rulemaking hearing in 1989.
New York State Public Service Commission	—	200	Adopted August 29, 1990.

[1] At road crossings
[2] Landowner may waive limit

Sources: TDHS Report, 1989; TDHS Report, 1990

Table 6: Common noise levels

Sound Level, dBA	Noise Source or Effect
128	Threshold of pain
108	Rock-and-roll band
80	Truck at 50 ft.
70	Gas lawnmower at 100 ft.
60	Normal conversation indoors
50	Moderate rainfall on foliage
49	Edge of proposed 500-kV right-of-way during rain (no parallel lines)
40	Refrigerator
25	Bedroom at night
0	Hearing threshold

Adapted from: USDOE, 1996.

Table 7: Predicted foul-weather and fair-weather audible noise (AN) levels at edge of right-of-way (ROW) for the proposed Klondike - John Day 230-kV line. AN levels expressed in decibels on the A-weighted scale (dBA). L_{50} and L_5 denote the levels exceeded 50 and 5 percent of the time, respectively.

Edge of Right-of-Way Audible Noise		
Descriptor	**L_{50}, dBA**	**L_5, dBA**
Foul weather	42	45
Fair weather	17	20

Figure 1: Configuration for the proposed Klondike – John Day 230-kV transmission line. Routes and configuration are described in Tables 1 and 2.

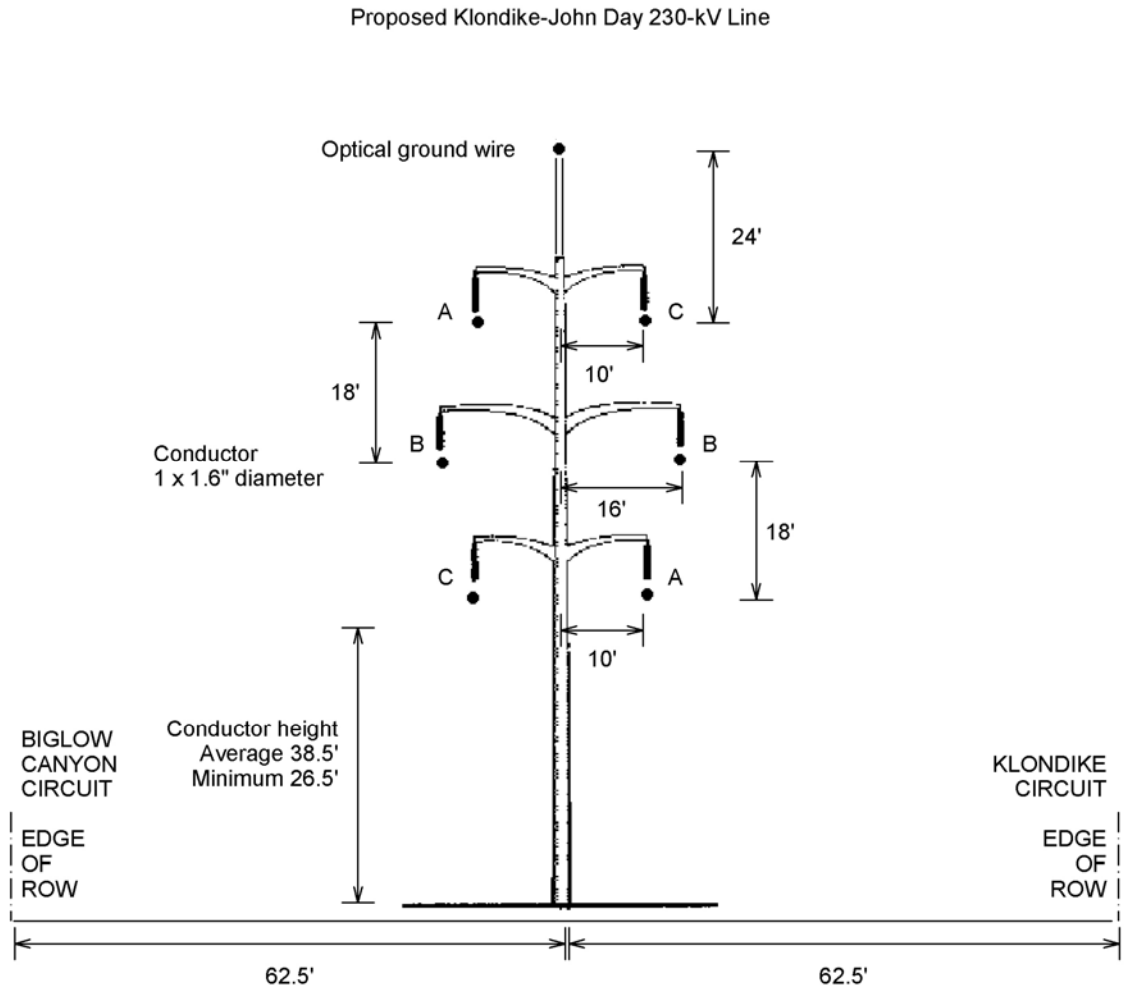


Figure 2: Electric-field profiles for the proposed Klondike – John Day 230-kV transmission line under maximum voltage conditions. Configuration is described in Table 2.

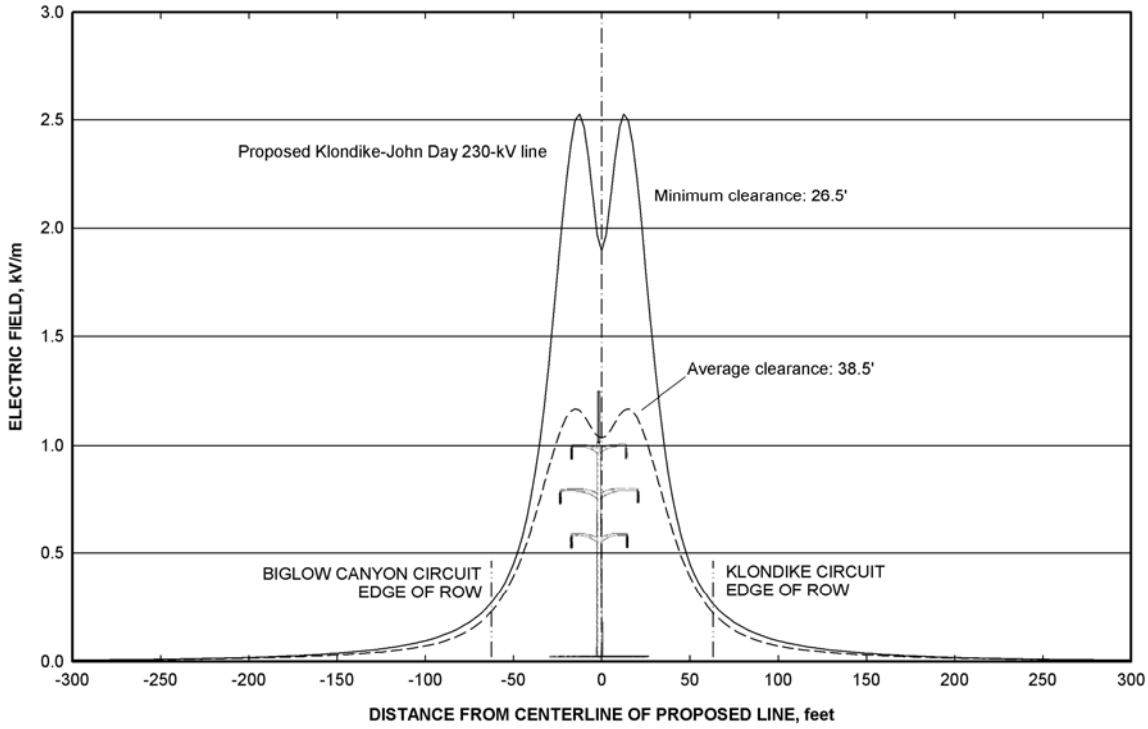


Figure 3: Magnetic-field profiles for the proposed Klondike – John Day 230-kV transmission line under maximum current conditions. Configuration is described in Table 2.

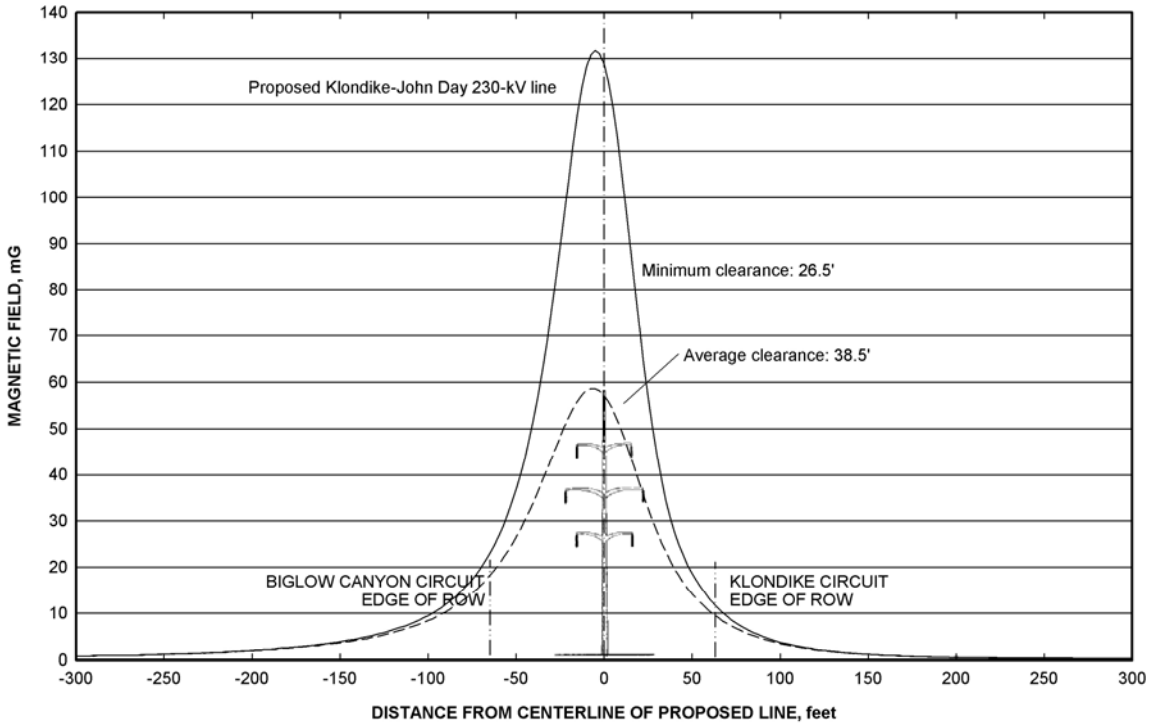
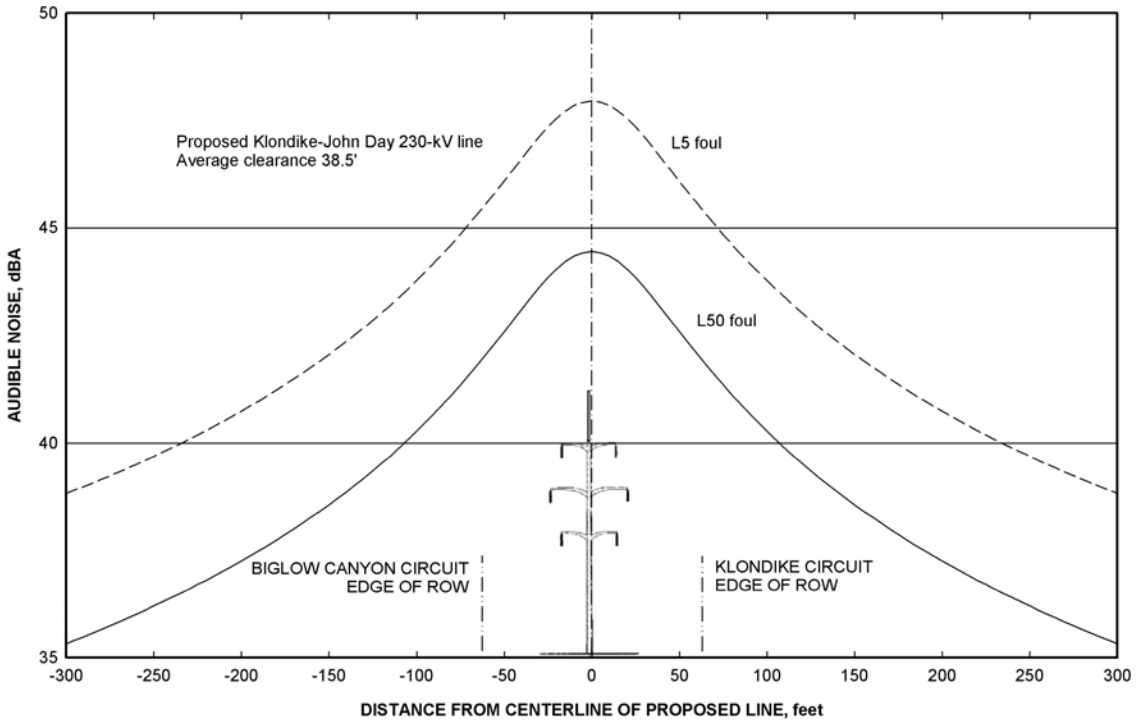


Figure 4: Predicted foul-weather L_{50} audible noise levels for the proposed Klondike - John Day 230-kV transmission line. Configuration is described in Table 2.



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Appendix D Assessment Of Research Regarding EMF And Health And Environmental Effects

KLONDIKE III/BIGLOW CANYON WIND INTEGRATION PROJECT

APPENDIX D:

ASSESSMENT OF RESEARCH REGARDING EMF AND HEALTH AND ENVIRONMENTAL EFFECTS

MARCH 2006

Prepared by

Exponent™

for

T. Dan Bracken, Inc.

and

Bonneville Power Administration

Table of Contents

1 Introduction

Over the last 25 years, research has been conducted in the United States (U.S.) and around the world to examine whether exposures to electric and magnetic fields (EMF) at 50/60 Hertz (Hz) have health or environmental effects. EMF is produced by both natural and man-made sources that surround us in our daily lives. They are found throughout nature and in our own bodies. The earth itself produces a static (0 Hz) magnetic field – this is the field that is used for compass navigation. Electricity provided to homes and offices produces EMF that changes direction and intensity 60 times per second - a frequency of 60 Hertz (Hz). Fields at this frequency are quite different from higher frequency electromagnetic fields such as radio and television signals, microwaves from ovens, cellular phones, and radar (which can have frequencies up to billions of Hz). Man-made EMF is found wherever electricity is generated, delivered, or used. Power lines, wiring in homes, workplace equipment, electrical appliances, and motors produce EMF.

One of the most important characteristics of electric and magnetic fields is that their strength diminishes as you move away from the source. This is similar to the way that the heat from a candle or campfire will diminish as you move away. Although ordinary objects do not block magnetic fields, they can be shielded by using special materials and techniques. In contrast, intervening objects, especially those that can conduct electricity, can reduce electric fields. For example, a typical house may block up to 90% of the electric field from outside sources. Scientific research on people has focused on magnetic fields since objects such as trees, walls, etc. easily shield electric fields.

Epidemiology studies have largely addressed many issues that have been raised about EMF and health. There is an overwhelming consensus in the scientific community, as expressed in multidisciplinary reviews, that the epidemiologic evidence is insufficient to demonstrate a causal relationship between extremely low frequency (ELF) -EMF and any health effect (NIEHS, 1998; NIEHS, 1999; HCN, 2001; NRPB, 2001; IARC, 2002; HCN, 2004; NRPB, 2004). Laboratory studies have not shown a biological mechanism for the development of cancer, including leukemia.

The Bonneville Power Administration (BPA) requested Exponent to update BPA on scientific research conducted on EMF and health and environmental effects in relation to exposures that might occur near the Klondike Wind Transmission Line Project. This update concentrates on recent major research studies to explain how they contribute to the assessment of effects of EMF on health (Section 2). The focus is on both epidemiologic and laboratory research, because these research approaches provide different and complementary information for determining whether an environmental exposure can affect human health. Section 3, Ecological Research, reviews studies of potential effects of EMF on plants and animals in the natural environment. This update includes studies of experimental, residential or environmental exposures to EMF that became available through June 2005.

2 Health

2.1 The NIEHS Report and Research Program

In 1998, the National Institute of Environmental Health Sciences (NIEHS) completed a comprehensive review of the scientific research on health effects of EMF. The NIEHS directed a research program that Congress funded in 1992 in response to questions regarding exposure to EMF from power sources. The program was known as the EMF RAPID Program (Research and Public Information Dissemination Program). The NIEHS convened a panel of scientists (the "Working Group") to review and evaluate the

RAPID Program research and other research. Their report, *Assessment of Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields,* was completed in July 1998 (NIEHS, 1998).

In June 1999, the director of the NIEHS prepared a health risk assessment of EMF and submitted it to Congress (NIEHS, 1999). Experts at NIEHS, who had considered a previous Working Group report, reports from four technical workshops, and research that became available after June 1998, concluded as follows:

> The scientific evidence suggesting that ELF-EMF [extremely low frequency-electric and magnetic field] exposures pose any health risk is weak. The strongest evidence for health effects comes from associations observed in human populations with two forms of cancer: childhood leukemia and chronic lymphocytic leukemia in occupationally exposed adults. . . . In contrast, the mechanistic studies and animal toxicology literature fail to demonstrate any consistent pattern. . . . No indication of increased leukemias in experimental animals has been observed. . . . The lack of consistent, positive findings in animal or mechanistic studies weakens the belief that this association is actually due to ELF-EMF, but it cannot completely discount the epidemiology findings. . . . The NIEHS does not believe that other cancers or other non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern (NIEHS, 1999: 9-10). (N.B. full quote in Table 1.)

Although the results of the RAPID research are described in some detail in the 1998 report, some of the studies had not been published in the peer-reviewed literature. Recognizing the need to have these results reviewed and considered for publication, the NIEHS arranged for this research to be published in a peer reviewed special edition of the journal *Radiation Research* (e.g., Balcer-Kubiczek et al., 2000; Boorman et al., 2000a; Boorman et al., 2000b; Loberg et al., 2000; Ryan et al., 2000).

2.2 Research Related to Cancer

To assess the potential health effects from any exposure, data from several types of studies, including non-experimental, epidemiologic observations of people, and experimental studies on animals, humans, and tissues in laboratory settings, must be critically evaluated.

Epidemiology is the study of diseases and their causes in the human population. Epidemiology studies are observational in that they examine and analyze people in their normal daily life. Such studies are designed to quantify and evaluate the associations between exposures to environmental factors (e.g., vegetables in the diet) and health outcomes (e.g., coronary artery disease). Epidemiologic studies can help suggest risk factors that may contribute to a disease risk, but they usually cannot be used as the sole basis for drawing inferences about cause-and-effect relationships, and they usually only provide information on a limited range of exposures.

In contrast to epidemiology studies, laboratory or experimental studies are conducted under controlled laboratory conditions. Experimental studies designed to test specific hypotheses under controlled conditions are generally required to establish cause-and-effect relationships. Conversely, the results of experimental studies, particularly of isolated tissues or cells, by themselves may not always be directly extrapolated to human populations. It is therefore both necessary and desirable that biological responses to agents that could present a potential health threat be explored by epidemiologic methods in human populations, as well as by experimental studies in the research laboratory.

Toxicology is an important part of laboratory research designed to evaluate the potential beneficial or harmful effects of an agent (e.g., a chemical or a magnetic field). The goal of toxicology studies is to identify the nature of effects that result from exposure and the dose of the agent in the target tissue that

elicits that effect. A most critical distinction, therefore, must be made between harmless biological responses or effects, and those that are truly adverse or deleterious. Many agents produce biological responses in organisms—like the response of the eye to light or the influence of food and water on growth and cellular metabolism—at quite low concentrations or intensities. Hence, the mere demonstration of a biological response or effect does not indicate that an exposure to an agent is hazardous *per se*. Rather, it is imperative to ascertain whether biological responses are deleterious or innocuous, and to establish what, if any, exposure concentrations may be toxic and under what conditions.

2.2.1 Epidemiology Studies of Children

Research on EMF in residential settings and health was prompted by an epidemiology study of children exposed to EMF, mostly from neighborhood distribution lines in the U.S. (Wertheimer and Leeper, 1979). Because the source of the fields was low voltage distribution lines, not high voltage transmission lines the assumption has been that the relevant exposure associated with power lines is the magnetic field, rather than the electric field. This assumption rests on the fact that electric fields are shielded from the interior of homes (where people spend the vast majority of their time) by walls and vegetation, while magnetic fields are not. Subsequent studies have largely addressed almost all issues that have been raised about EMF and health. Summaries of two of the largest and most comprehensive studies of EMF and childhood leukemia are provided below. Both groups of investigators concluded that their data provided little evidence for an association of magnetic fields with leukemia in children.

Epidemiologic studies report results in the form of statistical associations. The term "statistical association" is used to describe the tendency of two things to be linked or to vary in the same way, such as level of exposure and occurrence of disease. However, statistical associations are not automatically an indication of *cause and effect*, because the interpretation of numerical information depends on the context, including (for example) the nature of what is being studied, the source of the data, how the data were collected, and the size of the study. The larger studies and more powerful studies of EMF have not reported convincing statistical associations between power lines and childhood leukemia (e.g., Linet et al., 1997; McBride et al., 1999; UKCCS, 1999; UKCCS, 2000). However, despite the larger sample size, these studies had a limited number of cases exposed over 4 milligauss (mG).

The National Cancer Institute (NCI) — The NCI completed a large and comprehensive study of childhood leukemia in the US in 1997. This study compared exposure to magnetic fields in children who did not have cancer to the exposure of those who had acute lymphocytic leukemia (ALL), the most common form of leukemia in children (Linet et al., 1997). The major advantage of this study was the short time between exposure assessment and diagnosis compared to previous studies, and the assessment of exposure by a variety of methods. In addition, the investigators obtained magnetic field measurements from multiple rooms in each child's home, which included magnetic field exposures from household appliances. No association was found between ALL and the wiring configuration code at the residences occupied by the children before they had cancer. The researchers observed a statistical association between leukemia and magnetic field levels in the category 4.0 – 4.99 mG, but not for time weighted average (TWA) exposures less than 4 mG or for exposures greater than or equal to 5 mG, the highest exposure category. There was no overall trend for a stronger association with increased exposure. Further analyses indicated that distance from high-voltage lines and other exposure indexes were not related to risk for ALL (Kleinerman et al., 2000).

United Kingdom Childhood Cancer Study (UKCCS) — The largest childhood cancer study of magnetic fields to date was completed in the United Kingdom (UK) in 2000. The UKCCS investigators reported on magnetic field measurements on a portion of the cases and controls evaluated in a previous study (UKCCS, 1999). To obtain additional information, they used a method to assess exposure to magnetic fields without entering homes (UKCCS, 2000) and were able to analyze 50% more subjects (a total of 1,331 ALL cases). For all these children, they measured distances to power lines and substations.

This information, combined with data on historical current flow, was used to calculate the magnetic field from these external field sources, based on power line characteristics related to production of magnetic fields. The results of the second UKCCS study showed no evidence for an association with leukemia for magnetic fields calculated to be between 1 mG – 2 mG, 2 mG – 4 mG, or 4 mG or greater at the residence, which is consistent with the results of the earlier report in which magnetic field exposure was estimated by measurement (UKCCS, 1999). Children with leukemia are not more likely to live near distribution, high-voltage power lines or substations than control children. A more recent study of distance from transmission lines reported a weak association with childhood leukemia but not tumors of other tissues (central nervous system/brain, other) but the association was present at distances where no magnetic field would be measured (Draper et al, 2005).

Researchers have proposed that the associations that are sometimes reported between childhood leukemia and power lines might be due to other factors that can confound the analysis (other risk factors for disease that may distort the analysis). One example is heavy traffic, which may occur near power lines and can increase the levels of potentially carcinogenic chemicals in the area. Earlier studies had reported associations between traffic density and childhood cancer (Savitz et al., 1988). If power lines were more common in areas that had higher traffic density, then the increased air pollution might explain an association between power lines and childhood cancer. A recent study by Knox et al. (2005) reported stronger associations between exposures to sources of benzene, 1,3 butadiene, benzo(a)pyrene, and dioxins and childhood leukemia. These exposures should be included in future epidemiology studies of childhood leukemia (Steffen et al., 2004; Knox et al., 2005).

Meta-analyses of Studies of Leukemia

In 2000, researchers reanalyzed the data from previous epidemiology studies of magnetic fields and childhood leukemia that met specified criteria (Ahlbom et al., 2000; Greenland et al., 2000). In each of these analyses, the researchers pooled the data on individuals from each of the studies, creating a study with a much larger number of subjects and therefore greater statistical power than any single study. These meta-analyses focused on studies that assessed exposure to magnetic fields using 24-hour measurements or calculations based on the characteristics of the power lines and current load. Ahlbom et al. combined 9 studies; Greenland et al. used 12 studies, 8 of which were the same as used by Ahlbom. Both studies included ALL as well as other forms of leukemia. Neither Greenland et al. nor Ahlbom et al. included data from the recent, very large study from the UK (UKCCS, 2000), Greenland also did not include results from UKCCS (1999). The statistical results of these analyses can be summarized as follows:

- The pooled analyses provided no indication that wire codes[1] are more strongly associated with leukemia than measured magnetic fields.

- Pooling these data corroborates an absence of an association between childhood leukemia and magnetic fields for exposures below 3 mG.

- Pooling these data results in a statistical association with leukemia for exposures greater than 3-4 mG.

[1] Wire Codes are a surrogate for magnetic field exposure, based on the diameter or thickness of the wire and its distance from the residence.

It is important to note that the information from these pooled analyses is not new because, for many years, epidemiologic studies and reviews have suggested an association between magnetic fields and childhood leukemia. Previous reviews based on fewer studies had suggested an association of magnetic fields with childhood leukemia at time-weighted average exposure levels as low as 2 mG; however, an association is *not* present for exposures below about 3 to 4 mG. Average magnetic fields above 3 mG in residences are estimated to be rather rare, about 3% in the US (Zaffanella, 1993). The authors are appropriately cautious in the interpretation of their analyses and they clearly identify the limitations in their evaluation of the original studies (e.g., small sample size, uncertainty related to pooling estimates of exposure obtained by different methods from studies of diverse design).

Wartenberg (2001) published a different type of meta-analysis of data from epidemiologic studies of childhood leukemia studies. He used 19 studies overall, including the UKCCS (1999) study. This meta-analysis did not have the advantage of obtaining and pooling the data on all of the individuals in the studies, unlike those published before it (Ahlbom et al., 2000; Greenland et al., 2000). Rather than using individual data from each of the individual studies, Wartenberg used an approach based on the results from several published studies, which were reported as grouped data. No statistically consistent results in this meta-analysis were found. He reported a weak association for a) "proximity to electrical facilities" based on wire codes or distance, and b) magnetic-field level over 2 mG, based on either calculations from wiring and loading characteristics (if available) or on spot magnetic-field measurements. There are several limitations of the Wartenberg meta-analysis. The author concludes that the analysis supports an association, however, few scientifically significant odds ratios were found, and as he notes, "limitations due to design, confounding, and other biases may suggest alternative interpretations" (p 100).

2.2.2 Epidemiology Studies of Adults

Studies of occupational exposure have been conducted because these populations are presumed to have high exposure to EMF. Occupational studies have varied greatly in the methods used to estimate exposure (e.g., type of industry, exposure based only on job titles, direct electric and magnetic field measurements), study design (e.g., retrospective cohort studies based on death records, case-control studies with direct magnetic field measurements) and source of exposure to EMF (e.g., specific occupations i.e., railway workers, electricity generation and transmission industry or multiple industries). Recent studies have greatly improved estimates of EMF exposures. Occupational studies published through 2002 are described in the International Agency for Research on Cancer (IARC) monographs (IARC, 2002). No consistent relationship between residential and occupational exposures to magnetic or electric fields has been found for any type of cancer in adults, including leukemia, and types of cancer affecting the brain and breast (Gammon et al., 1988; Kheifets et al., 1999; Wrensch et al., 1999; Laden et al., 2000; Zheng et al., 2000; Davis et al., 2002; London et al., 2003; Schoenfeld et al., 2003; Forssen et al., 2005).

2.2.3 Laboratory Studies of EMF

Laboratory studies complement epidemiologic studies of people because the effects of heredity, diet, and other health-related exposures of animals can be better controlled or eliminated. The assessment of EMF and health, as for any other exposure, includes chronic, long-term studies in animals (*in vivo* studies) and studies of changes in genes or other cellular processes observed in isolated cells and tissues in the laboratory (*in vitro*).

Although the results of the RAPID Program were described in some detail in the NIEHS reports (NIEHS, 1998), many of the studies had not been published in the peer-reviewed literature. The RAPID research program included studies of four biological effects, each of which had previously been observed in only one laboratory. These effects are as follows: effects on gene expression, increased intracellular calcium in a human cell line, proliferation of cell colonies on agar, and increased activity of the enzyme ornithine

decarboylase (ODC). Some scientists have suggested that these biological responses are signs of possible adverse health effects of EMF. It is standard scientific procedure to attempt to replicate results in other laboratories, because artifacts and investigator error can occur in scientific investigations. Replications, often using more experiments or more rigorous protocols, help to ensure objectivity and validity. Attempts at replication can substantiate and strengthen an observation, or they may discover the underlying reason for the observed response.

Studies in the RAPID program reported no consistent biological effects of EMF exposure on gene expression, intracellular calcium concentration, growth of cell colonies on agar, or ODC activity (Boorman et al., 2000b). For example, Balcer-Kubiczek et al. (2000) and Loberg et al. (2000) studied the expression of hundreds of cancer-related genes in human mammary or leukemia cell lines. They found no increase in gene expression with increased intensity of magnetic fields. To test the experimental procedure, they used X-rays and treatments known to affect the genes (chemical and hyperthermia). These are known as positive controls and, as expected, caused gene expression in exposed cells.

Scientists have concluded that the combined animal bioassay results provide no evidence that magnetic fields cause, enhance, or promote the development of cancer including leukemia and lymphoma, or mammary cancer (e.g., Boorman et al., 1999; McCormick et al., 1999; Boorman et al., 2000a,b; Anderson et al., 2001; IARC, 2002; NRPB 2001; McLean et al., 2003; Sommer and Lerchl, 2004).

2.2.4 Summary Regarding Cancer

Epidemiology studies do not support the hypothesis that EMF from power lines increase the risk of cancers in adults. The latest epidemiologic studies of childhood cancer, considered in the context of laboratory data, provide no persuasive evidence that leukemia in children is causally associated with magnetic fields measured at the home, calculated magnetic fields based on distance and current loading, or wire codes. Recent meta-analyses reported no association between childhood cancer and magnetic fields below 2 or 3 mG. Although some association was reported for fields above this level, fields at most residences are likely to be below 3 or 4 mG. The authors of each of these analyses list several biases and problems that render the data inconclusive and prevent resolution of the inconsistencies in the epidemiologic data. For this reason, laboratory studies can provide important complementary information. Large, well-conducted animal studies and studies of initiation and promotion, provide no basis to conclude that EMF increases leukemia, lymphoma, breast, brain, or any other type of cancer.

2.3 Research Related to Reproduction

Several epidemiology studies have examined effects of exposures to magnetic fields on pregnancy, including miscarriages (spontaneous abortion). They reported no association with birth weight, birth defects, or fetal growth retardation after exposure to sources of relatively strong magnetic fields such as electric blankets, or sources of typically weaker magnetic fields such as power lines (Bracken et al., 1995; Belanger et al., 1998; Lee et al., 2000; Blaasaas et al., 2002; Blaasaas et al., 2003; Blaasaas et al., 2004).

Two studies of EMF and miscarriage reported a positive association between miscarriage and exposure to high maximum, or instantaneous, peak magnetic fields (Li et al., 2002; Lee et al., 2002). However, no reliable associations were found with higher average magnetic field levels during the day, the typical way of assessing exposure. Neither study found that miscarriage was associated with residential wiring codes, another method presumed to identify higher magnetic fields from power lines. There are several possible issues to be considered in assessing whether these statistical associations with the maximum magnetic field exposure during the day are possibly causal in nature (Feychting et al., 2005; Mezei et al., 2005). First, the studies include possible biases. For example, each of the studies had a low response rate, which means that the study groups may not be comparable because those who participated in the studies may have differed from those who declined (selection bias). Second, these studies found no reliable

association with higher daily average exposure, that is, the average of the measurements recorded throughout the day. Third, despite years of research, there is no biological basis to indicate that EMF increases the risk of miscarriage.

In summary, the recent evidence from epidemiology and laboratory studies do not support that exposure to power-frequency EMF has an adverse effect on reproduction, pregnancy, or growth and development of the embryo. The results of these recent studies are not sufficiently persuasive to change the conclusions of the NIEHS.

2.4 Implanted Medical Devices and EMF

Advances in technology have led to the development of more medical devices that can be implanted to maintain or enhance organ function. Of these devices, most concern has focused on potential interference to cardiac pacemakers and defibrillators. A cardiac pacemaker monitors the electrical activity of the heart. If the heart fails to beat, the pacemaker administers a small stimulus to trigger the 'missing' beats. An implanted cardiac defibrillator (ICD) similarly monitors the electrical activity of the heart but is designed to block disorganized contractions of the heart (arrhythmias) by administering a strong electrical shock to restore normal heart rhythms. Exposure to electric and magnetic fields could affect the function of these devices if induced signals on sensing leads are interpreted as natural cardiac activity (Griffin, 1986; CCOHS, 1988; Barold et al., 1991). However, the opportunities for exposure and interference from power lines are lower than for contact with ordinary household appliances.

Although scientific studies report that exposure to power frequency electric and magnetic fields have not resulted in adverse responses to patients with pacemakers, the possibility cannot be completely ruled out. In order to reduce potential effects of environmental exposure to electrical and magnetic fields, the Center for Devices and Radiological Health of the U.S. Food and Drug Administration (FDA) has developed guidelines for both the development of pacemakers and the design of new electrical devices to minimize susceptibility to electrical interference from any source. Pacemakers today are designed to filter out electrical stimuli from sources other than the heart, e.g., muscles of the chest, currents encountered from touching household appliances, or currents induced by electric or magnetic fields. Used in both temporary and permanent pacemakers, these electrical filters increase the pacemaker's ability to distinguish extraneous signals from legitimate cardiac signals (Toivonen et al., 1991). Most circuitry of pacemakers is encapsulated by titanium metal, which insulates the device by shielding the pacemaker's pulse generator from electric fields. Some may also be programmed to automatically pace the heart if interference from electric and magnetic fields is detected. This supports cardiac function and allows the subject to feel the pacing and move away from the source.

Due to recent design improvements, many pacemakers in use would not be particularly susceptible to low intensity electrical fields. There remains a very small possibility that some pacemakers, particularly those of older designs, and with single-lead electrodes, may sense potentials induced on the electrodes and leads of the pacemaker and provide unnecessary stimulation to the heart. In persons wearing some types or brands of implanted cardiac pacemakers, the pacing of the heart might be affected by electric fields at field intensities above about 2 kV/m. The sensitivity of ICD's to external 60-Hz fields has not been studied but might be expected to be somewhat lower than for pacemakers. The ACGIH (American Conference of Governmental Industrial Hygienists, 2001) recommends that routine occupational exposure of persons with cardiac pacemaker and similar medical electronic devices should not exceed 1 kV/m and 1000 mG (0.1 mT).

2.5 Weight-of-the-Evidence Conclusions by Multidisciplinary Groups

Numerous organizations responsible for health decisions, including national and international organizations have convened groups of scientists to review the body of EMF research. These expert

groups, including the NIEHS, the IARC, the National Radiological Protection Board of Great Britain (NRPB), and the Health Council of the Netherlands (HCN), have included dozens of scientists with diverse skills that reflect the different research approaches required to answer questions about health.

2.5.1 The IARC Working Group

Based upon the review of the epidemiologic and laboratory animal studies and consideration of other supplementary data, the IARC Working Group concluded that the epidemiologic studies do not provide support for an association between childhood leukemia and residential magnetic fields at intensities less than 4 mG. The IARC Working Group concluded that the EMF data do not merit the category "carcinogenic to humans" or the category "probably carcinogenic to humans," nor did it find that "the agent is probably not carcinogenic to humans." The latter classification has been applied to only a single chemical among more than 895 exposures evaluated by IARC. Overall, magnetic fields were evaluated as "possibly carcinogenic to humans" (Group 2B), based solely upon "limited evidence" for a statistical association of higher-level residential magnetic fields with childhood leukemia. The Working Group also evaluated the animal data and concluded that they were "inadequate" to support a risk for cancer.

In the rating system used by IARC, the recognition of an association between exposure and cancer in epidemiology studies is considered "limited evidence" of carcinogenicity. A rating of "limited evidence" for epidemiology studies, even without any evidence from experimental studies that an exposure might pose a cancer risk, requires that the exposure be categorized as a "possible carcinogen" even though chance, bias and confounding cannot be ruled out as the explanation with reasonable confidence (IARC, 2002).

The evidence for EMF was insufficient to establish a causal relationship between magnetic fields and childhood leukemia because there was neither sufficient evidence from epidemiology studies that magnetic fields caused cancer in humans, nor sufficient evidence that magnetic fields caused cancer in experimental studies of animals. In addition, no strong evidence is available to suggest a biological mechanism for the development of cancer. IARC noted that many hypotheses have been suggested to explain possible carcinogenic effects of electric or magnetic fields; however, no scientific explanation for the potential carcinogenicity of these fields has been established (IARC, 2002).

2.5.2 Conclusions of Other Multidisciplinary Review Panels

The conclusions from several other national and international organizations including the NIEHS (NIEHS, 1998; NIEHS, 1999), the National Academy of Sciences (NAS, 1999), the NRPB (NRPB, 2001; NRPB, 2004), and the HCN (HCN, 2001; HCN, 2004) are listed in Table 1. These organizations assembled large (7-31 members) multidisciplinary teams of scientists to review the literature.

The assessments by IARC, the NIEHS, the NAS, the NRPB, and the HCN agree that there is little evidence suggesting that EMF is associated with adverse health effects, including most forms of adult and childhood cancer, heart disease, Alzheimer's disease, depression, and reproductive effects. However, all of the assessments concluded that epidemiology studies *in total* suggest an association between magnetic fields at higher time-weighted average exposure levels (greater than 4 mG) and childhood leukemia. All agree that the experimental laboratory data do not support a causal link between EMF and any adverse health effect, including leukemia, and have not concluded that EMF is, in fact, the cause of any disease.

Table 1. Conclusions of Large Multidisciplinary Review Groups Assembled by Health Agencies and Scientific Organizations

Agency or Scientific Organization	Conclusions
National Institute of Environmental Health Sciences (NIEHS, 1999)	"The scientific evidence suggesting that ELF-EMF exposures pose any health risk is weak. The strongest evidence for health effects comes from associations observed in human populations with two forms of cancer: childhood leukemia and chronic Lymphocytic leukemia in occupationally exposed adults. While the support from individual studies is weak, the epidemiological studies demonstrate, for some methods of measuring exposure, a fairly consistent pattern of a small, increased risk with increasing exposure that is somewhat weaker for chronic lymphocytic leukemia than for childhood leukemia. In contrast, the mechanistic studies and the animal toxicology literature fail to demonstrate any consistent pattern across studies although sporadic findings of biological effects have been reported. No indication of increased leukemias in experimental animals has been observed. The lack of connection between the human data and the experimental data (animal and mechanistic) severely complicates the interpretation of these results. The human data are in the "right" species, are tied to "real life" exposures and show some consistency that is difficult to ignore. This assessment is tempered by the observation that given the weak magnitude of these increased risks, some other factor or common source of error could explain these findings. However, no consistent explanation other than exposure to ELF-EMF has been identified. Epidemiological studies have serious limitations in their ability to demonstrate a cause and effect relationship whereas laboratory studies, by design, can clearly show that cause and effect are possible. Virtually all of the laboratory evidence in animals and humans and most of the mechanistic work done in cells fail to support a causal relationship between exposure to ELF-EMF at environmental levels and changes in biological function or disease status. The lack of consistent, positive findings in animal or mechanistic studies weakens the belief that this association is actually due to ELF-EMF, but it cannot completely discount the epidemiological findings. The NIEHS concludes that ELF-EMF exposure cannot be recognized at this time as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In my opinion, the conclusion of this report is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or noncancer health outcomes provide sufficient evidence of a risk to currently warrant concern."
National Academy of Sciences NAS, 1999	"An earlier Research Council assessment of the available body of information on biologic effects of power-frequency magnetic fields (NRC 1997) led to the conclusion 'that the current body of evidence does not show that exposure to these fields presents a human health hazard. Specifically, no conclusive and consistent evidence shows that exposures to residential electric and magnetic fields produces cancer, adverse neurobehavioral effects, or reproductive and developmental effects'. The new, largely unpublished contributions of the EMF-RAPID program are consistent with that conclusion. We conclude that no finding from the EMF-RAPID program alters the conclusions of the previous NRC review on the Possible Effects of Electromagnetic Fields on Biologic Systems (NRC 1997). In view of the negative outcomes of EMF-RAPID replication studies, it now appears even less likely that MFs [magnetic fields] in the normal domestic or occupational environment produce important health effects, including cancer."

Agency or Scientific Organization	Conclusions
National Radiological Protection Board of Great Britain (NRPB, 2001)	"Laboratory experiments have provided no good evidence that extremely low frequency [ELF] electromagnetic fields are capable of producing cancer, nor do human epidemiological studies suggests that they cause cancer in general. There is, however, some epidemiological evidence that prolonged exposure to higher levels of power frequency magnetic fields is associated with a small risk of leukemia in children. In practice, such levels of exposure are seldom encountered by the general public in the UK [or in the US]."
(NRPB, 2004)	Because of the uncertainty… and in absence of a 'dose-response' relationship, NRPB has concluded that the data concerning childhood leukemia cannot be used to derive quantitative guidance on restricting exposure."
Health Council of the Netherlands (HCN, 2001)	"Because the association is only weak and without a reasonable biological explanation, it is not unlikely that it [an association between ELF exposure and childhood leukemia] could also be explained by chance… The committee therefore sees no reason to modify its earlier conclusion that the association is not likely to be indicative of a causal relationship."
(HCN, 2004)	"The Committee, like the IARC itself, points out that there is no evidence to support the existence of a causal relationship here. Nor has research yet uncovered any evidence that a causal relationship might exist."
International Agency for Research on Cancer (IARC, 2002)	"Studies in experimental animals have not shown a consistent carcinogenic or co-carcinogenic effects of exposures to ELF [extremely low frequency] magnetic fields, and no scientific explanation has been established for the observed association of increased childhood leukaemia risk with increasing residential ELF magnetic field exposure." IARC categorized EMF as a "possible carcinogen" for exposures at high levels, based on the meta-analysis of studies of statistical links with childhood leukemia at levels above 3-4 mG.

2.6 Standards and Guidelines

There are no state or federal standards for limiting exposure to power frequency (60 hertz) magnetic fields based on health effects. However, two states, Florida and New York, have enacted standards to limit magnetic fields at the edge of rights-of-way from transmission lines (150 mG and 200 mG, respectively) (NYPSC, 1978; FDER, 1989; NYPSC, 1990; FDEP, 1996). The basis for limiting magnetic fields from transmission lines was to maintain the "status quo" so that fields from new transmission lines would be no higher than those produced by existing transmission lines.

Additionally, several scientific organizations have published guidelines for public exposure to these fields. The limit published by the International Committee on Electromagnetic Safety (ICES) is 0.904 millitesla (9,040 mG) (ICES, 2002); the value published by the International Commission on Non-ionizing Radiation (ICNIRP) is 0.083 millitesla (830 mG) (ICNIRP, 1998).

2.7 Other EMF Perspectives

Several other organizations have provided perspectives on EMF and health. These include a report from the California EMF Program and two more recent publications from the World Health Organization (WHO) and the NIEHS.

2.7.1 California EMF Program

In response to a request from the California Public Utilities Commission, three scientists from the California EMF program (two epidemiologists and a physicist) reviewed and evaluated the scientific research regarding EMF and health (Neutra et al., 2002). The scientists evaluated over a dozen health conditions and the degree that they believe these diseases are caused by exposure to EMF and completed their fourth and final draft in June 2002.

The scientists used two different approaches to conduct their evaluation. One was characterized as following the IARC approach, described above, in which reviewers summarize the "quality of evidence." However, unlike IARC, which weighs both epidemiology and experimental data, the scientists gave little weight to the experimental data. The other approach was a set of guidelines developed by the California EMF Program, which calls for each scientist to express a degree of confidence in their belief that a disease may be caused by high EMF exposures.

The scientists evaluated data regarding approximately a dozen health conditions and concluded that the epidemiologic data provided little support for an association of EMF with nine of the conditions. For the rest, they expressed the belief "that EMFs can cause some degree of increased risk of childhood leukemia, adult brain cancer, Lou Gehrig's disease, and miscarriage." Their median "confidence ratings" for these conditions, however, were not high enough to indicate any strong certainty or "high probability" that EMF was a cause of these conditions. As noted previously, they state, "there is a chance that EMFs have no effect at all" (Neutra et al., 2001). For all other health effects, including breast cancer, heart disease, Alzheimer's disease, depression, increased risk of suicide, and adult leukemia, Neutra et al. do not believe that there is evidence that exposures to EMF increases the risk of developing any of these illnesses. They agree that EMF is not a universal carcinogen (Neutra et al., 2002). The California Department of Health Services has not changed its fact sheets to the public based on this assessment (CDHS, 1999; CDHS, 2000).

2.7.2 World Health Organization

In 2002, the WHO published a handbook for risk communication on EMF. The document entitled "Establishing a Dialogue on Risks from Electromagnetic Fields" was developed because of public concern over EMF and possible health effects. It is intended for persons who need to communicate possible risks from exposure to EMF to others, and to teach the reader about risk perception and risk management. In regard to the hypothesized cause-and-effect relationship between EMF and health, the WHO states "while the classification of ELF magnetic fields as possibly carcinogenic to humans has been made by IARC, it remains possible that there are other explanations for the observed association between exposure to ELF magnetic fields and childhood leukaemia" (WHO, 2002).

2.7.3 National Institute of Environmental Health Sciences

Since the conclusions of the California EMF Program have become available, the NIEHS published a brochure on questions and answers on EMF and health (NIEHS, 2002). The status of EMF and health is summarized by NIEHS as:

> Electricity is a beneficial part of our daily lives, but whenever electricity is generated, transmitted, or used, electric and magnetic fields are created. Over the past 25 years, research has addressed the question of whether exposure to power-frequency EMF might adversely affect human health. For most health outcomes, there is no evidence that EMF exposures have adverse effects. There is some evidence from epidemiology studies that exposure to power-frequency EMF is associated with an increased risk for childhood

> leukemia. This association is difficult to interpret in the absence of reproducible laboratory evidence or a scientific explanation that links magnetic fields with childhood leukemia.
>
> EMF exposures are complex and come from multiple sources in the home and workplace in addition to power lines. Although scientists are still debating whether EMF is a hazard to health, the NIEHS recommends continued education on ways of reducing exposures. This booklet has identified some EMF sources and some simple steps you can take to limit your exposure. For your own safety, it is important that any steps you take to reduce your exposures do not increase other obvious hazards such as those from electrocution or fire. At the current time in the United States, there are no federal standards for occupational or residential exposure to 60-Hz EMF (NIEHS, 2002).

2.8 Summary of EMF and Health Research

By far, the greatest interest in EMF and health has focused on childhood leukemia and estimated long-term exposures to higher magnetic field levels. Childhood leukemia is a rare disease and the evidence for causality between EMF and leukemia is lacking (Linet et al., 2003). The larger and more rigorous epidemiology studies (e.g., NCI, UKCCS) have not found evidence to support a causal relationship between exposure to magnetic fields and childhood leukemia, nor did they find a dose response relationship with exposure to higher magnetic field levels. Laboratory studies do not provide a biological mechanism for the development of any form of cancer, including leukemia. The consensus of scientists who have reviewed the literature for scientific and regulatory organizations including the IARC, the NIEHS the HCN, and the NRPB of Great Britain is that no cause-and-effect relationship between EMF from any source and ill health has been established at the levels generally found in residential environments.

The WHO provides insight as to why the reviews by these organizations are so important to weighing 30 years of literature on a single topic and states:

> Science is a powerful tool and has earned its credibility by being predictive. However, its usefulness depends on the quality of the data, which is related to the quality and credibility of the scientists. It is important to verify the knowledge and integrity of so called “experts,” who may look and sound extremely convincing but hold unorthodox views that the media feel justified in airing “in the interests of balance.” In fact giving weight to these unorthodox views can disproportionately influence public opinion. For the public, often the best sources of information are from panels of independent experts who periodically provide summaries of the current state of knowledge (WHO, 2002).

3 Ecological Research

Scientists have studied the effects of high-voltage transmission lines on many plant and animal species in the natural environment. This section briefly reviews the research on the effects of EMF on ecological systems to assess the likelihood of adverse impacts. In addition to the comprehensive review of research on this topic by wildlife biologists at BPA (Lee et al., 1996), a search of the published scientific literature for more recent studies published between 1995 and June 2005 was conducted.

3.1 Fauna

The habitat on the transmission-line right-of-way and surrounding area shields most wildlife from electric fields. Vegetation in the form of grasses, shrubs, and small trees largely shields small ground-dwelling species such as mice, rabbits, foxes, and snakes from electric fields. Species that live underground, such as moles, woodchucks, and worms, are further shielded from electric fields by the soil; aquatic species are shielded from electric fields by water. Hence, large species such as deer and domestic livestock (e.g., sheep and cattle) have greater potential exposures to electric fields since they can stand taller than surrounding vegetation. However, the duration of exposure for deer and other large animals is likely to be limited to foraging bouts or the time it takes them to cross under the line. Furthermore, all species would be exposed to higher magnetic fields under or near a transmission line than elsewhere, as the vegetation and soil do not provide shielding from this aspect of the transmission-line electrical environment.

Field studies have been performed in which the behavior of large mammals in the vicinity of high-voltage transmission lines was monitored. No effects of electric or magnetic fields were evident in two studies from the northern U.S. on big game species, such as deer and elk, exposed to a 500-kilovolt (kV) transmission line (Goodwin 1975; Picton et al., 1985). In such studies, a possible confounding factor is audible noise. Audible noise associated with high-voltage power transmission lines (with voltages greater than 110 kV) is due to corona. Audible noise generated by transmission lines reaches its highest levels in inclement weather (rain or snow).

Much larger populations of animals that might spend time near a transmission line are livestock that graze under or near transmission lines. To provide a more sensitive and reliable test for adverse effects than informal observation, scientists have studied animals continuously exposed to fields from the lines in relatively controlled conditions. For example, grazing animals such as cows and sheep have been exposed to high-voltage transmission lines and their reproductive performance examined (Lee et al., 1996). No adverse effects were found among cattle exposed to a 500-kV direct-current overhead transmission line over one or more successive breedings (Angell et al., 1990). Compared to unexposed animals in a similar environment, the exposure to 50-Hz fields did not affect reproductive functions or pregnancy of cows (Algers and Hennichs, 1985; Algers and Hultgren, 1987).

A group of investigators from Oregon State University, Portland State University, and other academic centers evaluated the effects of long-term exposure to EMF from a 500-kV transmission line operated by BPA on various cellular aspects of immune response, including the production of proteins by leukocytes (IL-1 and IL-2) of sheep. In previous unpublished reports, the researchers found differences in IL-1 activity between exposed and control groups. However, in their most recent replication, the authors found no evidence of differences in these measures of immune function. The sheep were exposed to 27 months of continuous exposure to EMF, a period of exposure much greater than the short, intermittent exposures that sheep would incur grazing under transmission lines. Mean exposures of EMF were 35-38 mG and 5.2-5.8 kV/m, respectively (Hefeneider et al., 2001).

Scientists from the Illinois Institute of Technology (IIT) monitored the possible effects of electric and magnetic fields on fauna and flora in Michigan and Wisconsin from 1969 – 1997 to evaluate the effects of an aboveground, military-communications antenna operating at 76 Hz. The antenna produces EMF at a frequency close to that of high-voltage transmission lines, but of much lower intensity. This study, which included embryonic development, fertility, postnatal growth, maturation, aerobic metabolism, and homing behavior, showed no adverse impacts of ELF electric and magnetic fields on the animals. The fish community examined in this study showed no significant differences in species diversity, biomass or condition when compared to the control site. The results of the other studies also demonstrated no convincing evidence for effects of EMF on any of the organisms or ecosystems they examined (NRC, 1997).

Another part of the IIT study examined the effect of the antenna system fields on the growth, development, and homing behavior of birds. Studies of embryonic development (Beaver et al., 1993), fertility, postnatal growth, maturation, aerobic metabolism, and homing behavior showed no adverse impacts of ELF electric and magnetic fields on the animals (NRC, 1997). Fernie and colleagues studied the effects of continuous EMF exposure of raptors to an electric field of 10 kV/m in a controlled, laboratory setting. The exposure was designed to mimic exposure to a 765-kV transmission line. Continuous EMF exposure was reported to reduce hatching success and increase egg size, fledging success, and embryonic development (Fernie et al., 2000). In a study of the effects on body mass and food intake of reproducing falcons, the authors found that EMF lengthened the photoperiod as a result of altered melatonin levels in the male species, yet concluded that "EMF effects on adult birds may only occur after continuous, extended exposure," which is not likely to occur from resting on power lines (Fernie and Bird, 1999:620). Fernie and Reynolds (2005) conducted a review of EMF from power lines on avian species and concluded that EMF can have an effect on birds, however these results are not seen consistently or in the same direction.

The hormone melatonin, secreted at night by the pineal gland, plays a role in animals that are seasonal breeders. Studies in laboratory mice and rats have suggested that exposure to electric and/or magnetic fields might affect levels of the hormone melatonin, but results have not been consistent (Wilson et al., 1981; Holmberg, 1995; Kroeker et al., 1996; Vollrath et al., 1997; Huuskonen et al., 2001). However, when researchers examined sheep and cattle exposed to EMF from transmission lines exceeding 500-kV, they found no effect on the levels of the hormone melatonin in blood, weight gain, onset of puberty, or behavior in sheep and cattle (Stormshak et al., 1992; Lee et al., 1993; Lee et al., 1995; Thompson et al., 1995; Burchard et al., 1998; Burchard et al., 2004)

Several avian species are reported to use the earth's static magnetic field as one of the cues for navigation. It has been proposed that deposits of magnetite in specialized cells in the head are the mechanism by which the birds can detect variations in the inclination and intensity of this direct-current (dc) magnetic field (Kirschvink and Gould, 1981; Walcott et al., 1988). In early studies of transmission lines, it was reported that the migratory patterns of birds appeared to be altered near transmission lines (Southern, 1975; Larkin and Sutherland, 1977). However, these studies were of crude design, and Lee et al. (1996) concluded that, "During migration, birds must routinely fly over probably hundreds (or thousands) of electrical transmission and distribution lines. We are not aware of any evidence to suggest that such lines are disrupting migratory flights" (Lee et al., 1996:4-59). No further studies on this topic have been identified in the literature (through June 2005).

Bees, like birds, are able to detect the earth's dc magnetic fields. They are known to use magnetite particles, which are contained in an abdominal organ, as a compass (Kirschvink and Gould, 1981). In the laboratory, they are able to discriminate between a localized magnetic anomaly and a uniform background dc magnetic field (Walker et al., 1982; Kirschvink et al., 1992).

Greenberg et al. (1981) studied honeybee colonies placed near 765-kV transmission lines. They found that hives exposed to ac electric fields of 7 kV/m had decreased hive weight, abnormal amounts of propolis (a resinous material) at hive entrances, increased mortality and irritability, loss of the queen in some hives, and a decrease in the hive's overall survival compared to hives that were not exposed. Exposure to electric fields of 7-12 kV/m may induce a current or heat the interior of the hive; however, placing the hive farther from the line, shielding the hive, or using hives without metallic parts eliminates this problem. ITT studied the effects of EMF on bees exposed to the 76-Hz antenna system at lower intensities and concluded that these behavioral effects of "ELF-EMF impacts are absent or at most minimal" (NRC, 1997:102).

Crystals of magnetite have also been found in Pacific salmon (Mann et al., 1988; Walker et al., 1988). These magnetite crystals are believed to serve as a compass that orients to the earth's magnetic field.

However, other studies have not found magnetite in sockeye salmon (*Oncorhynchus nerka*) fry (Quinn et al., 1981). While salmon can apparently detect the geomagnetic field, their behavior is governed by multiple stimuli as demonstrated by the ineffectiveness of magnetic field stimuli in the daytime (Quinn et al., 1982) and the inability of strong magnetic fields from permanent magnets attached to sockeye salmon to alter their migration behavior (Ueda et al., 1998). There are no data on the effects of ac EMF on salmon navigation, but based on a study with honeybees, it appears that organisms that use magnetite crystals to orient to the earth's magnetic field would be affected only when the field levels are very much greater than the levels expected from the transmission line. Given this evidence and the salmon's ability to navigate using multiple sensory cues, the proposed transmission line is unlikely to have an adverse impact on these species of concern and the aquatic ecosystems.

Reptiles and amphibians contribute to the overall functioning of the forest ecosystems. However, little research has been performed on the effects of EMF on reptiles and amphibians in their natural habitat.

3.2 Flora

Numerous studies have been carried out to assess the effect of exposure of plants to transmission-line electric and magnetic fields. These studies have involved both forest species and agriculture crops. Researchers have found no adverse effects on plant responses, including seed germination, seedling emergence, seedling growth, leaf area per plant, flowering, seed production, germination of the seeds, longevity, and biomass production (Lee et al., 1996).

The only confirmed adverse effect of transmission lines on plants was reported for transmission lines with voltages above 1200 kV. For example, Douglas fir trees planted within 15 meters (m) of the conductors were shorter than trees planted away from the line. Shorter trees are believed to result from corona-induced damage to the branch tips. Trees between 15 and 30 m away from the line suffered needle burns, but those 30 m and beyond were not affected (Rogers et al., 1984). These effects would not occur at the lower field intensities expected of the proposed 230-kV transmission line.

3.3 Summary of Ecological Research

The habitat on the transmission-line rights-of-way and surrounding areas shields smaller animals from electric fields produced by high-voltage transmission lines; thus, vegetation easily shields small animals from electric fields. The greatest potential for larger animals to be exposed to EMF occurs when they are passing beneath the lines. Studies of animal reproductive performance, behavior, melatonin production, immune function, and navigation have found minimal or no effects of EMF. Past studies have found little effect of EMF on plants; no recent studies of plants growing near transmission lines have been performed. In summary, the literature published to date has shown little evidence of adverse effects of EMF from high-voltage transmission lines on wildlife and plants. At the field intensities associated with the proposed 230-kV transmission line, no adverse effects on wildlife or plants are expected.

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Maria D. Van Kerkhove, M.S., is a Senior Epidemiologist in Exponent's Health Sciences practice. Ms. Van Kerkhove has experience in designing epidemiology studies and managing data for epidemiology studies. She has designed data collection instruments, organized and analyzed large datasets, and worked with state vital statistic registries. She also has experience in recruiting and interviewing subjects for epidemiologic studies. Ms. Van Kerkhove also specializes in writing critical reviews of epidemiologic literature. She has critically evaluated epidemiologic studies of electric and magnetic fields (EMF) and health and has prepared numerous reports of the literature for governmental agencies and electric utilities. She has also prepared reports regarding causality in medical areas such as respiratory conditions, infectious diseases, environmental contaminants and neurological diseases. She is skilled at communicating scientific information to scientists, executives, management, and the public. Ms. Van Kerkhove has participated in several open houses and public meetings to address health concerns including those related to EMF, air pollution and environmental contaminants.

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Appendix E Contractor Disclosure Forms

NEPA Disclosure Statement for Preparation of an EIS for the Proposed Klondike III/Biglow Canyon Wind Integration Project

CEQ regulations at 40 CFR 1506.5(c), which have been adopted by DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project," for the purposes of this disclosure, is defined in the March 23, 1981 guidance entitled "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 18026-180338 at Question 17a and b.

Financial or other interest in the outcome of the project "includes" any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients). 46 FR 18026-18038 at 18301.

In accordance with these requirements, the offerer and any proposed subcontractors hereby certify as follows: [check either (a) or (b)].

(a) ___X___ Offerer and any proposed subcontractor have no financial interest in the outcome of the project.

(b) _____ Offerer and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to the award of the contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Signature

Daniel D. Hoagenson / Sr. Vice President

Name

March 23, 2006

Date

DAVID EVANS AND ASSOCIATES INC.

NEPA Disclosure Statement for Preparation of an EIS for the Proposed Klondike III/Biglow Canyon Wind Integration Project

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Financial or Other Interests

1.
2.
3.

Certified by:

[signature]

Signature

Jo Rosse Ainin, VP

Name

3/23/06

Date

NEPA Disclosure Statement for Preparation of an EIS for the Proposed Klondike III/Biglow Canyon Wind Integration Project

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Financial or Other Interests

1.
2.
3.

Certified by:

Signature

T. DAN BRACKEN

Name

3/24/2006

Date

NEPA Disclosure Statement for Preparation of an EIS for the Proposed Klondike III/Biglow Canyon Wind Integration Project

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Financial or Other Interests

1.
2.
3.

Certified by:

Signature

KATHLEEN CONCANNON Concannon Creative Services

Name

March 30, 2006

Date

NEPA Disclosure Statement for Preparation of an EIS for the Proposed Klondike III/Biglow Canyon Wind Integration Project

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Financial or Other Interests

1.
2.
3.

Certified by:

Signature

Vice-President

Dale Strickland

Name

3/30/06

Date

Western EcoSystems Technology, Inc. 2003 Central Ave., Cheyenne, WY 82001
Phone (307) 634-1756 Fax (307) 637-6381

BEFORE THE
ENERGY FACILITY SITING COUNCIL
OF THE STATE OF OREGON

In the Matter of the Application for a Site Certificate for the Klondike III Wind Project	))))	FINAL ORDER ON THE APPLICATION

The Oregon Energy Facility Siting Council

June 30, 2006

KLONDIKE III WIND PROJECT:

FINAL ORDER ON THE APPLICATION

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

AINW	Archaeological Investigations Northwest, Inc.
App	Site Certificate Application as submitted on May 13, 2005
App Supp	Application Supplement submitted on February 6, 2006
BLM	Bureau of Land Management
BPA	Bonneville Power Administration
Council	Energy Facility Siting Council
CRGNSA	Columbia River Gorge National Scenic Area
CRP	Conservation Reserve Program
Department	Oregon Department of Energy
dBA	The "A-weighted" sound pressure level. The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
DEQ	Oregon Department of Environmental Quality
EFU	land zoned for "exclusive farm use"
F-1	Exclusive Farm Use zone under the Sherman County Zoning Ordinance
FAA	Federal Aviation Administration
KIII	Klondike Wind Power III LLC
kV	kilovolt or kilovolts
KWP	Klondike III Wind Project
LCDC	Land Conservation and Development Commission
mph	miles per hour

MW	megawatt or megawatts
m/s	meters per second
O&M	Operations and maintenance
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
Office	Oregon Department of Energy
ONHIC	Oregon Natural Heritage Information Center
RAI	Oregon Department of Energy request for additional information
SCCP	Sherman County Comprehensive Plan
SCZO	Sherman County Zoning Ordinance
USFWS	U.S. Fish and Wildlife Service
WGS	Washington ground squirrel
WRD	Oregon Water Resources Department

KLONDIKE III WIND PROJECT:

FINAL ORDER ON THE APPLICATION

I. INTRODUCTION

This final order addresses the application for a site certificate for the construction and operation of a proposed wind energy facility in Sherman County near Wasco, Oregon. The applicant is Klondike Wind Power III LLC (KIII). The applicant has named the proposed facility the "Klondike III Wind Project" (KWP). The Energy Facility Siting Council (Council) issues this order based on its review of the application and the comments and recommendations on the application by state agencies, local governments, tribal organizations and the public.

ORS 469.320 requires a site certificate from the Council before construction of a "facility." ORS 469.300 defines "facility" as "an energy facility together with any related or supporting facilities." The proposed KWP would be an "energy facility" under the definition in ORS 469.300(11)(a). A "site certificate" is a binding agreement between the State of Oregon and the applicant, authorizing the applicant to construct and operate a facility on an approved site, incorporating all conditions imposed by the Council on the applicant.

It is the public policy of the State of Oregon that "the siting, construction and operation of energy facilities shall be accomplished in a manner consistent with protection of the public health and safety and in compliance with the energy policy and air, water, solid waste, land use and other environmental protection policies of this state." ORS 469.310. A site certificate issued by the Council binds the state and all counties and cities and political subdivisions of Oregon. Once the Council issues the site certificate, the responsible state agency or local government must issue any necessary permits that are addressed in the site certificate without further proceedings. ORS 469.401(3).

To issue a site certificate for a proposed facility, the Council must determine that "the facility complies with the standards adopted by the Council pursuant to ORS 469.501 or the overall public benefits of the facility outweigh the damage to the resources protected by the standards that facility does not meet." ORS 469.503(1). The Council, further, must decide whether the proposed facility complies with all other applicable Oregon statutes and administrative rules identified in the project order, excluding requirements governing design or operational issues that do not relate to siting and excluding compliance with requirements of federally delegated programs. ORS 469.401(4) and ORS 469.503(3). In addition, the Council must include in the site certificate "conditions for the protection of the public health and safety, for the time for completion of construction, and to ensure compliance with the standards, statutes and rules described in ORS 469.501 and ORS 469.503." ORS 469.401(2).

In accordance with ORS 469.370(1), the Oregon Department of Energy (Department) issues a draft proposed order on an application. Following the issuance of that draft, the Council must conduct at least one public hearing in the affected area. At the hearing, the Council takes public comment on the application and draft proposed order. ORS 469.370(2). Any issues that may be the basis for a contested case hearing must be raised by the public hearing comment deadline or they are waived and cannot be considered in a contested case. ORS 469.370(3).

After the public hearing and the Council's review of the *draft* proposed order, the Department issues the proposed order recommending approval or rejection of the application. The Department issues a public notice of the proposed order that includes notice that the Council will conduct a contested case hearing on the application. The notice specifies a deadline for requests to participate as a party in the contested case and the date for the initial prehearing conference. ORS 469.370(4). Only those who appeared in person or in writing at the public hearing on the application (described in the preceding paragraph) may request to become parties to the contested case, and only those issues that were raised on the record of the public hearing with sufficient specificity can be considered in the contested case. ORS 469.370(5).

After the conclusion of the contested case proceeding, the Council decides whether to grant a site certificate and issues a final order that either approves or rejects the application based on the standards adopted under ORS 469.501 and any additional state statutes, rules or local government ordinances determined to be applicable to the proposed facility by the project order. ORS 469.370(7).

The Council's final order is subject to judicial review by the Oregon Supreme Court. Only a party to the contested case may request judicial review, and the only issues that may be subject to judicial review are issues that parties to the contested case have raised. A petition for judicial review must be filed with the Supreme Court within 60 days after the date of service of the Council's final order. ORS 469.403.

The definitions in ORS 469.300 and OAR 345-001-0010 apply to terms used in this proposed order.

II. PROCEDURAL HISTORY

1. Request for Expedited Review

On February 17, 2005, KIII, a wholly owned subsidiary of PPM Energy, Inc., submitted a request for expedited review of the proposed KWP. The KWP would have an average electric generating capacity of approximately 91 megawatts. The Department reviewed the request for compliance with OAR 345-015-0300 and determined that the proposed facility satisfied the requirements for expedited review under that rule. Department sent notification of its determination to KIII on March 28, 2005.

In considering whether the KWP met the requirements for expedited review listed in OAR 345-015-0300(2), the Department considered whether the Klondike I and Klondike II wind energy projects should be made subject to the site certificate for the proposed KWP (Klondike III).[1] By themselves, Klondike I and Klondike II are not "energy facilities" under ORS 469.300(11)(a)(J). Klondike I has an average electric generating capacity of 8.3 megawatts; Klondike II, when operational, would have an average electric generating capacity of 25 megawatts. The statutes do not address the question whether adjacent wind energy projects under the same corporate ownership should be considered part of a single "electric power generating plant."

[1] Klondike I is a 24-MW wind project approved by Sherman County. Klondike I began operation in December 2001. Klondike II is a 75-MW wind project approved by Sherman County. Klondike II was under construction at the time of KIII's request for expedited review. PPM Energy owns both Klondike I and II.

The Council's rules do not expressly address this question in the context of a request for expedited review of a proposed energy facility, but the Department considered the following language in OAR 345-024-0010 as relevant guidance:

> *Public Health and Safety Standards for Wind Energy Facilities*
>
> *(1) For the purposes of this rule and OAR 345-024-0015, "wind energy facility" means an energy facility that consists of one or more wind turbines or other such devices and their related or supporting facilities that produce electric power from wind and are:*
>
> *(a) Connected to a common switching station, or*
>
> *(b) Constructed, maintained, or operated as a contiguous group of devices.*

The above language defines a "wind energy facility" for purposes of applying the Council's "Specific Standards for Wind Facilities," OAR 345-024-0010 and OAR 345-024-0015, but the language does not address how the Council would distinguish between two adjacent "facilities" under the same ownership.

The Department developed a list of questions to assess the relationship between the proposed KWP and the locally-permitted Klondike I and II. The Department sent these questions to KIII on March 10, 2005.[2] KIII responded to the questions on March 14, 2005.[3] The Council adopts the Department's recommendation that no single question be considered determinative but that the totality of the information be considered on a case-by-case basis. In the case of the proposed KWP, the Department found the following facts supported its conclusion that the KWP should be considered a facility separate from the Klondike I and II wind projects:

1. Klondike I was purchased from Northwestern Wind Power as an operating asset (after the project was built and operational).
2. No part of the Klondike III "site" (land on which the "facility" is proposed to be located) would be included within the project areas of Klondike I or Klondike II.
3. There would be no shared transmission infrastructure between Klondike III and Klondike I and II. ("Transmission infrastructure" means related or supporting infrastructure, not the proposed new BPA line.)
4. No Klondike III related or supporting facilities would be shared with Klondike I and II, except two new access roads that would extend from existing access roads serving Klondike II turbines.
5. A new control building is being proposed for Klondike III that is distinct from the control building utilized for Klondike I and II.
6. Power output dispatching decisions for Klondike III would be independent of those made for Klondike I and II.

[2] Email from John White to Jesse Gronner, dated March 10, 2005, regarding "Klondike III: separate facility questions."
[3] Email from Jesse Gronner to John White, dated March 14, 2005, regarding "RE: Klondike III: separate facility questions."

7. The entire output of Klondike I and II is already sold under separate, long-term power purchase agreements.

8. The output from Klondike III is not yet sold but would be sold under its own contract or contracts.

9. Each project would be operated and maintained under its own agreement with local authorities. Each facility also has its own site-specific maintenance practices, and maintains separate warranty provisions with the turbine manufacturer.

10. Klondike III would have its own transmission contract for its output, separate from Klondike I and II.

11. Klondike I and II are electrically interconnected in many ways, including shared transformer and shared transmission line. Klondike I and II utilize shared space within the control room and storage areas. In contrast, Klondike III would be electrically independent and will utilize its own supporting facilities.

12. If Klondike I and II did not exist, Klondike III could be constructed, operated and managed without any of the Klondike I and II facilities in place and without having to construct any of the Klondike I and II facilities, except for the minor overlap in access roads to the two turbine strings noted above.

Based on these facts, the Department concluded that the proposed KWP was eligible for expedited review under OAR 345-015-0300 as "an energy facility with an average electric generating capacity of less than 100 megawatts" separate from the Klondike I and II wind energy projects. The Council finds that the proposed KWP is a separate energy facility.

2. Site Certificate Application

KIII submitted an application for a site certificate on May 13, 2005. The Department issued a project order on July 8, 2005.

On November 7, 2005, the Council appointed John W. Burgess as the Hearing Officer for the public hearing and contested case proceedings for the KWP.

On February 6, 2006, the Department determined that the application was complete based on additional information submitted by the applicant in the time since the application was submitted. As required under OAR 345-021-0055, the applicant prepared a supplement to the application and distributed copies of the supplement to the reviewing agencies and others identified by the Department, together with the notice described in OAR 345-015-0200.

The Department issued public notice of the filing of the application by publishing the notice in *The Dalles Chronicle*, a newspaper of general circulation available in the vicinity of the proposed facility. The Department mailed a notice of filing to the property owners listed in Exhibit F of the application and to persons on the Council's general mailing list and the special mailing list set up for the proposed facility, as described in OAR 345-015-0190.

In response to the notice of filing, the Department received written comments from the following state agencies:

- Oregon Water Resources Department (advising that the proposed source of water for construction purposes was not available for that purpose and suggesting other sources).[4]
- Oregon Parks and Recreation Department (asking that lighting on certain wind turbines that might be visible from the John Day Scenic Waterway be avoided, subject to FAA requirements).[5]
- Oregon Department of Fish and Wildlife (raising multiple concerns about protection of raptor nest locations, threatened and endangered species, wildlife monitoring plan components, habitat mitigation and revegetation of temporarily disturbed areas).[6]
- Oregon Department of Transportation (raising concerns about a proposed direct access to State Highway 206, a permit for the proposed underground transmission cable crossing under Highway 206, and traffic safety near turbines visible from the highway).[7]

In addition, the Department received comments from the Sherman County Planning Director recommending several site certificate conditions related to the county's Conditional Use Permit.[8] The Department also received two letters from interested individuals expressing approval of the proposed wind energy facility. In preparing the draft proposed order, the Department considered all of the comments received.

On April 18, 2006, the Department issued a draft proposed order and a Notice of Public Hearing and Request for Comments in accordance with OAR 345-015-0220. The Department received comments from the applicant. A public hearing was held in Moro, Oregon, on May 11, 2006. There were no public comments made at the public hearing. The deadline for written comments was May 16, 2006. The Department received one written comment from an individual (who was in favor of the project) and written comments from the Oregon Department of Fish and Wildlife (ODFW), which concurred with the wildlife-related sections of the draft proposed order and to proposed revisions that had been discussed with the Department. In addition, the Department received written comments from the applicant raising issues about several proposed site certificate conditions and suggesting revisions.

The Council reviewed the draft proposed order at a meeting on May 19, 2006, in accordance with OAR 345-015-0230. At that time, the Department informed the Council of the comments received by the Department on the draft proposed order. The Council received copies of all written comments. The Department presented to the Council a list of changes to the language of the draft proposed order, based in part on the comments and in part on the Department's own continued review of the proposed facility for compliance with the siting standards. In light of the Council discussion, the Department prepared a proposed order.

On May 31, 2006, the Department issued the proposed order and a Notice of Proposed Order and Contested Case Proceeding that established a deadline of June 14 for interested

[4] E-mail from Jerry Sauter, WRD, February 13, 2006.
[5] E-mail from Jan Houck, Oregon Parks and Recreation Department, March 7, 2006.
[6] Letter from Rose Owens, ODFW, March 10, 2006
[7] E-mail from Patrick Smith, ODOT, March 15, 2006.
[8] E-mail from Georgia Macnab, Sherman County Planning Director, March 23, 2006.

persons to submit petitions for party or limited party status. At a Council meeting on June 6, 2006, the Council reviewed the draft proposed order for the Biglow Canyon Wind Farm (Biglow). Some members of the Council questioned whether the Wildlife Monitoring and Mitigation Plan proposed for Biglow included sufficient avian monitoring to allow the Council to base mitigation decisions on the "best available science," whether the proposed monitoring would be "meaningful" and whether the proposed plan would allow the Council to use the monitoring information to require additional mitigation in the future. The proposed Biglow plan generally required two years of monitoring and was similar to the monitoring plan proposed for the KWP. A Council member observed that OAR 345-027-0028(4) requires the certificate holder to report any "significant environmental change or impact attributable to the facility" but does not give the Council authority to use the information to require additional mitigation by the certificate holder. As a result of this discussion, Department staff researched the most appropriate long-term monitoring for the Biglow site and proposed additional raptor nest monitoring and a provision allowing the Council to re-assess mitigation for grassland bird displacement based on new information to be reported in the future. In anticipation that the Council might choose to impose similar requirements in a site certificate for the KWP, the Department issued a Supplement to the Proposed Order on June 13, 2006, and a Notice of Supplemental Proposed Order and Contested Case Proceeding. The notice established a revised deadline of June 26 for interested persons to submit petitions for party or limited party status.

On June 28, 2006, the Hearing Officer issued an order stating that there had been no requests for party status as result of contested case notice or the supplemental contested case notice and that the contested case proceeding was therefore closed.

The Council considered the proposed order, including the supplement, and issued this final order at a public meeting in The Dalles, Oregon, on June 30, 2006.

III. GENERAL FINDINGS OF FACT

1. Description of the Proposed Facility

(a) Project Overview

The applicant provided information about the components of the proposed facility in Exhibit B of the application. The proposed KWP is an electric power generating plant that would produce power from wind energy.

The KWP would consist of not more than 165 wind turbines, each with a peak generating capacity of not more than 1.65 megawatts. The combined peak generating capacity of the project would be not more than 272.25 megawatts. Turbines would be mounted on tubular steel towers. The turbine towers would be about 265 feet tall at the turbine hub and would have an overall height of about 400 feet including the radius swept by the turbine blades. The turbines would be spaced 400 to 600 feet apart in approximately twenty-three strings. The facility would be located on private land subject to long-term wind energy leases that KIII has negotiated with the landowners.

(b) The Energy Facility

ORS 469.300(11)(a)(J) defines the "energy facility" in this case as "an electric power generating plant with an average electric generating capacity of 35 megawatts or more if the power is produced from … wind energy at a single energy facility." The average electric generating capacity of the proposed KWP would be about 91 megawatts.[9] The proposed "electric power generating plant" consists of 165 wind turbine locations, each consisting of a turbine tower and foundation, turbine pad area, nacelle, rotor and blade assembly and generator step-up transformer. Wind turbines would be arranged in strings as shown in the site certificate application.[10]

KIII is requesting a site certificate that would allow the option of using either of two wind turbines: the GE 1.5 MW wind turbine or the Vestas V82 1.65 MW wind turbine. In either case, the turbine towers would be approximately 80 meters (263 feet) high at the rotor hub. The diameter of the rotor-swept area would be up to 82.5 meters depending on the turbine selected.

Turbines would be mounted on tubular steel towers. Inside each tower would be a controller cabinet at the base and an access ladder to the nacelle. Tower access would be through a locked entry door at ground level. There would be a graveled turbine pad area of approximately 1,000 square feet at the base of each tower.

Tower foundations would be "spread footer" concrete foundations with a subsurface area of approximately 2,000 square feet. Foundation design for each turbine would be determined based on site-specific geotechnical information and structural loading requirements of the selected turbine model. A generator step-up transformer would be installed on a separate foundation at the base of each wind turbine. The purpose of the step-up transformer is to increase the output voltage of the wind turbine to the voltage of the power collection system.

(c) Related or Supporting Facilities

KIII proposes to construct the following related or supporting facilities:

- Power collection system
- Substations and interconnection system
- Meteorological towers
- Operations and maintenance building
- Control system
- Access roads
- Temporary laydown and staging areas

Power Collection System

A power collection system operating at 34.5 kilovolts (kV) would transport the power from each turbine to a collector substation. To the extent practical, the collection system would be installed underground. Approximately 18.3 miles of collector lines would be

[9] ORS 469.300(4) defines the "average electric generating capacity" of a wind energy facility as the peak generating capacity divided by 3.00.
[10] App Figure C-3, incorporated herein by this reference.

installed within existing county road right-of way, and an additional 19.7 miles of collector lines would be installed within the leasehold lands of the project.[11] Underground segments of the collector line would be buried at a depth of at least 36 inches. Where geotechnical conditions or other engineering considerations require, segments of the collector system may be aboveground, but the total length of aboveground segments would not exceed approximately 5.5 miles. The aboveground segments of the collector system would have single or double circuit conductors mounted on monopole support structures (Condition (84)). The aboveground segments would be placed only in developed or agricultural areas at least 200 feet from any existing residence.[12]

Power from the western section of the facility would be routed to a new substation near the existing Bonneville Power Administration (BPA) Klondike Schoolhouse Substation. Power from the eastern section would be routed to a collector substation near Webfoot, where a transformer would step up the voltage to 230 kV. This power would be transmitted to the substation near Schoolhouse on an aboveground power line.[13] The aboveground line would be approximately 3.5 miles in length, supported on single wood or steel poles approximately 110 feet tall spaced approximately 500 to 700 feet apart. To avoid conflicting with possible future expansion of public roads by the County, the aboveground line would be located outside the public right-of-way on right-of-way granted in leases with the property owners.

Substations and Interconnection System

A new project substation would be located on approximately 4 acres of land near the existing BPA Klondike Schoolhouse Substation. In addition, a new collector substation near Webfoot would occupy a portion of the 4-acre parcel on which the O&M building would be located. The substation facilities would conform to all applicable Oregon and BPA regulations and standards.

The power generated by the proposed KWP would connect to the regional transmission grid through the BPA Klondike Schoolhouse Substation. A new BPA transmission line from this substation to the BPA John Day Substation is not considered a related or supporting facility.

Meteorological Towers

KIII proposes to install three permanent meteorological (met) towers. The met towers would be un-guyed steel towers approximately 80 meters in height with a triangular base approximately 25 feet on each side. The location of the met towers would be as shown on Figure C-2 of the application.

Operations and Maintenance Building

An operations and maintenance building would be constructed on Klondike Lane.[14] An on-site well would be constructed to supply water to the O&M facility. Power for the

[11] App Appendix C-5 and response to the Department's request for additional information (App Supp, Section 1, RAI #2, B6).
[12] E-mail from Dana Siegfried, November 11, 2005, regarding "Response to October 28, 2005 E-mail" (App Supp, Section 1). Revised based on the Department's consideration of the applicant's comments on the draft proposed order and consultation with ODFW.
[13] App Appendix C-1.
[14] App Figure C-2.

O&M facility would be supplied by Wasco Electric Cooperative through a one-mile feeder line from the existing O&M facility that serves the Klondike I and II projects. This power would be carried to the O&M facility on the same poles as the aboveground power collection line described above. The O&M building would be approximately 5,000 square feet in size and occupy part of a 4-acre parcel of land.

Control System

A fiber optic communications network would link the wind turbines to a central computer at the O&M facility, described above. A "supervisory, control and data acquisition" (SCADA) system would collect operating and performance data from each wind turbine and the project as a whole and provide remote operation of the wind turbines. The SCADA software would be provided by the turbine manufacturer or a third party SCADA vendor.

Access Roads

Approximately 19 miles of new roads would be constructed to provide access to the turbine strings. Access roads would connect to graveled turbine turn-out and pad areas at the base of each wind turbine. The roads would be 20 feet wide and constructed with crushed gravel. In addition, approximately 4 miles of existing county road segments would be improved and widened to accommodate two eight-foot travel lanes.

Temporary Laydown and Staging Areas

Nineteen temporary laydown areas would be used to stage construction and store supplies and equipment during construction, including fifteen 2-acre laydown areas and four 4-acre laydown areas.[15] The laydown areas would have a crushed gravel surface. These areas would be restored to their pre-construction conditions following construction.

2. Location of the Proposed Facility

The applicant provided information about the location of the proposed facility in Exhibit C of the application. The proposed facility site is approximately 4 miles east of Wasco, in Sherman County, Oregon, about 5 miles south of the Columbia River. The property is located in Townships 1 and 2 North and Ranges 17, 18 and 19 East Sections. The facility would permanently occupy approximately 64 acres. In addition, construction would temporarily affect approximately 97 acres. The proposed facility site is located on parcels consisting of approximately 14,500 acres owned by several landowners. These parcels have been leased in whole or in part to KIII for the development of the proposed facility.

Figure C-2 in the application illustrates the proposed location of project components. Figure C-2 is incorporated herein by this reference.

There would be no off-site linear facilities. The transmission interconnection would be from leased land adjacent to the BPA Klondike Schoolhouse Substation. The facility would require no pipeline interconnections.

3. Wind Energy Facility Micrositing

The KWP site certificate application as submitted in May 2005 proposed construction of 165 wind turbines in the specific locations shown in Figure C-2. In July 2005, while the

[15] App Figure C-2.

KWP application was under review, the Department received a notice of intent from Orion Energy LLC for the proposed Biglow Canyon Wind Farm. Orion requested flexibility to locate its wind turbines within 500-foot wide "turbine corridors" rather than at specific locations. After internal discussions and discussions with Orion and KIII, the Department agreed that the flexibility to "microsite" wind turbines after issuance of a site certificate would be advantageous to wind energy facility developers and to the Council. Council approval of a corridor for micrositing would reduce the necessity of later amendment proceedings if the proposed specific turbine locations were later discovered to be unsuitable due to geotechnical constraints, site-specific wind resource factors and the desire to reduce conflict with farming practices and reduce impacts to higher-value wildlife habitat.

Council adoption of a micrositing approach in site certificates for wind energy facilities would also accommodate the uncertainties in the market for wind turbines. This approach would give developers the flexibility to propose a range of turbine sizes for site certificate approval, to choose a turbine within that range from those available in the marketplace and then to design the final turbine layout according to the particular turbine selected for the facility.

The Council hereby adopts a policy permitting wind developers to locate turbines within "micrositing corridors" (defined as an area within which a certificate holder may "microsite" turbines and other facility components before construction) as long as the developer has adequately studied the entire corridor and location of a facility components anywhere within the corridor meets the applicable standards. The Department's recommendations regarding micrositing for the proposed KWP reflect the particular circumstances of this application, as discussed below.

KIII initially proposed 300-foot-wide micrositing corridors throughout most of the project area.[16] On October 31, 2005, the Department requested that both KIII and Orion provide more detailed descriptions of their proposed micrositing corridors and estimates of the maximum amount of habitat mitigation that would be needed (assuming the greatest area of habitat impact that could result from adjustments in the location of the turbines based on micrositing considerations).[17] Having an estimate of the maximum habitat impact was essential before the Department could recommend findings of compliance with the Council's Habitat Standard.

On December 9, 2005, KIII proposed 900-foot-wide micrositing corridors centered on the specific turbine locations shown in Figure C-2 of the application. KIII acknowledged that it had not performed on-site survey work for wetlands and other waters of the state or for cultural resources in areas outside of narrower, 300-foot corridors. Nevertheless, KIII requested the 900-foot micrositing corridors, subject to site certificate conditions that would ensure that there would be no impact on cultural resources or jurisdictional wetlands or waters of the state in those areas not previously surveyed.[18]

After further consideration and staff discussion, the Department concluded that it would recommend Council approval of KIII's proposed micrositing corridors, subject to the

[16] Letter from Dana Siegfried, October 19, 2005 (App Supp, Section 1, Response to RAI #2).
[17] E-mail from John White, ODOE, October 31, 2005.
[18] Memo from Dana Siegfried, December 9, 2005 (App Supp, Section 1, "Turbine Corridor Micrositing").

conditions necessary to ensure that those corridors would comply with Council standards.[19] The conditions recommended by the Department in the proposed order included conditions that address protection of cultural resources and jurisdictional waters and wetlands in areas that were not surveyed before the application was filed. The Department's recommendation regarding these conditions reflects the unique circumstances of the KWP application, which was submitted by the applicant before Department consideration of wind turbine micrositing corridors and before Council adoption of that approach. It is the Department's expectation that in the future the full micrositing corridor identified by the applicant will be studied prior to submission of an application for a site certificate and that conditions governing corridor study after the site certificate is issued will not be necessary. Therefore, the Department recommended that the Council find that these special conditions are not intended to establish a regular practice or precedent for future wind energy facilities.

The Council approves KIII's proposed micrositing corridors, subject to the conditions necessary to ensure that those corridors comply with Council standards. The Council finds that these special conditions are not intended to establish a regular practice or precedent for future wind energy facilities.

4. The Site and Site Boundary

For the purpose of analysis in the site certificate application, the "site boundary" is defined under OAR 345-001-0010(53) as "the perimeter of the site of the proposed energy facility, its related or supporting facilities, [and] all temporary laydown and staging areas." The locations of the temporary laydown and staging areas are shown on Figure C-2 of the application.

The applicant requested the flexibility to determine the final turbine locations before construction, but after a site certificate has been issued, based on the turbine type selected for the facility, geotechnical considerations based on site-specific geotechnical investigation, consideration of farm operations and other micrositing factors. The Council approves a site certificate that allows micrositing of turbines and related facilities within micrositing corridors defined as the area within a boundary that is 450 feet in all directions from turbine string centerlines defined by a straight line between the endpoints listed in Table 1 (900-foot-wide micrositing corridors). Turbine location numbers are shown on the Turbine Location Map, which is included in the application as Appendix C-3.

[19] E-mail from John White, March 30, 2006.

Table 1: Micrositing Corridor Endpoints

String	Turbine Location	Turbine Number	Latitude	Longitude
A	Wpt1	1	45.56143104000	-120.66263222000
	Wpt4	4	45.55657671000	-120.66253187000
B	Wpt5	5	45.55399210000	-120.66253144000
	Wpt10	10	45.54668547000	-120.66233485000
C	Wpt11	11	45.54475534000	-120.65828190000
	Wpt17	17	45.53569225000	-120.65793936000
D	Wpt18	18	45.55153273000	-120.63639962000
	Wpt25	25	45.54154988000	-120.63605834000
E	Wpt26	26	45.56082735000	-120.62164462000
	Wpt30	30	45.55487207000	-120.62164402000
F	Wpt31	31	45.55246254000	-120.61348375000
	Wpt37	37	45.54340912000	-120.61299560000
G	Wpt38	38	45.54166556000	-120.60473603000
	Wpt40	40	45.53863962000	-120.60468682000
H	Wpt50	50	45.61811216000	-120.58855202000
	Wpt53	53	45.61346370000	-120.58845450000
I	Wpt54	54	45.62586049000	-120.58014585000
	Wpt57	57	45.62162465000	-120.58004752000
J	Wpt41	41	45.55442228000	-120.57072676000
	Wpt43	43	45.55125879000	-120.57072605000
K	Wpt44	44	45.54888661000	-120.56593824000
	Wpt49	49	45.54170001000	-120.56583954000
L	Wpt58	58	45.62599850000	-120.55320828000
	Wpt71	71	45.60688553000	-120.55306190000
M	Wpt72	72	45.60407109000	-120.55829426000
	Wpt75	75	45.59977288000	-120.55819622000
N	Wpt163	163	45.58210000000	-120.55280000000
	Wpt165	165	45.57781666000	-120.55280000000
O	Wpt85	85	45.60403267000	-120.53060975000
	Wpt94	94	45.59109475000	-120.53060814000
P	Wpt136	136	45.58262994000	-120.52971039000
	Wpt149	149	45.56384286000	-120.52936518000
Q	Wpt150	150	45.56167545000	-120.52340252000
	Wpt156	156	45.55255824000	-120.52325456000
R	Wpt76	76	45.61862522000	-120.51853089000
	Wpt84	84	45.60695245000	-120.51818634000
S	Wpt95	95	45.60224306000	-120.51261574000
	Wpt102	102	45.59192026000	-120.51256887000
T	Wpt126	126	45.58940740000	-120.50693363000
	Wpt129	129	45.58479718000	-120.50693322000
U	Wpt130	130	45.58256088000	-120.50688415000
	Wpt135	135	45.57526711000	-120.50673689000
V	Wpt157	157	45.56580402000	-120.50620288000
	Wpt162	162	45.55861344000	-120.50610626000
W	Wpt103	103	45.60420455000	-120.48533296000
	Wpt116	116	45.58496973000	-120.48513612000
X	Wpt117	117	45.58184026000	-120.48024932000
	Wpt118	118	45.57998215000	-120.48020049000
Y	Wpt119	119	45.58229149000	-120.46256500000
	Wpt125	125	45.57388984000	-120.46261412000

For the purpose of analysis of the site certificate application, the "site boundary" includes the components of the final site, listed below, and the area within the 900-foot micrositing corridors. No permanent facilities or temporary construction disturbance would be permitted outside of the 900-foot micrositing corridors, except for those components of the final site specifically described below.

Before beginning construction of the facility, the certificate holder would determine the final turbine locations and submit a legal description of the facility site to the Department (Condition (2)). OAR 345-001-0010(49) defines the facility "site" as "all land upon which a facility is located or proposed to be located." A "facility" includes the energy facility and its related or supporting facilities (OAR 345-001-0010(19)). The final site of the proposed KWP facility would include the following components:

- Turbine site corridors (final location) – The site includes the area within 369-foot-wide site corridors, centered on the turbine string centerlines defined by the final center-point locations of the turbine towers.
- Meteorological towers and underground data lines from these towers – The site includes the area within 30 feet of the tower locations shown on Figures P-2, P-5 and P-6 (App Supp, Tab P, Item i) and the centerline of underground meteorological tower data lines.
- Collector transmission lines – The site includes the area within 30 feet of the centerline of all underground and aboveground collector lines.
- Access roads – The site includes the area within 30 feet of the centerline of all turbine string access roads.
- KWP substation near Webfoot – The site includes a four-acre parcel that includes the substation and the proposed O&M building as shown on Figure P-4 (App Supp, Tab P, Item i).
- KWP substation near Schoolhouse – The site includes a four-acre parcel as shown on Figure P-4 (App Supp, Tab P, Item i).
- 230-kV transmission line – The site includes the area within 30 feet on all sides of the centerline of the transmission line as shown on Figure P-4 (App Supp, Tab P, Item i).

IV. THE COUNCIL'S SITING STANDARDS: FINDINGS AND CONCLUSIONS

The Council must decide whether the proposed KWP complies with the facility siting standards adopted by the Council. ORS 469.503. In addition, the Council must impose conditions for the protection of the public health and safety, for the time of commencement and completion of construction, and to ensure compliance with the standards, statutes and rules addressed in the project order. ORS 469.401(2).

The Council is not authorized to determine compliance with regulatory programs that have been delegated to another state agency by the federal government. ORS 469.503(3). Nevertheless, the Council may consider these programs in the context of its own standards to ensure public health and safety, resource efficiency and protection of the environment.

The Council has no jurisdiction over design or operational issues that do not relate to siting, such as matters relating to employee health and safety, building code compliance, wage and hour or other labor regulations, or local government fees and charges. ORS 469.401(4).

1. General Standard of Review

OAR 345-022-0000

(1) To issue a site certificate for a proposed facility or to amend a site certificate, the Council shall determine that the preponderance of evidence on the record supports the following conclusions:

(a) The facility complies with the requirements of the Oregon Energy Facility Siting statutes, ORS 469.300 to ORS 469.570 and 469.590 to 469.619, and the standards adopted by the Council pursuant to ORS 469.501 or the overall public benefits of the facility outweigh the damage to the resources protected by the standards the facility does not meet as described in section (2);

(b) Except as provided in OAR 345-022-0030 for land use compliance and except for those statutes and rules for which the decision on compliance has been delegated by the federal government to a state agency other than the Council, the facility complies with all other Oregon statutes and administrative rules identified in the project order, as amended, as applicable to the issuance of a site certificate for the proposed facility. If the Council finds that applicable Oregon statutes and rules, other than those involving federally delegated programs, would impose conflicting requirements, the Council shall resolve the conflict consistent with the public interest. In resolving the conflict, the council cannot waive any applicable state statute.

* * *

We address the requirements of OAR 345-022-0000 in the findings of fact, reasoning, conditions and conclusions of law discussed in the sections that follow. Upon consideration of all of the evidence in the record, we state our general conclusion regarding the application in Section VIII at page 126.

2. Standards about the Applicant

(a) Organizational Expertise

OAR 345-022-0010

(1) To issue a site certificate, the Council must find that the applicant has the organizational expertise to construct, operate and retire the proposed facility in compliance with Council standards and conditions of the site certificate. To conclude that the applicant has this expertise, the Council must find that the applicant has demonstrated the ability to design, construct and operate the proposed facility in compliance with site certificate conditions and in a manner that protects public health and safety and has demonstrated the ability to restore the site to a useful, non-hazardous condition. The Council may consider the applicant's experience, the applicant's access to technical expertise and the applicant's past performance in constructing, operating and retiring other facilities, including, but not limited to, the number and severity of regulatory citations issued to the applicant.

(2) The Council may base its findings under section (1) on a rebuttable presumption that an applicant has organizational, managerial and technical

expertise, if the applicant has an ISO 9000 or ISO 14000 certified program and proposes to design, construct and operate the facility according to that program.

(3) If the applicant does not itself obtain a state or local government permit or approval for which the Council would ordinarily determine compliance but instead relies on a permit or approval issued to a third party, the Council, to issue a site certificate, must find that the third party has, or has a reasonable likelihood of obtaining, the necessary permit or approval, and that the applicant has, or has a reasonable likelihood of entering into, a contractual or other arrangement with the third party for access to the resource or service secured by that permit or approval.

(4) If the applicant relies on a permit or approval issued to a third party and the third party does not have the necessary permit or approval at the time the Council issues the site certificate, the Council may issue the site certificate subject to the condition that the certificate holder shall not commence construction or operation as appropriate until the third party has obtained the necessary permit or approval and the applicant has a contract or other arrangement for access to the resource or service secured by that permit or approval.

Findings of Fact

The applicant provided evidence about its organizational expertise in Exhibit D and about permits needed for construction and operation of the proposed facility in Exhibit E of the application.

A. Applicant's Expertise

The applicant, KIII, is a limited liability company organized in Oregon.[20] KIII is a wholly owned subsidiary of PPM Energy, Inc. (PPM), an Oregon corporation. PPM is a subsidiary of ScottishPower Holdings, Inc. (SPHI), a Delaware corporation with general offices located in Portland, Oregon.[21] PPM is an affiliate of ScottishPower Finance (US), Inc., which is also an SPHI subsidiary. SPHI is a subsidiary of Scottish Power PLC, a public limited corporation organized under the laws of Scotland.

PPM would provide the organizational, managerial and technical expertise to construct and operate the proposed KWP. PPM is an integrated, non-utility energy company that owns, controls, manages or operates nearly 1,614 MW of independent power generation facilities in the western United States, including 831 MW of wind energy generation. PPM successfully developed and constructed the Klamath Cogeneration Project and operates that facility for the City of Klamath Falls subject to a site certificate. The Council has approved site certificates for the Klamath Generation Facility and the Klamath Generation Peakers, developed by other PPM subsidiaries. In addition, PPM owns and operates the existing Klondike I and II wind energy projects.

PPM's key personnel for the development, construction and operation of the proposed energy facility have experience in power project engineering, design, development,

[20] App Appendix A-1.
[21] In March 2006, PacifiCorps Holdings, Inc., changed its name to ScottishPower Holdings, Inc. (e-mail from Jesse Gronner, May 25, 2006).

construction and operation.[22] PPM would hire qualified contractors with substantial experience constructing similar facilities to design and build the KWP facility (Condition (34)).

The applicant relies on mitigation to demonstrate compliance with Council standards. The mitigation actions necessary to demonstrate compliance with these standards are described in the site certificate conditions in Sections VI and VII below. The Council finds that the applicant could successfully complete the mitigation actions, based on evidence provided including past experience with other projects and the qualifications and experience of personnel upon whom the applicant would rely.

B. Third-Party Permits

KIII does not rely on any state or local government permit issued to a third party.

Conclusions of Law

The Council finds that KIII, subject to the conditions stated in this order, has demonstrated that it has the organizational expertise to construct and operate the proposed facility. The Council further finds that no third-party permits would be required for construction or operation of the proposed facility. The Council finds that a site certificate for the facility should include Conditions (15) and (34). Based on these findings and conditions, the Council concludes that the applicant has met the Organizational Expertise Standard.

(b) Retirement and Financial Assurance

OAR 345-022-0050

To issue a site certificate, the Council must find that:

(1) The site, taking into account mitigation, can be restored adequately to a useful, non-hazardous condition following permanent cessation of construction or operation of the facility.

(2) The applicant has a reasonable likelihood of obtaining a bond or letter of credit in a form and amount satisfactory to the Council to restore the site to a useful, non-hazardous condition.

Findings of Fact

A. Retirement

The wind facility is expected to have a useful life of at least 25 to 30 years. The facility might be "repowered" in the future by upgrading the existing towers with more efficient turbines and by replacing other infrastructure and related equipment. If the facility is repowered in the future, it could have a useful life longer than 30 years.

OAR 345-022-0050(1) ensures that the facility site can be restored to a useful, non-hazardous condition at the end of the facility's useful life. For the purpose of the standard, a "useful, non-hazardous condition" is a condition consistent with the applicable local comprehensive land use plan and land use regulations. The proposed KWP is located on land

[22] A listing of key personnel responsible for the proposed KWP with their qualifications is included in the site certificate application and is incorporated herein by this reference (App pages D-2 through D-4).

zoned Exclusive Farm Use. To satisfy the standard, KIII must show that the site can be restored to a non-hazardous condition suitable for agricultural use.

The certificate holder is obligated to retire the facility upon permanent cessation of construction or operation. Before restoring the site, the certificate holder must submit a final retirement plan for approval by the Council. The retirement plan must describe the activities necessary to restore the site to a useful, non-hazardous condition. After Council approval of the plan, the certificate holder would obtain the necessary authorization from the appropriate regulatory agencies to proceed with restoration of the site. In addition, the certificate holder is obligated to maintain a bond or letter of credit to ensure that funds would be available to the Council to restore the site if the certificate holder does not retire the facility as required by Condition (9).

Restoring the site to a useful, non-hazardous condition upon retirement would involve dismantling all aboveground structures, including the wind turbines, meteorological towers, transmission lines, O&M building and substations, removing foundations and grading and replanting the affected area. Nacelles and rotors would be removed, and the turbine towers would be dismantled. Pad-mounted transformers and related above-ground equipment would be removed. Gravel would be removed from adjacent turbine pad areas. Concrete turbine and transformer pads and underground foundations would be removed to a minimum depth of three feet below grade. At a depth of three feet, buried materials are not expected to interfere with farming practices.[23] Aboveground transmission lines and support structures would be removed. Underground transmission lines and communication cables that are at least three feet below grade would be left in place. All excavated areas would be filled with topsoil. The surface would be graded as appropriate for agricultural uses. The affected areas, including areas temporarily disturbed during site restoration activities, would be replanted with native plant seed mixes or agricultural crops, as appropriate, based on the use of surrounding lands.

Facility access roads would be removed. Road areas would be restored with topsoil, graded and replanted with native plant seed mixes or agricultural crops, as appropriate. Alternatively, access roads on private property might be left in place based on landowner preference.

Demolition waste material would be disposed at authorized sites. Turbine towers, nacelles, and pad-mounted transformers are expected to have scrap value, which would offset part of the cost of site restoration.

The proposed facility would not have any underground storage tanks or other on-site bulk storage of hazardous materials. Small quantities of lubricants, vehicle fuel and herbicides might be transported over and across the site during operation, and leaks, spills and improper handling of these materials could occur.[24] Given the small amounts of such materials used on the site, soil contamination is unlikely.[25]

[23] Letter from Sandy Macnab, OSU Extension Service, Sherman County Crops agent, dated September 29, 2005 (App Supp, Tab V).
[24] Table G-1 in the application lists hazardous materials that could be used on-site (App p. G-4).
[25] Because of the low probability of soil contamination, we have not included an additional cost for site remediation in the estimate of site restoration costs below.

The Council finds that the actions necessary to restore the site are feasible and that restoration of the site to a useful, non-hazardous condition could be achieved.

B. Estimated Cost of Site Restoration

OAR 345-022-0050(2) addresses the possibility that the certificate holder is unable or unwilling to restore the site upon permanent cessation of construction or operation of the facility at any time. A bond or letter of credit provides a site restoration remedy to protect the State of Oregon and its citizens if the certificate holder fails to perform its obligation to restore the site under any circumstances. To provide a fund that is adequate for the State of Oregon to pay site restoration costs if the certificate holder fails to perform its obligation, the Council assumes circumstances under which the restoration cost would be greatest.

The applicant estimated the cost of site restoration to be $7,363,450.[26] The applicant estimated the value of scrap metals to be $5,828,981 and the net site restoration cost to be $1,534,469. The Department obtained an independent cost estimate, based on the estimating procedure outlined in its draft "Facility Retirement Cost Estimating Guide." The Department also obtained an independent estimate of the current value of scrap steel.[27] The Department estimated of the gross cost of site restoration to be $7,098,773 and estimated the scrap value of metals to be $5,418,780.[28] The Council finds that the net cost of site restoration (in 2005 dollars) is $2,201,000, including an offset for the value of scrap metal, as shown in Table 2.

[26] Revised estimate by Blattner, email from Jesse Gronner, PPM Energy, dated January 9, 2006 (App Supp, Tab W, Item iii).

[27] The Department's estimates were developed by Pacific Energy Systems, which engaged Pinnell Busch Inc. in the preparation of the Facility Retirement Cost Estimating Guide and in the investigation of local scrap steel values.

[28] In making these estimates, the Department assumed that the retirement costs would be substantially the same whether the certificate holder selected the 1.5-MW turbines or the 1.65-MW turbines. As described in the application, the 1.5-MW turbines have a rotor diameter of 77 m to 82 m and a tower hub height of up to 80 m. The 1.65-MW turbines are comparable, having a rotor diameter of 82 m and the same tower hub height. The application did not describe any differences in the foundations. Regardless of the choice of turbines, the maximum number of turbines removed would be the same, the same aboveground transmission and substation infrastructure would be removed, the same amount of access road area would be restored, the same O&M building would be removed and the same amount of temporary disturbance would likely occur during site restoration. In general, the Department made conservative assumptions about each component of the estimate so that any differences due to choice of turbine are not likely to affect the overall estimate significantly.

Table 2: Cost Estimate for Site Restoration

	Quantity	Unit Cost	Extension
Turbines			
Disconnect electrical and ready for disassembly (per turbine)	165	$983	$162,198
Remove turbines, turbine towers and nacelles (per tower)	165	$20,016	$3,302,626
Remove and load pad transformers	165	$2,256	$372,182
Foundation and transformer pad removal, restoration and reseeding	165	$2,417	$398,736
Met Towers			
Dismantle and dispose of met towers (per tower)	3	$7,311	$21,934
Substation and O&M Building			
Dismantle and dispose of substation and O&M building	2	$142,341	$284,682
Transmission Line			
Removal of 230 kV transmission line (per mile)	3.5	$14,486	$50,700
Removal of 34.5 kV aboveground transmission line (per mile)	5.5	$3,189	$17,542
Junction boxes - remove electrical to 4' below grade (each)	20	$1,324	$26,479
Access Roads			
Road removal and grading (per mile)	19	$39,612	$752,627
Reseeding road areas (per acre)	46	$2,780	$127,892
Temporary Areas			
Grading and reseeding area disturbed during restoration work (per acre)	97	$16,301	$1,581,175
Gross Cost			$7,098,773
Less scrap value of steel and other metals (per ton)	36,367.65	($149)	($5,418,780)
Subtotal			$1,679,993
Performance Bond		1%	$16,800
Administration and Project Management		10%	$167,999
Future Developments Contingency		20%	$335,999
Total Site Restoration Cost (rounded to nearest $1,000)			**$2,201,000**

C. Ability of the Applicant to Obtain a Bond or Letter of Credit

The Council finds that the value of the financial assurance bond or letter of credit for restoring the site of the proposed KWP would be $2.201 million in 2005 dollars adjusted annually as described in Condition (32).[29] Condition (8) requires that the certificate holder provide the bond or letter of credit before beginning construction, in accordance with OAR 345-027-0020(8). The bond or letter of credit would remain in force until the certificate holder has fully restored the site. The Council finds that a site certificate for the facility should require construction to begin within three years after the effective date of the site certificate and to be completed within five years after the effective date of the site certificate (Conditions (4), (26) and (27)).

OAR 345-022-0050(2) requires the Council to decide whether the applicant has a reasonable likelihood of obtaining a bond or letter of credit in a form and amount satisfactory to the Council to restore the site to a useful, non-hazardous condition. KIII provided information about its financial capability in Exhibits D and M of the application. KIII

[29] The adjustment calculation adjusts the gross cost according to the inflation rate and separately adjusts the scrap value based on changes in the Producer Price Index.

proposes to provide a financial assurance bond or letter of credit in a form approved by the Council before beginning construction of the energy facility and to maintain that performance bond or letter of credit in effect until the facility is retired and the site has been restored.

KIII has provided a letter from The Royal Bank of Scotland (Bank) that states that PPM Energy has "sufficient available letter of credit capacity…under its existing uncommitted financing arrangements with the Bank" to support a potential letter of credit in the amount of $2.5 million.[30] The Bank states that there is a "reasonable likelihood" that the Bank would provide an annual letter of credit for the KWP in the amount requested. Though this letter does not constitute a firm commitment from the Bank to issue a bond or letter of credit for $2.201 million with annual adjustments as described herein, it is credible evidence that KIII could obtain the necessary bond or letter of credit.

It is customary for a performance bond to contain provisions allowing the surety to complete construction of a project in order to reduce its potential liability. Oregon law and Council rules require a site certificate to construct or operate an energy facility. ORS 469.320(1); OAR 345-027-0100(1). Accordingly, the Council requires the certificate holder to ensure that the surety has agreed to comply with all applicable statutes, Council rules and site certificate conditions if the surety retains the right to complete construction, operate or retire the energy facility. In addition, the Council requires that the surety seek Council approval before commencing construction, operation or retirement activities. These requirements are included in Condition (33).

Conclusions of Law

The Council finds that the KWP site, taking into account mitigation, can be restored adequately to a useful, non-hazardous condition following permanent cessation of construction or operation of the facility. The Council further finds that $2.201 million in 2005 dollars adjusted annually as described in Condition (32) is a reasonable estimate of the cost to restore the site to a useful, non-hazardous condition. The Council finds that KIII, subject to the conditions stated in this order, has demonstrated a reasonable likelihood of obtaining a bond or letter or credit, satisfactory to the Council, in an amount adequate to restore the site to a useful, non-hazardous condition. The Council finds that a site certificate for the facility should include Conditions (26), (27), (32) and (33). Based on these findings and conditions, the Council concludes that the applicant has met the Retirement and Financial Assurance Standard for the proposed KWP.

3. Standards about the Impacts of Construction and Operation

(a) Land Use

OAR 345-022-0030

(1) To issue a site certificate, the Council must find that the proposed facility complies with the statewide planning goals adopted by the Land Conservation and Development Commission.

(2) The Council shall find that a proposed facility complies with section (1) if:

[30] Letter from Emily Freedman, Vice President, The Royal Bank of Scotland, May 30, 2006.

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(b) The applicant elects to obtain a Council determination under ORS 469.504(1)(b) and the Council determines that:

(A) The proposed facility complies with applicable substantive criteria as described in section (3) and the facility complies with any Land Conservation and Development Commission administrative rules and goals and any land use statutes directly applicable to the facility under ORS 197.646(3);

(B) For a proposed facility that does not comply with one or more of the applicable substantive criteria as described in section (3), the facility otherwise complies with the statewide planning goals or an exception to any applicable statewide planning goal is justified under section (4); or

(C) For a proposed facility that the Council decides, under sections (3) or (6), to evaluate against the statewide planning goals, the proposed facility complies with the applicable statewide planning goals or that an exception to any applicable statewide planning goal is justified under section (4).

(3) As used in this rule, the "applicable substantive criteria" are criteria from the affected local government's acknowledged comprehensive plan and land use ordinances that are required by the statewide planning goals and that are in effect on the date the applicant submits the application. If the special advisory group recommends applicable substantive criteria, as described under OAR 345-021-0050, the Council shall apply them. If the special advisory group does not recommend applicable substantive criteria, the Council shall decide either to make its own determination of the applicable substantive criteria and apply them or to evaluate the proposed facility against the statewide planning goals.

(4) The Council may find goal compliance for a proposed facility that does not otherwise comply with one or more statewide planning goals by taking an exception to the applicable goal. Notwithstanding the requirements of ORS 197.732, the statewide planning goal pertaining to the exception process or any rules of the Land Conservation and Development Commission pertaining to the exception process, the Council may take an exception to a goal if the Council finds:

(a) The land subject to the exception is physically developed to the extent that the land is no longer available for uses allowed by the applicable goal;

(b) The land subject to the exception is irrevocably committed as described by the rules of the Land Conservation and Development Commission to uses not allowed by the applicable goal because existing adjacent uses and other relevant factors make uses allowed by the applicable goal impracticable; or

(c) The following standards are met:

(A) Reasons justify why the state policy embodied in the applicable goal should not apply;

(B) The significant environmental, economic, social and energy consequences anticipated as a result of the proposed facility have been identified and adverse impacts will be mitigated in accordance with rules of the Council applicable to the siting of the proposed facility; and

(C) The proposed facility is compatible with other adjacent uses or will be made compatible through measures designed to reduce adverse impacts.

* * *

Findings of Fact

KIII provided information about compliance with the Council's Land Use Standard in Exhibit K of the application and elected to have the Council make the land use determination under OAR 345-022-0030(2)(b). The analysis area for the Land Use standard is the area within the site boundary and one-half mile from the site boundary.

The proposed facility would lie entirely on land within the land use jurisdiction of Sherman County. The energy facility and its related or supporting facilities, as well as staging areas needed during construction, would be on privately-owned land zoned Exclusive Farm Use (EFU).[31]

The land use analysis begins with identification of the "applicable substantive criteria" recommended by the Special Advisory Group. On April 8, 2005, the Council appointed the Sherman County Board of Commissioners the Special Advisory Group for this application. The Department requested that the Sherman County Commissioners identify the applicable substantive criteria in effect on the date KIII submitted the application (May 13, 2005).[32] Sherman County identified Article 5 of the Sherman County Zoning Ordinance (SCZO) as applicable to the proposed KWP.[33] The County did not identify any specific sections of the Sherman County Comprehensive Plan (SCCP) as containing applicable substantive criteria; however, compatibility with the SCCP is required under SCZO Section 5.2.1.

The Council's Land Use Standard (OAR 345-022-0030) must be applied in conformance with the requirements of ORS 469.504. The Oregon Supreme Court recently held "under ORS 469.504(1)(b) and (5), the council may choose to determine compliance with statewide planning goals by evaluating a facility under paragraph (A) or (B) or (C), but … it may not combine elements or methods from more than one paragraph, except to the extent that the chosen paragraph itself permits."[34]

Under ORS 469.504(5), "If the special advisory group recommends applicable substantive criteria for an energy facility described in ORS 469.300 or a related or supporting facility that does not pass through more than one local government jurisdiction or more than three zones in any one jurisdiction, the council shall apply the criteria recommended by the special advisory group." In this case, the special advisory group recommended that the applicable substantive criteria are those criteria contained in Article 5 of the SCZO. Accordingly, the Council has applied those criteria.

The Council may find compliance with statewide planning goals under ORS 469.504(1)(b)(A) if the Council finds that the proposed facility "complies with applicable substantive criteria from the affected local government's acknowledged comprehensive plan

[31] App Supp, Tab K, Item ii.
[32] Letter from John White to Commissioner Gary Thompson, dated March 31, 2005; Request for Comments on Completeness of the Application, dated May 13, 2005.
[33] Letter from Judge Gary Thompson, dated June 16, 2005; letter from Georgia Macnab, Sherman County Planning Director, dated July 7, 2005.
[34] *Save Our Rural Oregon v Energy Facility Siting Council*, 339 Or 353 (2005).

and land use regulations that are required by the statewide planning goals and in effect on the date the application is submitted." For the reasons discussed below, the Council finds that the proposed facility does not comply with all of the applicable substantive criteria.

If the proposed facility does not comply with one or more of the applicable substantive criteria, then the Council must proceed under ORS 469.504(1)(b)(B) and must determine whether the proposed facility "otherwise [complies] with the applicable statewide planning goals." The Court held in *Save Our Rural Oregon* that "paragraph (B) necessarily requires an evaluation of the same applicable substantive criteria as paragraph (A) and, to the extent those criteria are not met, directs the council to consider statewide planning goals." The Council finds that the applicable statewide planning goal is Goal 3 and that an exception to Goal 3 is justified, for the reasons discussed below.

ORS 469.504(1)(b)(C) is not available to the Council, because subsection (5) of the statute does not allow the Council to elect to apply the statewide planning goals directly when, as in this case, the special advisory group has recommended applicable substantive criteria.

The substantive criteria contained in Article 5 of the SCZO are in Sections 5.2 and 5.8 of the ordinance. The other sections of the article are procedural. The Council makes findings regarding these criteria as discussed below.

A. Applicable Substantive Criteria

SCZO Section 5.2: General Criteria

In determining whether or not a Conditional Use proposal shall be approved or denied, it shall be determined that the following criteria are either met or can be met through compliance with specific conditions of approval.

1. *The proposal is compatible with the County Comprehensive Plan and applicable Policies.*
2. *The proposal is in compliance with the requirements set forth by the applicable primary Zone, by any applicable combining zone, and other provisions of this Ordinance that are determined applicable to the subject use.*
3. *That, for a proposal requiring approvals or permits from other local, state and/or federal agencies, evidence of such approval or permit compliance is established or can be assured prior to final approval.*
4. *The proposal is in compliance with specific standards, conditions and limitations set forth for the subject use in this Article and other specific relative standards required by this or other County Ordinance.*
5. *That no approval be granted for any use which is or expected to be found to exceed resource or public facility carrying capacities, or for any use which is found to not be in compliance with air, water, land, and solid waste or noise pollution standards.*
6. *That no approval be granted for any use violation of this Ordinance.*

SCZO Section 5.2.1: Compatibility with the Comprehensive Plan

SCZO Section 5.2.1 requires that the proposal (construction and operation of the KWP) be compatible with the SCCP and applicable policies. SCCP Sections I through X contain an introduction, definitions and procedural directives to the county commissioners. These sections do not contain applicable substantive criteria. Sections XI through XVI articulate the County's substantive land use goals. Several goals address specific resources within the County that would not be affected in any way by the proposed KWP: Goal VII (aggregate resources), Goal IX (BLM lands), Goal XII (use of resources within the Deschutes and John Day Oregon State Scenic Waterways) and Goal XVI (affordable housing). Goal VIII calls for an investigation of ground water resources. The proposed use would not conflict with an investigation of ground water resources, and, for the reasons discussed at page 90, the facility would not have a significant adverse impact on ground water. The proposed facility is compatible with the remaining goals and applicable policies for the reasons discussed in the sections that follow.

(a) Goal V: Quality of the Physical Environment

Goal V: Improve or maintain the existing quality of the physical environment within the County. [SCCP Section XI]

The proposed KWP would maintain the existing quality of the physical environment within the County. The two policies under SCCP Goal V are not applicable to the proposed KWP. Policy I "recognizes…recommendations for a state-wide non-point source pollution control program," and Policy II requires that erosion control provisions be incorporated into the subdivision ordinance.

(b) Goal VI: Natural Hazards

Goal VI: To protect life and property from natural disasters and hazards. [SCCP Section XI]

The proposed KWP would protect life and property from natural disasters and hazards. Policy I under Goal VI requires evaluation of potential natural hazard areas before construction of any permanent structure. We address potential geological hazards in our discussion of the Council's Structural Standard at page 85. To identify and avoid geological hazards, appropriate site-specific geotechnical evaluation would be done before construction of the proposed KWP (Conditions (13), (14) and (53)). Policy II under Goal VI is not applicable because it addresses construction within flood-prone areas, and the site of the KWP is not within a flood-prone area.

(c) Goal X: Landscape

Goal X: Preserve the integrity of the Sherman County Landscape. [SCCP Section XI]

The features of the Sherman County landscape are addressed in SCCP Section XI, Finding XI, which identifies rock outcroppings, trees, the John Day River Canyon and the Deschutes River Canyon as the "all-important features of the County's landscape." The Finding also notes certain segments of I-80, US 97, OR 206 and OR 216 were designated as

"scenic highways."[35] The KWP would preserve the integrity of these landscape features. The single policy under Goal X calls for retaining trees when practical. The proposed KWP would not require the removal of any trees.

(d) Goal XI: Fish and Wildlife

Goal XI: To maintain all species of fish and wildlife at optimum levels and prevent the serious depletion of any indigenous species. [SCCP Section XI]

The proposed KWP is compatible with the goal of maintaining fish and wildlife populations. Policy I under Goal XI calls for implementation of fish and wildlife management policies. We address compliance of the proposed facility with the ODFW habitat mitigation goals and standards in our discussion of the Council's Fish and Wildlife Habitat Standard, beginning at page 72. Approximately 87 percent of the land permanently affected and 84 percent of the land temporarily affected by the proposed KWP is cultivated agricultural land. This land has low potential to become important habitat for wildlife.

Policy II under Goal XI does not apply to the proposed KWP because it addresses range management programs. Policy III calls for consideration of retention of fence rows, ditch banks and brush patches for wildlife use. The proposed KWP would not remove any of these habitats. Policy IV does not apply because it addresses maintenance by ODFW of "existing habitat plantings and water developments constructed for wildlife use," which are not present at the KWP site. Policy V addresses the use of pesticides that have "low toxicity to wildlife, fish and people." Pesticides would not be used during construction and operation of the proposed KWP. Herbicides might be used for weed control, and a weed management plan would be implemented in consultation with the Sherman County Weed District (Condition (89)). Policy VI does not apply because it addresses habitat quality on Rufus Bar and Maryhill Islands. The proposed KWP would not affect these areas.

(e) Goal XIII: Plant and Animal Diversity

Goal XIII: Attempt to maintain the diversity of plan [sic] *and animal species within the County. [SCCP Section XI]*

The two policies under Goal XIII address protection of sites or areas considered "critical habitat," including areas containing threatened or endangered species. The proposed KWP would comply with these policies because such critical habitat areas would be avoided. The proposed KWP is compatible with Goal XIII based on the findings discussed herein regarding the Council's Fish and Wildlife Habitat Standard (discussed at page 72) and Threatened and Endangered Species Standard (discussed at page 68).

(f) Goal XIV: Social Services and Public Facilities

Goal XIV: To improve or maintain the current level of social services available with the County and to assure the provision of public facilities consistent with the intensity of land use. [SCCP Section XII]

There are twenty specific policies under Goal XIV, but only Policies X, XV and XX under Goal XIV are applicable to the proposed KWP. Compliance with the applicable policies is discussed below. The overall concern of Goal XIV is the adequacy of public services in

[35] We address the visual impacts of the proposed facility on the landscape in our discussion of the Council's Scenic and Aesthetic Values Standard at page 53.

Sherman County. We address the effect of the proposed facility on the delivery of public services in the analysis area in our discussion of the Council's Public Services Standard at page 89. Based on the findings in that discussion, the Council finds that the proposed KWP is compatible with this goal.

Policy X requires maintenance and improvement of the County road system "consistent with the needs of the Sherman County citizenry." Two segments of County roads would be improved during construction of the proposed KWP by graveling and grading or would be completely reconstructed and widened. This road work would improve the quality of the roads and have a beneficial impact on traffic safety. The facility would maintain the county road system by repairing any damage that occurs during construction (Condition (40)). Policy XV requires that the Wasco State Airport be retained in State ownership and requires its protection from incompatible land uses. The proposed KWP would be compatible with the Wasco Airport because the nearest turbines would be located at least two miles from the airport and would not interfere with airport operations. The certificate holder would install and maintain aviation warning lights on the turbine strings as required by Federal Aviation Administration (FAA) safety regulations (Condition (100)).

The proposed KWP would be compatible with Policy XX, which contains the County's transportation planning policies.[36] Subsection A.1 does not apply because the KWP is not a public road or highway project. No new public roads would be built for the proposed KWP. Subsection A.3, provides that "maintenance, repair and preservation of existing transportation facilities shall be allowed without land use review, except where specifically regulated." The applicant proposes to improve segments of existing County roads to meet or exceed County standards because roads will require a more substantial section to bear the weight of the vehicles and turbine components than would usually be constructed by the County (Condition (39)). Subsection B.2 requires County notice to the Oregon Department of Transportation (ODOT) of land use applications and development permits for properties that have direct frontage or direct access onto a state highway. Notice has been provided to ODOT regarding frontage along State Highway 206.

(g) Goal XV: Cultural Resources

Goal XV: To protect historical, cultural and archeological [sic] resources from encroachment by incompatible land uses and vandalism. [SCCP Section XII]

Historic, cultural and archaeological resources would be protected during construction and operation of the proposed facility.[37] Policy I under this goal identifies specific areas and structures considered historically, archaeologically or culturally significant, and Policy II calls for protection of these areas. The proposed KWP is consistent with the county policies because it would not affect any of these significant areas or structures.

(h) Goal XVII: Economic Base and Viability of Agriculture

Goal XVII: Diversify the economic base of the County and maintain the viability of the agricultural sector. [SCCP Section XIV]

[36] The county's "transportation system plan" is incorporated in SCZO Sections 3.1.3(f) and 4.14 (Georgia Macnab, Sherman County Planning Director, personal communication).
[37] We address the impact of the proposed facility on historic, cultural and archaeological resources at page 87.

The five policies under Goal XVII are not directly applicable to the proposed KWP. Policy II, which calls for the adoption of zoning and other necessary ordinances "to assure conservation and retention of agricultural lands in agricultural uses," applies indirectly through the provisions of the SCZO that address protection of agricultural uses (see discussion of SCZO Section 5.8.16 at page 35).

(i) Goal XVIII: Energy Resources

Goal XVIII: Conserve energy resources. [SCCP Section XV]

Policy I under Goal XVIII calls for cooperation in the use and development of renewable resources. The proposed KWP is a renewable resource energy project. Policy II concerns "pumped storage" and is inapplicable to the proposed KWP. Policy III requires "new high voltage electrical transmission lines with nominal voltage in excess of 230 kV" to be constructed within or adjacent to existing electrical transmission line right-of-way. The proposed KWP does not include an electrical transmission line "in excess of 230 kV." Policy IV is inapplicable to the proposed KWP because it concerns integration of transportation services at Biggs Junction.

(j) Goal XIX: Orderly Use of Lands

Goal XIX: To provide an orderly and efficient use of the lands within Sherman County. [SCCP Section XVI]

With the exception of Policy IV, the five policies under Goal XIX are not applicable to the proposed KWP. Policy IV states that "commercial businesses, except those related to agricultural uses, should be located within incorporated cities." The proposed KWP is a "commercial utility facility," which is a use specifically allowable in Sherman County's Exclusive Farm Use Zone.

SCZO Section 5.2.2: Compliance with Zoning Requirements

(a) Applicable Primary Zone and Applicable Combining Zone

Under SCZO Section 5.2.2, the proposed facility must comply with the requirements of the applicable primary zone and any applicable combining zone. The proposed facility would be located entirely within an Exclusive Farm Use zone, which is designated "F-1" under SCZO Section 3.1. There is no applicable combining zone.

Section 3.1.2 lists uses permitted outright in the F-1 zone, and subsection (g) allows "reconstruction or modification of public roads." The proposed KWP would include reconstruction of two small segments of public roads within the facility site.[38]

[38] Section 3.1.2, which lists permitted uses in the F-1 zone is not entirely consistent with ORS 215.283(1). ORS 215.283(1) lists uses that are permitted under state law and includes "utility facilities necessary for public service" (ORS 215.283(1)(d)) and "reconstruction * * * of public roads, *including the placement of utility facilities overhead and in the subsurface of public roads and highways along the public right of way* * * *" (ORS 215.283(1)(L)(emphasis added)). While SCZO Section 3.1.2(g) contains the introductory language for 215.283(1)(L) permitting "reconstruction or modification of public roads," it does not contain the additional language permitting placement of utilities "along the right-of-way." However, the county cannot narrow the application of uses permitted under ORS 215.283(1). *Brentmar v. Jackson County*, 321 Ore. 481; 900 P.2d 1030; 1995 Ore. LEXIS 93 (1995). Furthermore, ORS 758.010 grants to any person or corporation the right to place utility service lines along public roads. Thus, under ORS 215.283(1)(L), utility facilities such as transmission lines and junction boxes may be placed in the public right-of-way as of right.

Under SCZO Section 3.1.3(e)(17), "operations" conducted for "commercial utility facilities" are an allowed conditional use. SCZO Section 1.4.136 defines a "utility facility" to include "any major structure owned or operated by a…private…electric…company for the generation, transmission, distribution or processing of its products…but excluding local…power distribution lines, and similar minor facilities." The proposed wind turbines and meteorological towers, power collection system (including the aboveground transmission line and the substation near Webfoot), the O&M building and the substation near Schoolhouse are structures that meet this definition.[39]

The conditional uses listed in SCZO Section 3.1.3 and their "accessory uses" are permitted in an F-1 zone "when authorized in accordance with the requirements of Article 5 of this Ordinance and this Section." In context, "this Section" includes the dimensional standards of Section 3.1.4. "Accessory use or structure" is defined in Section 1.4.6 as "a use or structure, or a portion of a structure, the use of which is incidental and subordinate to the main use of the property or structure and located on the same premises as the main or primary use and/or structure."[40] The wind turbines, O&M building, substations, aboveground transmission lines, junction boxes and meteorological towers are "buildings" under the definition in SCZO Section 1.4.20 and are therefore subject to the setback requirements in Section 3.1.4. KIII has provided a site plan for the proposed facility showing the location of these structures and stated that all of the turbines "and other aboveground elements of the facility" would be located at least 50 feet from any property line.[41]

In Condition 42 of the draft proposed order, the Department recommended a 50-foot setback for all aboveground facility structures, based on the applicant's statement in the application. In its comments during the public hearing process, KIII asked that aboveground transmission lines and junction boxes be excluded from the 50-foot setback condition so as not to interfere with farm operations. SCZO Section 3.1.4 requires a setback of 30 feet from the property line, "except that the front yard setback requirement from the right-of-way line of an arterial or major collector road or street shall be 50 feet unless approved otherwise by the Planning Commission." For most of the aboveground structures, the ordinance requires a 30-foot setback.[42] At the Council meeting on the draft proposed order on May 19, 2006, the Department recommended revising Condition 42 to make it consistent with the Sherman County ordinance. Exclusion of the aboveground transmission lines and junction boxes from the setback requirements, as requested by KIII, would conflict with SCZO Section 3.1.4. The

[39] SCZO Section 3.1.3(e)(17) appears to be modeled on ORS 215.283(2)(g), which conditionally allows "commercial utility facilities for the purpose of generating power for public use by sale." However, the definition of "utility facility" in SCZO Section 1.4.136 is overbroad and includes some utility facilities, such as transmission lines, that are permitted outright under ORS 215.283(1)(d), subject to compliance with ORS 215.275. Thus, under SCZO Section 3.1.3, some uses that are allowed outright under applicable state law are improperly subjected to additional conditions under SCZO Section 3.1.3. *Brentmar v. Jackson County*, 321 Ore. 481; 900 P.2d 1030; 1995 Ore. LEXIS 93 (1995).

[40] The proposed meteorological towers and O&M building may alternatively be allowed as "accessory uses" rather than being considered parts of the "utility facility." The power collection system and the substations might also be considered "accessory uses," but we believe that these structures fit more directly within the definition of utility facility structures for "transmission, distribution or processing" of electricity.

[41] App pp. K-8 and K-9 and Appendix C-2.

[42] There are no arterials in the project area and the only "major collector" roads are North Klondike Road south from Hilderbrand Lane and Klondike Lane east from North Klondike Road to Sandon Road. (Georgia Macnab, Sherman County Planning Director, personal communication).

Council finds that the facility does not meet SCZO 3.1.4 if the site certificate condition removes the aboveground transmission lines and junction boxes from the setback requirements.

Under ORS 469.504(1)(b)(B), if a facility does not meet the applicable substantive criteria recommended by the special advisory group pursuant to ORS 469.504(5), the Council may nevertheless approve the facility if it complies with applicable statewide planning goals. The applicable statewide planning goal is Goal 3, which is the state's Agricultural Lands goal. The facility's compliance with Goal 3 is discussed below at page 37.

Goal 3 requires that nonfarm uses within exclusive farm use zones not have significant adverse effect on accepted farm or forest practices. The Council finds that the proposed aboveground transmission lines and junction boxes should be located along property lines and rights-of-way where practicable. The Council modifies proposed Condition 42 by removing aboveground transmission lines and junction boxes from the setback requirements and modifies proposed Condition 43 to require placement of transmission lines and junction boxes along road right-of-way to the extent practicable.

The proposed access roads are "transportation improvements" that are separately allowed as a conditional use under SCZO Section 3.1.3(f).

(f) Transportation Improvements. (Ord. No. 22-05-2003)

1) Construction, reconstruction, or widening of highways, roads, bridges or other transportation projects that are (1) not improvements designated in the Transportation System Plan; or (2) not designed and constructed as part of a subdivision or planned development subject to site plan and/or conditional use review. Transportation projects shall comply with the Transportation System Plan and applicable standards, and shall address the following criteria. For State projects that require an Environmental Impact Statement (EIS) or Environmental Assessment (EA), the draft EIS or EA shall be reviewed and used as the basis for findings to comply with the following criteria.

A. The project is designed to be compatible with existing land use and social patterns including noise generation, safety, and zoning.

The access roads will be compatible with existing land use and social patterns. Farm use characterizes the "existing land use and social patterns." The proposed facility, including the access roads, will be compatible with farm use for the reasons discussed below with respect to SCZO 5.8.16 at page 35. The project would not have a significant adverse effect on traffic safety, for the reasons discussed below at page 91. The project would comply with applicable noise control regulations for the reasons discussed below at page 94.

B. The project is designed to minimize unavoidable environmental impacts to identified wetlands, wildlife habitat, air and water quality, cultural resources, and scenic qualities.

For the reasons discussed herein, the project, including the proposed access roads, would be designed to "minimize unavoidable environmental impacts to identified wetlands, wildlife habitat, air and water quality, cultural resources, and scenic qualities." Potential impacts to the listed resources are discussed in this draft proposed order in sections beginning at the pages indicated: wetlands (page 100), wildlife habitat (page 72), water quality (page 93)

cultural resources (page 87) and scenic qualities (page 53). The project would not have emissions and therefore would have no adverse effect on air quality. The certificate holder would control dust generated during construction of the roads by standard best management practices in accordance with an Erosion and Sediment Control Plan (Condition (76)).

C. The project preserves or improves the safety and function of the facility through access management, traffic calming, or other design features.

General usage of the public roads from which the proposed facility roads would be accessed is low. The access roads would be designed for efficient access by maintenance personnel to the wind turbines and other parts of the facility. During operation, the use of the access roads by facility maintenance personnel would not have a significant impact on traffic. Therefore, the Council finds that the access roads preserve the safety and function of the facility.

D. The project includes provision for bicycle and pedestrian circulations as consistent with the comprehensive plan and other requirements of this ordinance.

The SCCP and the other requirements of the SCZO do not address bicycle and pedestrian circulation for commercial utility facilities. Accordingly, there are no applicable requirements to be addressed under SCZO 3.1.3(f)(D).

(b) Other Applicable Provisions

In addition to consideration of the requirements of the primary zone and any combining zone, Section 5.2.2 requires consideration of other provisions of the SCZO that are determined "applicable to the subject use." The applicant considered SCZO Sections 4.9, 4.13, 4.14, 11.1, 11.2 and 11.8 as possibly applicable to the proposed facility.

According to Section 11.1, the requirements of SCZO Article 11 apply to "any land division or development and the improvements required, whether by subdivision, partitioning, creation of a street or other right-of-way, zoning approval, or other land development requiring approval pursuant to the provisions of this Ordinance." SCZO Section 1.4.62 defines "land development" as "any subdivision or partition of land, or any other division of land provided for in this Document." The proposed facility would not require any land division or land development. For that reason, the Council finds that Article 11 of the SCZO does not apply to the proposed facility.[43]

Article 4 of the SCZO contains "Supplementary Provisions," and Sections 4.2 and 4.9 are applicable to the proposed use. Section 4.2 prohibits projections from buildings by more than 2 feet into a required yard, and the proposed facility would not have such projections. The proposed facility would comply with Section 4.2 (Condition (42)).

Section 4.9 provides: "Approval of any use or development proposal pursuant to the provisions of this Ordinance shall require compliance with and consideration of all applicable State and Federal agency rules and regulations." This provision is similar to language in the Council's General Standard of Review, which requires a finding that "except for those statutes and rules for which the decision on compliance has been delegated by the federal government to a state agency other than the Council, the facility complies with all other

[43] The Department confirmed this interpretation of the SCZO with Sherman County Planning Director Georgia Macnab in a personal communication on October 3, 2005.

Oregon statutes and administrative rules identified in the project order." The project order for the proposed KWP identifies all applicable state agency permits, rules and regulations. The Council's findings regarding the General Standard of Review are discussed in Section VIII at page 126 below. Exhibit E of the application identifies the applicable federal agency rules and regulations. Federal agencies having regulations that are potentially applicable are the FAA, the U.S. Army Corps of Engineers (USACOE) and the U.S. Fish and Wildlife Service (USFWS).

The certificate holder will file the required Notice of Proposed Construction or Alteration with the FAA and will notify the Department of the FAA's response as soon as it has been received (Condition (57)). The USACOE administers the Section 404 permit program under the Clean Water Act, which addresses fill activities in of waters of the United States, including wetlands. The permit is not required for the KWP because there would be no fill in any waters of the United States. No formal consultation with the USFWS is needed, because no federal license, permit, or authorization is required for the KWP under the Endangered Species Act. For the reasons discussed above and in Section VIII below, the Council finds that the proposed KWP complies with SCZO Section 4.9.

Sections 4.1 and 4.3 do not apply in an F-1 zone. Sections 4.4, 4.5, 4.6, 4.7, 4.8, 4.11 and 4.12 apply to residential uses, and therefore these sections do not apply to the proposed KWP. Section 4.10 applies to "divisions of land within the F-1 zone." The proposed use does not require a division of land, and therefore Section 4.10 is not applicable.

Section 4.13 contains conditions that the County "may require…for development proposals." The section is a list of discretionary conditions rather than substantive standards. In issuing a Conditional Use Permit for the proposed KWP, the County would be bound by the conditions listed in the site certificate.[44] The Department consulted with the Sherman County Planning Department regarding proposed site certificate conditions and recommended conditions requested by the County.

Section 4.14 contains the county's access management policies and Section 4.15 addresses "pedestrian, bicycle and vehicular circulation consistent with access management standards and the function of affected streets." Section 1.4.5 defines "access management" as "the process of providing and managing access to land development while preserving the flow of traffic in terms of safety, capacity and speed." Section 1.4.62 defines "land development" as "any subdivision or partition of land, or any other division of land provided for in this Document." Because the proposed KWP does not involve a division of land, Sections 4.14 and 4.15 are not applicable.

SCZO Section 5.2.3: Other Local, State and Federal Permits

Section 5.2.3 addresses any required approvals or permits from "other local, state and/or federal agencies" and requires evidence of approval or permit compliance. In context, "other local agencies" means local agencies other than the Sherman County Planning Commission. The certificate holder will obtain a building permit and a local on-site sewage permit, which would be required prior to construction (Conditions (29) and (104)). These are

[44] ORS 469.401(3).

construction-related permits that are not subject to Council approval.[45] The applicant has applied to the Oregon Department of Environmental Quality (DEQ) for the NPDES 1200-C General Construction Storm Water permit, and DEQ has assigned the project to the 1200-C general permit. The project order for the proposed KWP identifies all applicable state agency permits and approvals. The Council's findings regarding applicable state agency permits, rules and regulations are summarized in Section VIII at page 126 below.

SCZO Section 5.2.4: Compliance with Specific Standards, Conditions and Limitations

Section 5.2.4 requires compliance with provisions in Article 5 and "other specific relative standards required by this or other County Ordinance." The substantive criteria contained in Article 5 of the SCZO are in Sections 5.2 and 5.8 of the ordinance. We discuss Sections 5.2.1, 5.2.2 and 5.2.3 above, and we discuss Sections 5.2.5 and 5.2.6 below, followed by a discussion of Section 5.8.

SCZO Section 5.2.5: Resource Carrying Capacity and Pollution Standards

Section 5.2.5 prohibits land use approval if the use exceeds "resource or public facility carrying capacities" or does not comply with "air, water, land, and solid waste or noise pollution standards." The proposed facility would not exceed resource or public facility carrying capacity and would comply with all air, water, land and solid waste or noise pollution standards.

The proposed facility would have no emissions that would result in an adverse impact to air quality. The facility would use a significant amount of water during construction. We discuss the availability of sufficient water and the right to use it for construction purposes at page 101. Water used for construction-related purposes would evaporate or infiltrate into the ground on-site. Wastewater contained in portable toilets would be pumped and disposed of by a licensed contractor. Water would not be discharged to wetlands, lakes, rivers or streams, and there would be no adverse impact on water quality. Water use during operation would be insignificant. The KWP would obtain water for use during operation from an on-site well, and thus there would be no demand on public facilities to supply water during operation. Water used during operation at the O&M building would be disposed of in an approved on-site septic system and would not result in an adverse impact on water quality or affect any public sewer facilities (Condition (104)). To avoid or reduce soil erosion, the certificate holder would comply with the requirements of the NPDES 1200-C stormwater permit and an Erosion and Sediment Control Plan and would implement erosion control measure during construction and operation (Conditions (76) and (82)).

Operation of the facility would consume a small amount of electricity for typical office loads at the O&M building. The power would be supplied by Wasco Electric Cooperative and would not exceed the utility's "carrying capacity."

Compliance with Section 5.2.5 is further supported by the Council's findings under the Council's Public Services Standard, discussed below at page 89. Measures to reduce and properly dispose of solid waste are discussed below at page 92. The facility would comply with applicable noise control regulations, which we discuss at page 94.

[45] ORS 469.401(4). The Department of Environmental Quality does not require a Water Pollution Control Facility permit for an on-site septic system with a design capacity of less than 2,500 gallons-per-day (E-mail from Richard Nichols, DEQ, dated March 15, 2006).

SCZO Section 5.2.6: Use Violation

Section 5.2.6 prohibits land use approval for "any use violation of this Ordinance." The proposed KWP would not involve any use violations. The proposed principal use is a commercial utility facility, which is a conditional use allowed in an EFU zone under SCZO Section 3.1.3(e)(17). The proposed access roads are "transportation improvements" that are separately allowed as a conditional use under SCZO Section 3.1.3(f). The proposed minor reconstruction of public roads within the site boundary is allowed outright in an EFU zone under Section 3.1.2(g).

SCZO Section 5.8: Standards Governing Specific Conditional Uses

Section 5.8.10 contains standards for "Radio or Television Transmission Tower, Utility Station or Substation." Section 5.8.14 contains standards for "Public Facilities and Services." Section 5.8.16 contains standards for "Non-farm Uses in an F-1 Zone." The other sections of SCZO 5.8 are not applicable to the proposed KWP.

SCZO Section 5.8.10: Radio or Television Transmission Tower, Utility Station or Substation

> *When authorized as a Conditional Use, the following standards and limitations apply:*
>
> *(a) In a residential zone or area, all equipment storage on the site shall be enclosed within a building.*
>
> *(b) The use may be required to be fenced and provided with landscaping*
>
> *(c) Coloring of structures, buildings and other permanent installations shall be of neutral colors or as otherwise required by the Commission or reviewing authority.*

The proposed KWP would include two new substations. "Substation" is not specifically listed as a conditional use in an F-1 zone, but SCZO Section 3.1.3 authorizes the listed conditional uses "and their accessory uses." The Council finds that the proposed substations are authorized as conditional uses in the F-1 zone because they are "accessory uses" related to a "utility facility" (the wind energy facility).

Subsection (a) of SCZO 5.8.10 does not apply because the substations would not be located in a "residential zone or area." Subsection (b) provides that fencing and landscaping of the proposed use "may be required." The substations would be fenced (Condition (58)). The proposed substation buildings would comply with subsection (c) because they would be painted a neutral color (Condition (98)).

SCZO Section 5.8.14: Public Facilities and Services

> *(a) Public facilities including, but not limited to, utility substations, sewage treatment plants, storm water and water lines, water storage tanks, radio and television transmitters, electrical generation and transmission devices, fire stations and other public facilities shall be located so as to best serve the County or area with a minimum impact on neighborhoods, and with consideration for natural or aesthetic values.*
>
> *(b) Structures shall be designed to be as unobtrusive as possible. Wherever feasible, all utility components shall be placed underground.*

(c) Public facilities and services proposed within a wetland or riparian area shall provide findings that: Such a location is required and a public need exists; and Dredge, fill and adverse impacts are avoided or minimized.

Section 5.8.14 applies to "public facilities," including utility substations and electrical generation and transmission devices. The applicability of Section 5.8.14 is "not limited to" the facilities listed in subsection (a). The Council finds that Section 5.8.14 applies to the proposed KWP substations, "electrical generation devices" (wind turbines) and "electrical transmission devices" (transmission lines).

Subsection (a) requires the location of public facilities to "best serve" the County or area, to have "minimum impact" on neighborhoods and to consider "natural and aesthetic values." The wind turbines and associated power collection lines ("electrical generation and transmission devices") would be located take optimal advantage of the wind resource for power generation. To best serve their intended purpose, the substations and transmission lines that would be part of the proposed KWP must be located within the general area of the wind turbines and close to the point of interconnection with the BPA system. The location of these facilities would "best serve" the County or the area because they would use a small fraction of agricultural land (approximately 0.8 percent of the actively farmed acres adjacent to these facilities) to generate significant new tax revenues for the County and income for the landowners of the property leased to the facility. The facilities would have a "minimum impact on neighborhoods" because they would be located on rural land and not within neighborhoods. The location of the facilities would consider "natural and aesthetic values," including threatened or endangered species, wildlife habitat and scenic resources. The facilities would have no significant adverse effect on threatened or endangered species for the reasons discussed under the Council's Threatened and Endangered Species Standard below at page 68. Consideration of wildlife habitat and compliance with the Council's Fish and Wildlife Habitat Standard are discussed below at page 72. We discuss the potential impact of the proposed KWP on important aesthetic or scenic values and compliance with the Council's Scenic and Aesthetic Values Standard below at page 53.

Subsection (b) requires that public facilities be designed to be as "unobtrusive as possible" and requires utility components to be placed underground wherever feasible. Wind turbines must be mounted on tall tower structures. Likewise, meteorological towers associated with operation of the facility must be aboveground. The certificate holder would make these facilities as unobtrusive as possible by the use of uniform design and neutral colors (Condition (98)). The facility would not have an adverse impact on significant or important scenic resources, for the reasons discussed under the Council's Scenic and Aesthetic Values Standard below at page 53. To the extent feasible, the transmission collector system would be located underground. The fiber optic communications network linking the wind turbines to a central computer system at the O&M facility would be installed underground.

Subsection (c) applies to public facilities proposed "within a wetland or riparian area." No part of the proposed KWP would be located within a wetland or riparian area. We discuss the analysis of area wetlands and other waters of the state at page 100.

SCZO Section 5.8.16: Non-farm Uses in an F-1 Zone

> *Non-farm uses, excluding farm related, farm accessory uses or uses conducted in conjunction with a farm as a secondary use thereof, may be approved upon a findings* [sic] *that each such use:*
>
> *(a) Is compatible with farm uses described in ORS 215.203(2);*
>
> *(b) Does not interfere seriously with accepted farming practices on adjacent lands devoted to farm use;*
>
> *(c) Does not materially alter the overall land use pattern of the area;*
>
> *(d) Is situated upon generally unsuitable land for the production of farm crops and livestock, considering the terrain, adverse soil or land conditions, drainage and flooding, vegetation, location and size of the tract, and the availability of necessary support resources for agriculture;*
>
> *(e) Complies with other applicable significant resource provisions; and*
>
> *(f) Complies with such other conditions as deemed necessary.*

Although the SCZO allows commercial utility facilities to be located in an F-1 zone, "non-farm uses" must meet the standards contained in SCZO Section 5.8.16. Subsection (a) requires a finding that the proposed use is compatible with farm uses. The Council finds that the construction and operation of the wind energy facility would be compatible with farm use. The placement of the proposed facility would take very little area out of farm use.[46] The area occupied by the facility is a small fraction of the adjacent farmed area (approximately 56 acres, or 0.8 percent, of the 7,150 acres adjacent to the facility that are actively used for farming).[47] The applicant proposes to locate turbines and transmission interconnection lines along the margins of cultivated areas wherever feasible to avoid conflict with farming activities (Condition (43)). Farming activities could continue on cropland within the site boundary adjacent to KWP structures. The certificate holder would implement a weed control plan to mitigate the spread of weeds to cropland (Condition (89)). The landowner would be able to use the new turbine access roads for movement of farm equipment between cultivated fields.

Subsection (b) requires that the proposed use "not interfere seriously with accepted farming practices on adjacent lands." Farming on adjacent land consists predominantly of dry land wheat and barley cultivation with some open range areas for cattle.[48] Accepted farming practices include plowing, aerial fertilizing, sowing, mechanical and hand weeding and grain harvesting. Aerial crop dusting is used in some areas. Winter soil preparation includes burning stubble, spreading of straw or crop residue, discing and harrowing. Some of the farm equipment is large (for example, 28-foot-wide combines and 50-foot-wide rod weeders).

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[46] In its Order on the conditional use permit for Klondike II, the Sherman County Planning Commission found that 57 percent of the land area of the county is agricultural land, which amounts to 303,360 acres. The facility would occupy about 0.02 percent of the agricultural land in the county.

[47] The applicant interviewed the twelve property owners who would be directly affected by the KWP. Based on the information from these interviews, the Department conservatively estimated that there are 7,150 acres of actively farmed land adjacent to the proposed facility.

[48] App Appendix K-2.

The Council finds that the proposed KWP would not seriously interfere with accepted farming practices. During construction, which the applicant expects would take up to ten months, there would be temporary displacement of crops by construction activities. Construction traffic could cause temporary delays to movement of farm equipment and trucks. When construction is complete, farm operators would be able to cultivate the land around the footprint of turbine pads (occupying approximately 1,000 square feet each) and access roads (occupying a width of 20 feet). Individual turbines within strings would be spaced approximately 400 to 600 feet apart, and strings would be located about a mile apart, allowing even the largest farm equipment to be operated around and between the turbines. The location of the turbines and access roads could require farmers to change their previous patterns of harvesting and other mechanical operations on the fields, but those operations could continue and there would be no significant impact on the time needed to perform farming operations. Maneuvering large farm equipment around the tight radius of a wind turbine could result in corners or edges that cannot be cultivated with this equipment and could increase the opportunity for weeds to grow in those spots. Weed control is a major concern that local farmers have, and the applicant would practice weed control measures during construction and operation of the facility to minimize the spread of weeds (Condition (89)). Farmers would have the use of any facility access roads constructed on their property for access to fields or for movement of farm equipment between fields. Segments of public roads in the area would be widened and improved, which would benefit the movement of farm equipment in those areas. The KWP would occupy approximately 56 acres of agricultural land, which is about 0.8 percent of the actively farmed adjacent land.[49] Most of the landowners that were interviewed by the applicant anticipate that the effect of the proposed KWP on farming practices would be insignificant. The applicant also met with crop dusters who operate in the area. They did not anticipate having trouble avoiding the turbines.

Subsection (c) requires a finding that the non-farm use would not materially alter the overall land use pattern of the area. The Council finds that approval of the KWP would not materially alter the overall land use pattern of the area.[50] The area around the proposed facility can be characterized as rural, agricultural land. The area leased for the project lies on parcels consisting of about 14,500 acres, which are owned by 12 property owners. The non-farm use would occur on leased property; farm land would not be sold for non-farm use. Farming on these large parcels would continue to be the predominant land use pattern. The facility would not require any partition or other division of land. The amount of cropland converted to non-farm use would be less than 1 percent of the actively farmed land adjacent to the facility.

Subsection (d) requires a finding that the proposed use is "situated upon generally unsuitable land for the production of farm crops and livestock." The applicant argues that the land that would be occupied by the proposed facility is unsuitable for the production of farm crops and livestock because the soils "do not support a diversity of crops, nor crops that are high value" and because the soils "also do not generally support livestock in the county." The applicant further argues that "there is increasing evidence that maintaining production of

[49] Table P-3, App Supp Tab P, Item ii.

[50] Sherman County has previously approved the Klondike I and II wind energy facilities that are now operating within the same general area as the proposed KWP based in part on finding that the operation of the wind energy facilities would not materially alter the overall land use pattern.

wheat and barley on such lands is becoming uneconomic."[51] The Natural Resources Conservation Service (NRCS) soil survey for Sherman County identifies the soil types within the proposed facility site and classifies soil types into "capability" classes. This classification system shows, in a general way, the suitability of soils for growing field crops, and subclasses identify limitations or hazards affecting suitability for crop production. The land on which permanent KWP structures would be located is not of uniform suitability. Instead, the land is characterized by a mosaic of soil types ranging from Class VIII (soils that have limitations "that nearly preclude their use for commercial crop production") to Class IIc (soils that have moderate limitations "that reduce the choice of plants or that require moderate conservation practices"; the subclass "c" designation indicates soils that are limited by being very cold or very dry). Nevertheless, the proposed KWP would occupy approximately 56 acres of land that is now used for non-irrigated crop production. The fact of such use demonstrates the "general suitability" for the use. Accordingly, the Council finds that the proposed KWP is located on land "generally suitable" for crop production and does not comply with SCZO Section 5.8.16(d).

Subsection (e) of SCZO Section 5.8.16 requires that the proposed non-farm use comply with "other applicable significant resource provisions." The Council finds that the proposed facility would comply with the other SCZO provisions applicable to the EFU zone, for the reasons discussed above. Subsection (f) requires compliance with "such other conditions as deemed necessary." The KWP would be subject to the conditions of the site certificate.

B. Applicable Statewide Planning Goals

For the reasons discussed above, the proposed facility does not comply with SCZO Sections 3.1.4 and 5.8.16(d) and therefore does not comply with all of the applicable substantive criteria from Sherman County. Under ORS 469.504(1)(b)(B), the Council must determine whether the proposed facility "otherwise [complies] with the applicable statewide planning goals." Because the proposed facility complies with all other local criteria except SCZO Sections 3.1.4 and 5.8.16(d) (based on the findings above) and because those sections relate to land uses in the County's F-1 zone, the "applicable statewide planning goal" is Goal 3, which is the state's Agricultural Lands goal. As expressed in *Oregon's Statewide Planning Goals and Guidelines*, Goal 3 is:

> ***To preserve and maintain agricultural lands.***
> *Agricultural lands shall be preserved and maintained for farm use, consistent with existing and future needs for agricultural products, forest and open space and with the state's agricultural land use policy expressed in ORS 215.243 and 215.700.*

Consistent with Goal 3, Sherman County has identified the "F-1" zone as an "exclusive farm use" zone. Under Goal 3, nonfarm uses are permitted within a farm use zone as provided under ORS 215.283.

To find compliance with ORS 215.283, the Council must determine whether the proposed energy facility and its related or supporting facilities are uses that fit within the scope of the uses permitted in exclusive farm use zones as described in ORS 215.283(1), (2) or (3). The proposed KWP would consist of the energy facility (the wind turbines) and the

[51] App p. K-32.

following related or supporting facilities: the underground and aboveground power collection lines, two substations, three meteorological towers, an O&M building, the control system and access roads.[52]

In the Final Order on Amendment #2 for the Stateline Wind Project, the Council found that a wind energy facility (the "principal use") was a "commercial utility facility for the purpose of generating power for public use by sale" and allowable under ORS 215.283(2)(g). The Council found that the power collector system and meteorological towers were part of the principal use. The Council found that the Stateline substation and the aboveground transmission line connecting the substation with the main power grid were "utility facilities necessary for public service" allowed under ORS 215.283(1)(d). The Council found that the access roads were allowable under ORS 215.283(3).

The Council finds that the KWP energy facility is a "commercial utility facility for the purpose of generating power for public use by sale" and that the power collection system and meteorological towers are part of that principal use. In addition, the Council finds that the KWP control system and O&M building are part of the principal use. The Council finds that the proposed aboveground 230-kV transmission line, as described herein, is part of the KWP power collection system, unlike the aboveground transmission line at Stateline, which was proposed to interconnect the facility with the regional power grid. Therefore, the Council finds that the KWP aboveground transmission line is part of the principal use. Further, the Council finds that the access roads are allowable under ORS 215.283(3).

The applicant proposes two new substations. One of the substations would be located near the BPA Klondike Schoolhouse Substation and would function to step up the power to accommodate interconnection with the BPA system. This substation would be similar in function to the substation at Stateline, which was proposed to step up the power for transmission over a 115-kV or 230-kV line that would interconnect the Stateline facility with the regional power grid in Washington. Because the proposed substation near the BPA Klondike Schoolhouse Substation is necessary to make the power from the KWP available to the public through the BPA system, the Council finds that this substation is a "utility facility necessary for public service."

The second substation proposed for the KWP would be located near Webfoot. The applicant describes the Webfoot substation as part of the power collection system. This substation would collect the power from the eastern section of the project and step up the voltage for transmission to the BPA Klondike Schoolhouse Substation, a distance of 3.5 miles. The Council finds that the proposed Webfoot substation is part of the power collection system and therefore part of the principal use.

The Principal Use

In this case, the principal use is a "commercial utility facility." ORS 215.283(2)(g) authorizes "commercial utility facilities for the purpose of generating power for public use by

[52] Under ORS 469.300, the "energy facility" is "an electric power generating plant." Some facility components, such as the control system, might be considered intrinsic to the "electric power generating plant" and therefore part of the "energy facility" rather than separate, related or supporting facilities. The "related or supporting facilities" listed in the text are treated separately in this discussion, without implying any finding that any given component is separate from the energy facility.

sale" on agricultural land, subject to ORS 215.296. OAR Chapter 660, Division 33, contains the Land Conservation and Development Commission (LCDC) administrative rules for implementing the requirements for agricultural land as defined by Goal 3. OAR 660-033-0120 (Table 1) lists the "commercial utility facility" use as a type "R" use ("use may be approved, after required review") and references the standards found in OAR 660-033-0130(5) and (22) for such a facility if it is proposed to be located on non-high-value farmland.[53] For the reasons discussed below (at page 40), the KWP turbine string access roads are also subject to OAR 660-033-0130(5) and (22). The following discussion addresses both the principal use and the access roads.

OAR 660-033-0130(5) cross-references ORS 215.296, which provides that a use allowed under ORS 215.283(2) may be approved only if the use would not:

(a) Force a significant change in accepted farm or forest practices on surrounding lands devoted to farm or forest use; or

(b) Significantly increase the cost of accepted farm or forest practices on surrounding lands devoted to farm or forest use.

The Council finds that the principal use and the access roads for the KWP would not force a significant change in accepted farm practices on surrounding farm land and would not significantly increase the cost of accepted farm practices. There would be no significant change in accepted farming practices as a result of the proposed KWP for the reasons discussed above with respect to SCZO Section 5.8.16(a), (b) and (c). In summary, accepted farming activities could continue on the farm parcels where the KWP structures would be located. The KWP would occupy less than 1 percent of the actively farmed land adjacent to the facility. Construction and operation of the proposed KWP would be compatible with farm uses and would not seriously interfere with accepted farming practices.

The cost of farming practices in the area could be affected because of the acreage taken out of crop production by placement of permanent facilities, changes in patterns of harvesting and other mechanical operations on the fields, temporary displacement of crops by construction activities and temporary delays to movement of farm equipment and trucks due to construction traffic. The acreage that would become unavailable for crop production due to the principal use and the access roads amounts to 0.8 percent of the actively-farmed area adjacent to the proposed KWP.[54] The location of the turbines and access roads could require farmers to change their previous patterns of harvesting and other mechanical operations on the fields, but there would be no significant impact on the time needed to perform these farming operations and no significant increase in cost. During the ten-month construction period,

[53] OAR 660-033-0020(8) defines "high value farmland." Non-irrigated farmland is "high value" if the tract is composed predominantly of soils that are classified prime, unique, Class I or II by the NRCS. The soils in the area affected by the principal use are not classified as "prime farmland" by the NRCS, and the soil capability classifications in the area range from Class VIII to Class IIc (a subclass indicating limitation due to soil being very cold or very dry). Sherman County does not consider the affected land to be "high value farmland" (Letter from Georgia Macnab, Sherman County Planning Director, October 19, 2005.)

[54] The total area permanently affected by the KWP is estimated to be about 64 acres. Excluding 4 acres occupied by the proposed substation adjacent to the BPA Schoolhouse substation, the principal use and access roads would occupy 60 acres. Not all 60 acres is currently used for crop production (the 60 acres includes CRP land and grassland not in production. Nevertheless, assuming all 60 acres is potentially available for crop production, this area is only 0.8 percent of the actively-farmed area adjacent to the proposed facility.

approximately 82 acres of agricultural land would be temporarily unavailable for crop production. This amounts to 1.1 percent of the actively farmed area adjacent to the proposed KWP that would be out of production for ten months. Construction traffic could cause temporary delays in the movement of farm equipment and trucks during the ten-month construction period, but these delays, although inconvenient, would not result in a significant increase in the cost of farm practices.

For the reasons discussed above, the Council finds that the principal use and access roads would comply with the standards of ORS 215.296 and OAR 660-033-0130(5). The Council finds that the principal use would not take prime farmland out of production and that adverse impacts to farming practices or the costs of farming practices would be mitigated.

The KWP principal use and access roads are also subject to OAR 660-033-0130(22).

OAR 660-033-0130(22) provides as follows:

> *(22) A power generation facility shall not preclude more than 20 acres from use as a commercial agricultural enterprise unless an exception is taken pursuant to ORS 197.732 and OAR chapter 660, division 004*

In this case, the "power generation facility" consists of the principal use and the turbine string access roads. The area occupied by the power generation facility is shown in Table 3.

Table 3: Area Occupied by the Power Generation Facility[55]

Structure	Acres
Principal use	
Turbine towers, including pad areas and road turnouts	10
Meteorological towers	0.03
Aboveground 34.5 kV collector line	0.05
Aboveground 230-kV transmission line	0.05
O&M building site, including the Webfoot substation	4
Subtotal	14.13
Access roads	46.5
Total	**60.63**

As shown in Table 3, the principal use and access roads would occupy approximately 61 acres within the EFU zone.[56] The Council finds, therefore, that the principal use and access roads would occupy more than 20 acres and that the use would not comply with OAR 660-033-0130(22) and Goal 3. We discuss an exception to Goal 3 below at page 43.

The Access Roads

The proposed access roads are allowable on EFU land under ORS 215.283(3). ORS 215.283(3) allows "roads, highways and other transportation facilities and

[55] Figures in this table are based on a memorandum from Dana Siegfried (for KIII), dated December 6, 2005, regarding "Response to 11/22/05 e-mail" and on subsequent e-mail communications from John White (ODOE, 12/8/05), Jesse Gronner (for KIII, 12/13/05), White (12/20/05), Siegfried (12/28/05), Siegfried (1/19/06) and Gronner (3/22/06). The area of the proposed KWP "Schoolhouse" substation is not included in this table.
[56] Of this acreage, approximately 7.5 acres is not currently being used for crop production.

improvements" that are not otherwise allowed under paragraphs (1) and (2) of ORS 215.283 to be established in an EFU zone, subject to:

> *(a) Adoption of an exception to the goal related to agricultural lands and to any other applicable goal with which the facility or improvement does not comply; or*
>
> *(b) ORS 215.296 for those uses identified by rule of the Land Conservation and Development Commission as provided in section 3, chapter 529, Oregon Laws 1993*

The subparagraphs are conjoined by "or" and so either (a) or (b) applies. In this case, subparagraph (b) applies because the KWP access roads are a use that has been identified by the LCDC. OAR 660-033-0120 identifies uses authorized on agricultural lands. OAR 660-033-0120 (Table 1) lists "transportation improvements on rural lands allowed by OAR 660-012-0065" as a type "R" use ("use may be approved, after required review"). OAR 660-033-0120 does not reference any criteria in OAR 660-033-0130 for this use.

OAR 660-012-0065 applies to transportation improvements on rural lands. The proposed KWP access roads fall within the definition of "accessory transportation improvements" in OAR 660-012-0065(2)(d), because they are "transportation improvements that are incidental to a land use to provide safe and efficient access to the use."[57]

Under OAR 660-012-0065(3)(a), "accessory transportation improvements for a use that is allowed or conditionally allowed by ORS…215.283" are consistent with Goal 3, "subject to the requirements of this rule." The proposed access roads are accessory transportation improvements for a "commercial utility facility for the purpose of generating power for public use by sale," which is a use conditionally allowed by ORS 215.283(2)(g). Accordingly, the access roads are consistent with Goal 3, subject to any applicable requirements of OAR 660-012-0065.

The requirements of OAR 660-012-0065(4) are applicable:

> *Accessory transportation improvements required as a condition of development listed in subsection (3)(a) of this rule shall be subject to the same procedures, standards and requirements applicable to the use to which they are accessory.*

The rule language applies specifically to accessory transportation improvements "required as a condition of development." Because the KWP access roads are necessary for the operation and maintenance of the wind energy facility, they are a necessary condition of the development of the commercial utility facility. Accordingly, the access roads are subject to the standards and requirements applicable to the principal use. The applicable standards and requirements are contained in OAR 660-033-0130(5) and (22), and we have discussed the compliance of the principal use and the access roads with these provisions above.

[57] OAR 660-12-0065(2)(a) defines "access roads" as "low volume public roads that principally provide access to property or as specified in an acknowledged comprehensive plan." The proposed KWP turbine string access roads are not "access roads" under this definition because they are not public roads.

Substations

The proposed KWP Webfoot substation is part of the power collection system and therefore part of the principal use, which has been discussed above. The proposed KWP "Schoolhouse" substation is needed so that electricity generated by the energy facility can be transmitted over high-voltage lines to the BPA system and ultimately to public customers. For that reason, the "Schoolhouse" substation falls within the scope of ORS 215.283(1)(d), which allows "utility facilities necessary for public service" on EFU land, subject to the provisions of ORS 215.275.

ORS 215.275 lists factors for deciding whether a utility facility is "necessary for public service." The statute provides:

> *(1) A utility facility established under ORS 215.213 (1)(d) or 215.283 (1)(d) is necessary for public service if the facility must be sited in an exclusive farm use zone in order to provide the service.*
>
> *(2) To demonstrate that a utility facility is necessary, an applicant for approval under ORS 215.213 (1)(d) or 215.283 (1)(d) must show that reasonable alternatives have been considered and that the facility must be sited in an exclusive farm use zone due to one or more of the following factors:*
>
> *(a) Technical and engineering feasibility;*
>
> *(b) The proposed facility is locationally dependent. A utility facility is locationally dependent if it must cross land in one or more areas zoned for exclusive farm use in order to achieve a reasonably direct route or to meet unique geographical needs that cannot be satisfied on other lands;*
>
> *(c) Lack of available urban and nonresource lands;*
>
> *(d) Availability of existing rights of way;*
>
> *(e) Public health and safety; and*
>
> *(f) Other requirements of state or federal agencies.*

The proposed "Schoolhouse" substation must be located in an EFU zone because there is no non-EFU land in the vicinity of the BPA Klondike Schoolhouse Substation, which is the point of interconnection with the regional power grid. There are no reasonable alternatives. At least three of the factors listed in ORS 215.275(2) apply. "Technical and engineering feasibility" requires that there be a substation to accommodate interconnection with the BPA system. It is not feasible or technically possible to interconnect with the main transmission grid without a substation. The proposed substation is "locationally dependent." The substation must be located in proximity to the proposed wind turbines, because that is where the power would be generated. It must also be located near the point of interconnection with the BPA system so that the power can be transmitted to customers. There are no urban or nonresource lands available to locate the substation where it could serve its purpose. For these reasons, location of the substation on EFU land is "necessary for public service." The Council finds that the substation is allowable under ORS 215.283(1)(d).

ORS 215.275(4) requires that the owner of a utility facility approved under ORS 215.283(1)(d) be responsible for restoring agricultural land and associated improvements to

their former condition if they are damaged or disturbed by the siting, maintenance, repair or reconstruction of the facility. The proposed "Schoolhouse" substation would be located on a 4-acre parcel of land that would be part of the permanent KWP "footprint." Construction of the substation would not affect agricultural land or associated improvements outside of the 4-acre parcel. Nevertheless, the certificate holder would be responsible for restoring all areas temporarily disturbed during construction of the KWP upon completion of construction. (Conditions (11) and (81)).

ORS 215.275(5) requires the imposition of "clear and objective conditions" on siting a utility facility under 215.283(1)(d) "to mitigate and minimize the impacts of the proposed facility, if any, on surrounding lands devoted to farm use in order to prevent a significant change in accepted farm practices or a significant increase in the cost of farm practices on the surrounding farmlands." Construction of the proposed "Schoolhouse" substation as part of the KWP would not substantially increase the impacts of the principal use and access roads, which would occupy a much larger area of agricultural land than the substation. For the reasons discussed above, the principal use and access roads and would not result in a significant change in accepted farm practices or significantly increase the cost of those practices. The Council finds, therefore, that locating the proposed substation on a 4-acre parcel of agricultural land would not cause a significant change in accepted farm practices or significantly increase the cost of those practices.

C. Goal 3 Exception

The proposed principal use and access roads would occupy more than 20 acres in the EFU zone and would not comply with OAR 660-033-0130(22) and Goal 3. Therefore, to find compliance under ORS 469.504(1)(b)(B), the Council must find "that an exception to any applicable statewide planning goal is justified under subsection (2)" of ORS 469.504. Accordingly, the Council must determine whether an exception to Goal 3 is justified.

ORS 469.504(2)(c) sets out the requirements that must be met for the Council to take an exception to a land use planning goal, as follows:

> *(2) The council may find goal compliance for a facility that does not otherwise comply with one or more statewide planning goals by taking an exception to the applicable goal. Notwithstanding the requirements of ORS 197.732, the statewide planning goal pertaining to the exception process or any rules of the Land Conservation and Development Commission pertaining to an exception process goal, the council may take an exception to a goal if the council finds:*
>
> * * *
>
> *(c) The following standards are met:*
>
> *(A) Reasons justify why the state policy embodied in the applicable goal should not apply;*
>
> *(B) The significant environmental, economic, social and energy consequences anticipated as a result of the proposed facility have been identified and adverse impacts will be mitigated in accordance with rules of the council applicable to the siting of the proposed facility; and*

(C) The proposed facility is compatible with other adjacent uses or will be made compatible through measures designed to reduce adverse impacts.

The Council makes the findings discussed below and concludes that the standards for an exception to Goal 3 under ORS 469.504(2)(c) are met.

Reasons Supporting an Exception

The state policy embodied in Goal 3 is the preservation and maintenance of agricultural land for farm use. Several reasons support an exception to Goal 3.

First, although the proposed facility would occupy more than 20 acres, it would occupy less than 1 percent of the actively farmed land adjacent to the facility. The land that would be occupied by the wind facility would not be in a single, contiguous area within which no farming activities could occur. Rather, the spacing of turbines and turbine strings would preserve most of the land upon which the facility lies for farm use. The total amount of land occupied by wind turbines (including pad areas and access road turn-outs) would be approximately 10 acres; the majority of the area occupied by the KWP would be occupied by the access roads (approximately 46.5 acres). The access roads would be available for use by the landowner in farm operations.

Second, for the reasons discussed above in reference to SCZO 5.8.16 (see page 35), the facility is compatible with farm use, would not seriously interfere with accepted farm practices on adjacent land and would not materially alter the overall land use pattern of the area.

Third, approval of the proposed KWP furthers the state policy embodied in Goal 13 (Energy Conservation). The Guidelines for implementing Goal 13 expressly direct land use planning to utilize renewable energy sources, including wind, "whenever possible." KIII has chosen the project site because "extensive evaluation of wind resources in various areas within Sherman County indicates that the project site has among the best wind resources for the development of wind energy generating facilities."[58] It is not feasible to locate a renewable wind energy facility in the County without affecting agricultural land because the best wind resources are all located on agricultural land.

Fourth, the farmers who own the land where the KWP would be located are willing to enter into land leases to allow the project to be built. In return, the landowners would receive annual lease payments. Lease payments would provide a stable, supplemental income source that would help maintain the land in farm use by increasing the economic viability of the landowners' farm operations. The applicant estimates the total annual lease income to local landowners would amount to approximately $330,000.[59]

Fifth, the project would boost the local economy by creating jobs and contributions to the local tax base. The applicant estimates the number of construction jobs would range will from 100 to 120 during the 9-month construction period. Operation of the facility would

[58] App p. K-39.
[59] App p. K-23.

require 15 to 20 full-time and part-time employees.[60] The facility is expected to provide substantial tax revenues to the County over the life of the project.[61]

Sixth, the proposed location of the facility provides direct access to BPA's upgraded Klondike Schoolhouse substation and new 230-kV transmission line that are being built by BPA as general system upgrades. The new BPA substation and transmission line will be the only transmission facilities in Sherman County with the capacity to carry the project's power and the only point of interconnection to the Federal Columbia River Transmission System. The proposed access roads, collector lines, substations, meteorological towers, O&M building are all necessary to operate the KWP and must be located in the project area. The KWP would use existing roads to the extent possible. New turbine string access roads would be 20-feet wide and would be located to minimize conflict with farm uses on surrounding land.

Environmental, Economic, Social and Energy Consequences

The Council's standards address the environmental consequences of the proposed facility. In our discussion of each of the standards, we identify the potential adverse impacts of the proposed facility and explain how those impacts would be mitigated. We discuss impacts to soils at page 46; to protected areas at page 48: to scenic areas at page 53; to threatened and endangered species at page 68; to wildlife habitat at page 72; to ambient noise levels at page 94; to wetlands at page 100; and to groundwater at page 101. The facility would have no emissions that would adversely affect air or water quality. Upon retirement of the proposed facility, the structures would be removed and the land would be restored to a useful, non-hazardous condition (see discussion of the Council's Retirement and Financial Assurance Standard at page 16).

The proposed facility would have beneficial economic consequences. The facility would offer local employment opportunities by providing up to 120 jobs during construction and up to 20 jobs during operation. Annual lease payments to the landowners in the wind facility lease area would supplement income from other farm operations without significantly reducing the land base available for farming practices. In addition, the proposed facility would provide significant property tax revenue to Sherman County.

The Council's standards address the potential social consequences of the KWP. In our discussion of the standards we explain how any adverse social consequences would be mitigated. The proposed facility would not cause any significant adverse impact on the ability of communities in the local area to provide services such as housing, health care, schools, police and fire protection, water and sewer, solid waste management, transportation and traffic safety (see discussion of the Council's Public Services Standard at page 89). The facility would avoid adverse impact to historic, cultural and archaeological resources (see discussion at page 87). The proposed facility would have no adverse impact on recreational opportunities in the local area (see discussion at page 59). We address public safety issues related to the proposed facility at page 62 (Public Health and Safety Standards for Wind Energy Facilities); at page 65 (restriction of public access to wind turbines); at page 66 (Siting Standards for Transmission Lines); at page 85 (Structural Standard); and at page 102 (Public Health and Safety). During construction and operation of the facility, the certificate holder

[60] App p. U-1
[61] App p. U-9

would minimize the generation of solid waste and wastewater and would properly dispose or recycle waste materials (see discussion at page 92).

The "energy consequences" of the proposed facility would be the generation of approximately 91 megawatts of electricity (average electric generating capacity) that would become available to meet local and regional energy needs. This electricity would be generated from a renewable source, which furthers the state's energy policy "to develop permanently sustainable energy resources" (ORS 469.010). To meet the on-site electrical loads (which would be less than 150 kilowatts), the facility would use electric service from the Wasco Electric Cooperative, which can accommodate the facility's electrical needs.

Compatibility with adjacent uses

For the reasons discussed above in reference to SCZO 5.8.16 (see page 35), the facility is compatible with farm use, would not seriously interfere with accepted farm practices on adjacent land and would not materially alter the overall land use pattern of the area.

Conclusions of Law

Based on the foregoing findings of fact, reasoning, proposed conditions and conclusions, the Council finds that the proposed facility does not comply with SCZO Sections 3.1.4 and 5.8.16(d) and therefore does not comply with the applicable substantive criteria from Sherman County. Accordingly, the Council must proceed with its land use analysis under ORS 469.504(1)(b)(B). The Council finds that the proposed facility does not comply with OAR 660-033-0130(22) and therefore does not comply with the applicable statewide planning goal (Goal 3). The Council finds that an exception to Goal 3 is justified under ORS 469.504(2)(c). The Council finds that a site certificate for the facility should include Conditions (11), (13), (14), (29), (39), (40), (41), (42), (43), (44), (45), (46), (47), (53), (57), (58), (76), (81), (82), (89), (98), (100) and (104).[62] Based on these findings and conditions, the Council concludes that the proposed facility complies with the Land Use Standard.

(b) Soil Protection

OAR 345-022-0022

To issue a site certificate, the Council must find that the design, construction, operation and retirement of the facility, taking into account mitigation, are not likely to result in a significant adverse impact to soils including, but not limited to, erosion and chemical factors such as salt deposition from cooling towers, land application of liquid effluent, and chemical spills.

Findings of Fact

KIII provided evidence regarding soil impacts in Exhibit I of the application. The analysis area for the Soil Protection standard is the area within the site boundary.

Adverse impacts to soils can affect crop production on adjacent agricultural lands, native vegetation, fish and wildlife habitat and water quality. Construction and operation of the facility could have soil impacts such as erosion, compaction and chemical spills. Because

[62] Conditions 42, 43, 47, 81 and 98 in the proposed order included the Department's recommended revisions to those conditions as stated in the draft proposed order.

a wind facility does not have a cooling tower or liquid effluent, there is no potential for salt deposition.

KIII identified the near surface soils in the analysis area using the U.S. Soil Conservation Service Soil Survey of Sherman County, Oregon. Soil types are listed in Table I-1 of the application. Soils noted for high erosion potential in the analysis area include Anderly silt loams, Kuhl sandy loam and Mikkalo silt loams.[63] Based on a comparison of the soil map (App Figure I-1) with the site boundary map (Figure K-1), it appears that construction at some of the proposed turbine and access road locations would occur in areas of high erosion potential. Much of the land surrounding the project site is cropland, which is subject to erosion from agricultural activities.

A. Impacts during Construction

Wind and water erosion is of concern on both the project site and within temporarily disturbed areas. Construction of the energy facility would include removal of surface vegetation, grading and leveling operations and the use of large cranes and other heavy equipment that would temporarily increase the potential for soil erosion. Installation of underground communications and power collection systems would require trenching that could expose the affected areas to increased erosion risk.

Heavy equipment movement, car and truck traffic and component laydown during construction could cause soil compaction. Soil compaction in relation to this standard is a concern where it could reduce agricultural productivity or interfere with revegetation. During construction, approximately 97 acres would be temporarily disturbed for laydown and staging areas, turbine-string turn-around areas, parking and other construction-related uses.

There is a risk of chemical spills during construction from fuels, oils and grease associated with operation of construction equipment. Federal law (40 CFR 112) requires the operators of facilities that store quantities of oil and engage in refueling operations onsite to develop and implement a Spill Prevention, Control, and Countermeasure Plan during construction and operation.

B. Impacts during Operation

Operation of the facility would have little impact on soils. Precipitation could result in surface water collecting on structures and on concrete or gravel surfaces. Drainage from those areas could erode nearby soils. In addition, repair or maintenance of underground communications or power collection lines could expose soils to increased erosion. Small amounts of chemicals such as lubricating oils and cleaners for the turbines and herbicides for weed control would be used at the facility site and present a risk to soils from accidental spills.

C. Impacts during Retirement

Retirement would cause soil disturbance similar to construction. Use of trucks and heavy equipment could compact soils and temporarily increase the potential for soil erosion during removal of equipment, dismantling turbines, demolishing foundations and grading. Disturbance or removal of vegetation would expose soils to greater risk of wind and water

[63] App Table I-1.

erosion. Site restoration would be carried out subject to the terms of a final retirement plan approved by the Council, which would include measures for protection of the environment during the retirement process.

D. Control and Impact Mitigation Measures

The KWP would be subject to the requirements of the NPDES Storm Water Discharge General Permit (1200-C) and associated Erosion and Sediment Control Plan (Condition (76)). The Erosion and Sediment Control Plan would describe best management practices for erosion and sediment control and would be subject to DEQ approval. Construction truck traffic would be limited to existing and improved road surfaces to avoid soil compaction (Condition (77)). Gravel or other non-erosive covering would be spread on turbine pad areas immediately after soil exposure during construction (Condition (78)). All areas of temporary disturbance would be restored upon completion of construction (Condition (81)). During operation, facility staff would regularly inspect all project areas for signs of erosion or sedimentation and, as necessary, maintain or repair erosion control measures (Condition (82)). Measures would be taken to avoid accidental spills of hazardous materials and to remedy any spills that occur as discussed at page 92.

Conclusions of Law

The Council finds that the design, construction, operation and retirement of the proposed facility, taking into account mitigation and subject to the conditions stated in this order, are not likely to result in a significant adverse impact to soils. The Council finds that a site certificate for the facility should include Conditions (76), (77), (78), (81) and (82). Based on these findings and conditions, the Council concludes that the proposed facility complies with the Soil Protection Standard.

(c) Protected Areas

OAR 345-022-0040

(1) Except as provided in sections (2) and (3), the Council shall not issue a site certificate for a proposed facility located in the areas listed below. To issue a site certificate for a proposed facility located outside the areas listed below, the Council must find that, taking into account mitigation, the design, construction and operation of the facility are not likely to result in significant adverse impact to the areas listed below. Cross-references in this rule to federal or state statutes or regulations are to the version of the statutes or regulations in effect as of August 28, 2003:

(a) National parks, including but not limited to Crater Lake National Park and Fort Clatsop National Memorial;

(b) National monuments, including but not limited to John Day Fossil Bed National Monument, Newberry National Volcanic Monument and Oregon Caves National Monument;

(c) Wilderness areas established pursuant to The Wilderness Act, 16 U.S.C. 1131 et seq. and areas recommended for designation as wilderness areas pursuant to 43 U.S.C. 1782;

(d) National and state wildlife refuges, including but not limited to Ankeny, Bandon Marsh, Baskett Slough, Bear Valley, Cape Meares, Cold Springs, Deer Flat, Hart Mountain, Julia Butler Hansen, Klamath Forest, Lewis and Clark, Lower Klamath, Malheur, McKay Creek, Oregon Islands, Sheldon, Three Arch Rocks, Umatilla, Upper Klamath, and William L. Finley;

(e) National coordination areas, including but not limited to Government Island, Ochoco and Summer Lake;

(f) National and state fish hatcheries, including but not limited to Eagle Creek and Warm Springs;

(g) National recreation and scenic areas, including but not limited to Oregon Dunes National Recreation Area, Hell's Canyon National Recreation Area, and the Oregon Cascades Recreation Area, and Columbia River Gorge National Scenic Area;

(h) State parks and waysides as listed by the Oregon Department of Parks and Recreation and the Willamette River Greenway;

(i) State natural heritage areas listed in the Oregon Register of Natural Heritage Areas pursuant to ORS 273.581;

(j) State estuarine sanctuaries, including but not limited to South Slough Estuarine Sanctuary, OAR Chapter 142;

(k) Scenic waterways designated pursuant to ORS 390.826, wild or scenic rivers designated pursuant to 16 U.S.C. 1271 et seq., and those waterways and rivers listed as potentials for designation;

(L) Experimental areas established by the Rangeland Resources Program, College of Agriculture, Oregon State University: the Prineville site, the Burns (Squaw Butte) site, the Starkey site and the Union site;

(m) Agricultural experimental stations established by the College of Agriculture, Oregon State University, including but not limited to:

Coastal Oregon Marine Experiment Station, Astoria
Mid-Columbia Agriculture Research and Extension Center, Hood River
Agriculture Research and Extension Center, Hermiston
Columbia Basin Agriculture Research Center, Pendleton
Columbia Basin Agriculture Research Center, Moro
North Willamette Research and Extension Center, Aurora
East Oregon Agriculture Research Center, Union
Malheur Experiment Station, Ontario
Eastern Oregon Agriculture Research Center, Burns
Eastern Oregon Agriculture Research Center, Squaw Butte
Central Oregon Experiment Station, Madras
Central Oregon Experiment Station, Powell Butte
Central Oregon Experiment Station, Redmond
Central Station, Corvallis
Coastal Oregon Marine Experiment Station, Newport
Southern Oregon Experiment Station, Medford

Klamath Experiment Station, Klamath Falls;

(n) Research forests established by the College of Forestry, Oregon State University, including but not limited to McDonald Forest, Paul M. Dunn Forest, the Blodgett Tract in Columbia County, the Spaulding Tract in the Mary's Peak area and the Marchel Tract;

(o) Bureau of Land Management areas of critical environmental concern, outstanding natural areas and research natural areas;

(p) State wildlife areas and management areas identified in OAR chapter 635, Division 8.

Findings of Fact

KIII provided evidence about potential impacts to protected areas in Exhibit L of the application. The analysis area for the Protected Areas Standard is the area within the site boundary and 20 miles from the site boundary, including areas outside the state.

The proposed facility would not be located within any protected area designated under OAR 345-022-0040(1). The applicant identified 15 federal and state management areas within 20 miles of the proposed facility site.[64] Of the 15 areas identified by the applicant, 11 are protected areas according to the list in OAR 345-022-0040.[65] The following table shows the 11 protected areas, a reference to the applicable subparagraph of OAR 345-022-0040(1), the approximate distance and direction of each protected area from the proposed facility site and the state in which the area is located:

[64] Table L-1, App Supp Tab L, p. L-2.

[65] The applicant's list included Goldendale Observatory State Park, Maryhill State Park and Badger Gulch Natural Area Preserve, which are state parks and natural areas in Washington that are not listed in OAR 345-022-0040. The applicant also included the JS Burres State Recreation Site, which is owned by the State of Oregon but managed by the BLM as the "Cottonwood Recreation Site." It therefore is neither an Oregon State Park (OAR 345-022-0040(h)) nor a BLM protected area (OAR 345-022-0040(o)).

Table 4: Protected Areas within 20 Miles

Protected Area	Rule Reference	Distance (Miles)	Direction from KWP	State
Columbia River Gorge National Scenic Area	(g)	12.2	NW	Oregon Washington
Deschutes River State Recreation Area	(h)	12.9	NW	Oregon
Heritage Landing Day Use Area	(h)	13.5	NW	Oregon
Deschutes Federal Wild and Scenic River	(k)	8.0	W	Oregon
Deschutes State Scenic Waterway (Pelton Dam to Columbia River)	(k)	8.1	W	Oregon
Lower Deschutes Wildlife Area	(p)	7.4	W	Oregon
John Day Wildlife Refuge	(d)	0.8	E	Oregon
John Day Federal Wild and Scenic River	(k)	1.0	E	Oregon
John Day State Scenic Waterway (Parrish Creek to Tumwater Falls)	(k)	1.1	E	Oregon
Columbia Basin Agriculture Research Center (Moro)	(m)	5.0	SW	Oregon
Horn Butte Area of Critical Environmental Concern	(o)	19.3	E/NE	Oregon

A. Noise

Construction activities are likely to produce short-duration noise levels ranging from approximately 70 dBA to 98 dBA at a distance of 50 feet from the noise source.[66] At the closest point, construction noise sources would be at least 0.8 miles from the boundary of the John Day Wildlife Refuge. At this distance, the loudest construction activity (98 dBA at 50 feet) would produce noise levels of no more than 59 dBA. With the attenuation effects of intervening topography, the noise level is likely to be lower, in the range of 39 dBA to 49 dBA. It is unlikely that this level of noise would cause significant disturbance to wildlife in the Refuge.[67]

B. Traffic

Construction traffic would access the site along US 97 from Biggs Junction at I-84 and from the south. From US 97, construction-related vehicles would follow OR 206 to reach Wasco and would use local Sherman County roads to reach the site. Facility construction is anticipated to take about nine months and employ an estimated 100 to 120 workers at peak construction periods. In addition to travel by construction workers, construction traffic would include deliveries of heavy equipment, building materials and turbine components. KIII anticipates that construction traffic could cause traffic delays on US 97 and local roads that might adversely affect access on these routes to the protected areas along the John Day River corridor (John Day Wildlife Refuge, John Day Federal Wild and Scenic River and John Day State Scenic Waterway). Access to other protected areas would not be affected by construction traffic. The Council finds that traffic delays affecting access to protected areas

[66] App Appendix X-1, p. 11.
[67] Memorandum from Dana Siegfried, David Evans and Associates, dated November 11, 2005.

along the John Day River would not result in a significant adverse impact on those areas and that access to other protected areas would be unaffected by construction-related traffic.

During operation, the proposed facility would employ 15 to 20 people. Road use by employees, combined with road use for deliveries and other facility-related purposes, is not likely to have a significant impact on local road traffic. The Council finds that local facility-related road use during operation of the proposed facility would not result in a significant adverse impact on any protected area.

C. Water Use and Wastewater Disposal

Construction and operation of the proposed facility would not result in a significant adverse impact on water quantity or water quality within any protected area. During construction, water would be used primarily for dust suppression and for mixing concrete. An estimated 18 million gallons of water would be used during construction. The water would be acquired by a contractor and trucked in from offsite sources that would not require a new or transferred water right. All water used during construction would be lost on or very near the site, primarily through evaporation. No water used on the site would be discharged into wetlands, lakes, rivers or streams. There would be no impact on any protected area.

During the operations phase, water would be used for sanitary purposes at the O&M facility and possibly for turbine blade-washing. Water for these purposes would be supplied from an on-site well. Sanitary wastewater would be discharged to an on-site septic system. Water used for blade-washing would evaporate on site. There would be no impact on any protected area.

The Council finds that water use and disposal during construction and operation of the proposed facility would not result in a significant adverse impact on water quantity or water quality within any protected area.

D. Visual Impacts

Wind energy facilities have no emissions to affect air quality or visibility. Visual impacts would result from the visibility of wind turbine structures from locations within a protected area that might adversely affect a visual resource for which the area is designated as protected. In evaluating the visual impact of wind turbines on protected areas near the Stateline Wind Project, the Council found that the view of the turbines would not be significant at distances of five miles or more from the site (Final Order for the Stateline Wind Project, p. 48). Although the turbine towers for the proposed KWP are taller than those in operation at Stateline (approximately 80 meters at hub height compared to 50 meters for the Stateline turbines), the difference would not be significant when viewed from a distance of five miles or more.

Portions of the areas identified in Table 4 that lie along the John Day River are within five miles from the site. Portions of the John Day Wildlife Refuge are within five miles of the proposed facility, but the wildlife refuge area is protected because it provides wildlife habitat, and it is not managed primarily for its scenic views. The John Day Federal Wild and Scenic River and the John Day State Scenic Waterway are managed, in part, for outstanding scenic quality. KIII used computer modeling to determine what parts of the KWP would be visible from the John Day River. The applicant found that the tops of some turbine towers would be "intermittently visible" from the river between river miles 15.2 and 16.8. More of the project

would be visible from higher locations on the river canyon walls with the highest likelihood of project visibility occurring downstream of the McDonald Crossing (river mile 20.7).

The Council finds that although parts of the KWP might be visible from some locations within protected areas along the John Day River, the visual impact of the facility would not result in a significant adverse impact to these protected areas. In addition, the Council finds that the visual impact of the proposed facility, if it is visible at all, would be insignificant in protected areas located five miles or more from the facility.

Conclusions of Law

The Council finds that the proposed facility is not located in a protected area as listed in OAR 345-022-0040 and that the design, construction and operation of the proposed facility, taking into account mitigation and subject to the conditions stated in this order, are not likely to result in significant adverse impact to any protected area. The Council finds that a site certificate for the facility should include Conditions (98), (99) and (100). Based on these findings and conditions, the Council concludes that the proposed facility complies with the Protected Areas Standard.

(d) Scenic and Aesthetic Values

OAR 345-022-0080

(1) Except for facilities described in section (2), to issue a site certificate, the Council must find that the design, construction, operation and retirement of the facility, taking into account mitigation, are not likely to result in significant adverse impact to scenic and aesthetic values identified as significant or important in applicable federal land management plans or in local land use plans in the analysis area described in the project order.

***

Findings of Fact

KIII provided evidence about potential impacts to scenic and aesthetic values in Exhibit R of the application.[68] The analysis area for the Scenic and Aesthetic Values Standard is the area within the site boundary and 30 miles from the site boundary, including areas outside the state. In applying this standard, the Council focuses on the effects of facility structures on "scenic and aesthetic values identified as significant or important in applicable federal land management plans or in local land use plans in the analysis area."

The tallest structures that would be part of the proposed KWP are the turbine towers, and these structures, therefore, are the visual elements of the facility more likely to be visible from a distance. In evaluating the visual impact of wind turbines on protected areas near the Stateline Wind Project, the Council found that the view of the turbines would not be significant at distances of five miles or more from the site (Final Order for the Stateline Wind Project, p. 48). Although the turbine towers for the proposed KWP are taller than those in operation at Stateline (approximately 80 meters at hub height compared to 50 meters for the Stateline turbines), the difference would not be significant when viewed from a distance of five miles or more.

[68] Exhibit R (Revised September 16, 2005), App Supp, Tab R.

A. Visual Features of the Site and the Proposed Facility

The proposed KWP site occupies an overall area of approximately 23 square miles. Within that area, up to 165 wind turbine towers and tower pad areas, approximately 19 miles of new access roads, an O&M building, two new substations and up to nine miles of aboveground transmission line would be constructed on approximately 64 acres of land. Turbines would be arrayed in "strings" spaced about a mile apart. The turbine towers would be approximately 80 meters (263 feet) tall at the turbine hub, with an overall height of 121 meters (397 feet) including the length of the turbine blades. The towers would be smooth, tubular steel structures painted a neutral gray or white color, and other facility structures would be painted in a neutral color to blend with the surrounding landscape (Conditions (98) and (99)). Turbine tower lighting required by the FAA would make the facility visible at night.[69] In addition, three meteorological towers would be built. The meteorological towers would be non-guyed steel towers, approximately 80 meters tall.

A proposed 3.5-mile, 230-kV transmission line would be supported on wood or steel poles approximately 110 feet tall, and up to 5.5 miles of aboveground collector line would be supported on shorter wood or steel poles. The O&M building would cover approximately 5,000 square feet. The proposed substation near Schoolhouse would occupy approximately 4 acres of land, and the proposed substation near Webfoot would occupy a portion of a 4-acre parcel on which the O&M building would be located.

B. Effect on Identified Scenic Values

KIII considered the following managed areas within the analysis area for potential scenic values:[70]

[69] The FAA has recently issued guidance regarding daytime and nighttime visibility of wind energy facilities. James W. Patterson, Jr., *Development of Obstruction Lighting Standards for Wind Turbine Farms* (FAA, November 2005).

[70] OAR 345-022-0080 requires consideration of "applicable federal land management plans," which would include areas such as National Forests or National Wildlife Refuges, and "local land use plans," which would include tribal lands, state lands, counties and incorporated cities in the analysis area.

Table 5: Land Management Areas

Area	Management	Location
Columbia River Gorge	Federal	Oregon Washington
John Day River	Federal/State	Oregon
Oregon National Historic Trail	Federal	Oregon
Lower Deschutes River	Federal/State	Oregon
Lower Klickitat River Wild and Scenic River	Federal	Washington
Spokane District (BLM)	Federal	Washington
Journey Through Time Scenic Byway	State	Oregon
Sherman County	County	Oregon
Wasco County	County	Oregon
Gilliam County	County	Oregon
Morrow County	County	Oregon
Klickitat County	County	Washington
Yakima County	County	Washington

Columbia River Gorge

The Columbia River Gorge National Scenic Area (CRGNSA) is a federally managed area. The management plan describes the area as "world renowned for its outstanding scenic beauty."[71] The plan identifies "key viewing areas" as areas that "are important public vantage points from which Gorge landscapes are viewed" and emphasizes protection of these areas. The plan further identifies areas of "landscape significance" as areas that are "both visually diverse and seen from important viewpoints."

The applicant listed the following "key viewing areas" in the Scenic Area and within the analysis area for the KWP: Interstate 84 (I-84), Historic Columbia River Highway, Washington State Route 14 (SR-14), the Columbia River and the Rowena Plateau. The applicant listed the following Scenic Travel Corridors within the analysis area: I-84, Historic Columbia River Highway, SR-14 and Washington State Route 142.

The applicant's visibility analysis indicated that some portion of the proposed facility might be visible from the CRGNSA but that "almost without exception, topography or vegetation would screen the proposed facility from view." Although it is possible that parts of the facility would be visible in the distant background from some areas, the visual impact of the facility would be a subordinate element of the landscape. The nearest boundary of the CRGNSA lies more than ten miles from the proposed KWP site. For these reasons, the Council finds that the proposed facility is not likely to result in a significant adverse impact to the important scenic values of the CRGNSA.

John Day River

The Bureau of Land Management (BLM) manages the John Day River Canyon as an "area of high visual quality" and has designated the area as a Visual Resource Management Class II resource.[72] The main stem of the river from its mouth at the Columbia River to river

[71] App Supp, Tab R, Appendix R-2, *Management Plan for the Columbia River Gorge National Scenic Area*.
[72] App Supp, Tab R, Appendix R-2, *John Day River Proposed Management Plan* (June 2000), p. 58.

mile 89 lies within the analysis area. This area is also a designated State Scenic Waterway. Two sites along the John Day River within the analysis area are identified as Special Management Areas: the Oregon Train Historic Sites at Fourmile Canyon and McDonald Crossing and the John Day River Canyon.

The applicant described the potential visual impact of the proposed facility on the John Day River area using computer modeling and visibility analyses, field investigation, interviews with local, state and federal agency staff and visual simulations. Portions of the proposed facility would be visible from the river within the John Day River Canyon between river mile 15 and 17 and from areas near McDonald Crossing. Regarding protection of visual resources of the John Day and Deschutes river canyons, the BLM prioritizes areas "normally seen from these rivers."[73] Portions of the facility would be visible from many vantage points at higher elevation along the canyon walls, but these areas have limited access. The Oregon Parks and Recreation Department administers the state's Scenic Waterways Act, and its regulations are aimed at maintaining the scenic qualities as seen from the river.[74]

The applicant's modeling showed that portions of ten turbines would be visible from the John Day River at different vantage points. The applicant then identified five viewpoints that represented locations from which the most turbines would be visible at any given time ("worst case scenarios"). The nearest visible turbine would be more than two miles away from any of the five viewpoints. The applicant provided visual simulations, showing that in most cases only the blade tips would be visible above the ridgeline as viewed from the river.[75] The visual impact of the facility in these "worst case" examples would be a very small element within the landscape. The impact would affect only a few small segments of the John Day River. For these reasons, the Council finds that construction and operation of the facility would not result in significant adverse impact to the significant or important scenic and aesthetic values within the John Day River area.

Oregon National Historic Trail

The Oregon National Historic Trail received federal designation to commemorate the historic travel route and to promote its preservation, interpretation and public use and appreciation. The Trail passes through six states and covers 2,130 miles. Within the analysis area are five "high potential" sites: Fourmile Canyon, John Day River Crossing, Biggs Junction, Deschutes River Crossing and The Dalles Complex. The management plan does not identify specific scenic or aesthetic values beyond these five sites. "High potential" sites are sites that have potential to interpret the Trail's historical significance, that afford a high-quality recreational experience and greater than average scenic values.

Based on modeling results, field investigation and interviews with Oregon Department of Parks and Recreation staff, the applicant found that the proposed KWP would be visible from only one of the five high-potential sites in the analysis area. Portions of four KWP turbines would be visible from the John Day River and at locations along its banks at the John Day River Crossing (McDonald Ford), although the facility would not be visible from the

[73] App Supp, Tab R, Appendix R-2, *Two Rivers Resource Management Plan: Record of Decision* (June1986), p. 32.
[74] See, for example, *The Oregon Scenic Waterways Program: A Landowner's Guide* (Oregon Parks and Recreation Department).
[75] App Supp, Tab R, Figures R-18 through R-22.

BLM interpretive site near the crossing. The applicant provided a visual simulation, showing that only the blade tips of the turbines would be visible above the ridgeline as viewed from the river. The Council finds that, where visible at all, the KWP is not likely to result in significant adverse impact to the scenic quality of the John Day River Crossing site or the overall scenic values associated with the Oregon National Historic Trail.

Lower Deschutes River

The Lower Deschutes River is a Federal Wild and Scenic River and an Oregon State Scenic Waterway. Based on modeling results, field investigation and interviews with BLM and Oregon Department of Parks and Recreation staff, the applicant found that the proposed KWP would not be visible from the Lower Deschutes River Canyon. The closest wind turbines to any part of the Lower Deschutes River Canyon would be at least seven miles away. The Council finds that the proposed KWP would therefore not have any significant impact on visual resources along the designated Deschutes River resource areas.

Lower Klickitat River Wild and Scenic River

The lower ten miles of the Klickitat River is a Federal Wild and Scenic River. The KWP would not be visible from any part of the designated area. The area lies entirely in the State of Washington approximately 30 miles from the KWP site.

Spokane District (BLM)

The applicant states that the BLM lands within the Spokane District are not managed for scenic quality, based on an interview with BLM staff. There is a wildflower viewing area more than 25 miles from the KWP site, but the KWP would not have any adverse impact on viewing wildflowers in the area.

Journey Through Time Scenic Byway

The Journey Through Time Tour Route is managed by the Oregon Department of Transportation. It is an Oregon Scenic Byway running from Baker City to Biggs. Within the analysis area, the Byway follows US Highway 97. Although there are scenic areas along Highway 97, the Journey Through Time Tour Route Management Plan does not identify any significant or important scenic or aesthetic values in the analysis area. The goals of the management plan are primarily to create jobs and economic opportunities and to preserve the heritage and rural lifestyle of the communities along the route.

Sherman County

The Sherman County Comprehensive Plan identifies scenic resources within the County. In SCCP Section XI, Finding XI identifies “rock outcroppings, trees, the John Day River Canyon and the Deschutes River Canyon” as “important features of the County’s landscape. The Finding also notes “scenic highway” designations by ODOT. The related goal is SCCP Goal X: “Preserve the integrity of the Sherman County Landscape.” The single policy under this goal is: “Trees should be considered an important feature of the landscape and therefore the County Court shall encourage the retention of this resource when practical.” The proposed KWP would not require the removal of any trees. The Council finds that the proposed KWP would not result in a significant adverse impact to the scenic resources identified in the local Sherman County land use plan.

The visual impacts of the proposed facility on the Deschutes and John Day River Canyons and on US Highway 97 have been described above. In addition, the SCCP identifies

I-80 and Oregon Highways 206 and 216 as scenic highways, but ODOT does not list these routes as state or federal "scenic byways."[76]

Sherman County has already approved conditional use permits for the Klondike I and II wind energy projects. In approving Klondike II, the County Planning Commission found the wind project to be "consistent with Section XI of the County Comprehensive Plan."[77]

Wasco County

The applicant states that the Wasco County Comprehensive plan identifies the following "outstanding scenic and recreational areas": the Columbia River Gorge, areas within the Deschutes River canyon or designated as a state scenic waterway, areas seen from the John Day River or designated as a state scenic waterway, Rock Creek Reservoir, Pine Hollow Lake and lands within the White River Canyon. The visual impacts of the proposed facility on the Columbia Gorge and on the Deschutes and John Day River Canyons have been described above. White River Falls State Park lies just at the edge of the 30-mile analysis area, although most of the White River Canyon itself is not within the analysis area. The Council finds that the proposed facility is unlikely to have a significant impact on the visual qualities of the White River Canyon due to the distance from the site and intervening topography. The nearest parts of Wasco County are eight miles or more from the proposed KWP. The Council finds that the proposed facility would not have a significant adverse effect on important scenic resources in Wasco County.

Gilliam County

The applicant states that the Gilliam County Comprehensive Plan, Part 5, identifies "rock outcroppings marking the rim and walls of steep canyon slopes" as important scenic resources. The Council finds that the proposed KWP is not likely to have a significant impact on viewing rock outcroppings and scenic canyons in Gilliam County. In addition, the Plan identifies the John Day River corridor as a scenic resource. The visual impact of the proposed facility on the John Day River Canyon has been described above. The nearest parts of Gilliam County are east of the John Day River, at least two miles from the KWP site.

Morrow County

Based on personal communication with Morrow County Planning Director Carla McLane, the applicant states that there are no significant or important scenic values within the analysis area that are identified by the Morrow County Comprehensive Plan. The nearest parts of Morrow County are at least 20 miles from the KWP site.

Klickitat County

Klickitat County, Washington, lies north of Sherman County on the north side of the Columbia River. Based on personal communication with Klickitat County Planning Director Curt Dryer, the applicant states that there are no significant or important scenic values within the analysis area that have been identified by Klickitat County. The nearest parts of Klickitat County are at least nine miles from the KWP site.

[76] ODOT website, http://egov.oregon.gov/ODOT/HWY/SCENICBYWAYS/proponets.shtml (October 17, 2005)
[77] Planning Commission Order, June 3, 2004, p. 9.

Yakima County

The portion of Yakima County, Washington, that is within the analysis area is completely within the Yakama Reservation. The applicant states that the Yakama have no land management plan that identifies significant or important scenic values and that the Yakima County Policy Plan does not identify specific scenic resources within the analysis area. The nearest parts of Yakima County are approximately 25 miles from the KWP site.

Conclusions of Law

The Council finds that the design, construction, operation and retirement of the facility, taking into account mitigation, are not likely to result in significant adverse impact to scenic and aesthetic values identified as significant or important in applicable federal land management plans or in local land use plans in the analysis area. The Council finds that a site certificate for the facility should include Conditions (98), (99) and (100). Based on these findings and conditions, the Council concludes that the proposed facility complies with the Scenic and Aesthetic Values Standard.

(e) Recreation

OAR 345-022-0100

(1) Except for facilities described in section (2), to issue a site certificate, the Council must find that the design, construction and operation of a facility, taking into account mitigation, are not likely to result in a significant adverse impact to important recreational opportunities in the analysis area as described in the project order. The Council shall consider the following factors in judging the importance of a recreational opportunity:

(a) Any special designation or management of the location;

(b) The degree of demand;

(c) Outstanding or unusual qualities;

(d) Availability or rareness;

(e) Irreplaceability or irretrievability of the opportunity.

* * *

Findings of Fact

A. Recreational Opportunities in the Analysis Area

KIII provided information about compliance with the Council's Recreation Standard in Exhibit T of the application. The analysis area for the Recreation Standard is the area within the site boundary and five miles from the site boundary.

Recreational opportunities within the analysis area include upland bird and big game hunting, rafting, boating, fishing, sightseeing, nature and wildlife photography, bicycling, horseback riding, hiking and camping. Within the site boundary, there may be some opportunity for bird or deer hunting on private property with permission of the landowner. In addition, historic trail alignments might be viewed from county roads.

KIII identified the following recreational opportunities in the analysis area and assessed their importance based on the factors listed in OAR 345-022-0100:

John Day River

The analysis area contains a segment of the John Day River (approximately from river mile 5 to river mile 26). This segment is included within both federal and state special designations as a Federal Wild and Scenic River and a State Scenic Waterway. In addition, the segment is included in the state-designated John Day Wildlife Refuge. There are two developed Bureau of Land Management day use areas along the John Day within the analysis area: the Oregon Trail Interpretive Site near McDonald Crossing and the Rock Creek recreation area.

Recreational activities in this segment of the John Day include primarily boating, rafting and fishing and may also include bird hunting, sightseeing and nature photography. Demand (or usage) may be considered moderate to high. Outstanding recreational values are associated with the river's scenic, fish and wildlife, geological, paleontological and archaeological attributes as well as significant botanical and ecological features. Based on these qualities and the location and setting, the recreational opportunity may be considered uncommon and irreplaceable. The Council finds that this segment of the John Day River is an important recreational opportunity.

Journey Through Time Scenic Byway

A portion of US Highway 97 is a state-designated Scenic Byway, including a segment that runs through the analysis area (approximately from milepost 0 to milepost 36). The designation is based on the history of the area. There are no developed scenic overlooks or waysides in the analysis area. The associated recreational activity is sightseeing, and the demand may be considered moderate, although the availability of scenic views in the area is common. Nevertheless, because the segment of the highway within the analysis area is unique, it may be considered irreplaceable. The Council finds that this segment of the Journey Through Time Scenic Byway is an important recreational opportunity.

Historic Trail Alignments

The Oregon Trail and the Barlow Road Cutoff Trail run through the analysis area, including portions within the site boundary. Most of the area within the analysis area has been developed, primarily for agriculture. Development has largely obliterated visible evidence of these historic trails in the analysis area. There are no intact trail segments within the site boundary, and the only accessible intact segment within the analysis area is near the McDonald Crossing within the John Day River corridor. The recreational opportunity is limited to visiting and viewing the approximate historic alignments from county roads.

The historic trail alignments are outstanding because of their historical significance. Demand (or interest) in the alignments may be considered moderate. The opportunity to view developed areas of the alignment is common and replaceable, although views of intact segments are rare and irreplaceable. The Council finds that the historic trail alignments are important recreational opportunities.

Sherman County Historical Museum

The Sherman County Historical Museum is located in Moro, the county seat. The associated recreational opportunity is sightseeing (and the educational value of viewing

historic artifacts). Demand is low to moderate, based on reported visitor use. The opportunity may be considered neither rare nor irreplaceable, due to the existence of other similar historical museums outside the analysis area. The Council finds that the Sherman County Historical Museum is not an "important" recreational opportunity and that the design, construction and operation of the proposed KWP would have no effect on the museum as a recreational opportunity.

Sherman County Fairgrounds and RV Park

The Sherman County Fairgrounds and RV Park are located in Moro. The associated recreational opportunities are the sightseeing (events at the fairgrounds) and possibly camping. Demand for this opportunity is low to moderate. There are no unusual or outstanding qualities, and the opportunity is common and replaceable. The Council finds that the Sherman County Fairgrounds and RV Park is not an important recreational opportunity according to the factors listed in the Recreation Standard.

DeMoss Springs Memorial Park

The DeMoss Springs Memorial Park is a county park located between Wasco and Moro on US Highway 97. It marks the location of the DeMoss family town site. The family settled at the site in 1883. Park facilities include two shelters, a picnic area and interpretive signs. The recreational opportunity is sightseeing. Demand is low to moderate. The park has no unusual or outstanding features. It may be considered uncommon, due to its local historic significance, but the recreational opportunity is not irreplaceable. The Council finds that the DeMoss Springs Memorial Park is not an important recreational opportunity according to the factors listed in the Recreation Standard.

Moro City Park

Moro City Park facilities include picnic tables, a playground and restrooms. Demand (usage) is low. The recreational opportunity has no outstanding or unusual qualities and is common and replaceable. The Council finds that the Moro City Park is not an important recreational opportunity according to the factors listed in the Recreation Standard.

Wasco City Park

Wasco City Park has no outstanding or unusual qualities and is common and replaceable. Demand (usage) is low. The Council finds that the Wasco City Park is not an important recreational opportunity according to the factors listed in the Recreation Standard.

Bird and Deer Hunting

Hunting in the analysis area occurs primarily in the John Day River corridor. Demand for this recreational opportunity is low to moderate. There are no unusual or outstanding features of the hunting opportunity in the analysis area, and many other locations for hunting exist outside the analysis area. This recreational opportunity is common and replaceable. The Council finds that the opportunity for hunting in the analysis area is not an important recreational opportunity according to the factors listed in the Recreation Standard.

B. Potential Impact on Important Recreational Opportunities

Based on the analysis above, the Council finds that important recreational opportunities exist within the analysis area associated with the following features: John Day River, Journey Through Time Scenic Byway and historic trail alignments. Design,

construction and operation of the proposed facility would have no direct effect on any recreation opportunities in the analysis area. The only recreation-related feature within the site boundary are segments of the historic trail alignments, but because there are no visible signs of the trails within the site boundary, the proposed wind energy facility would have no adverse impact on any physical remnant of the trails. The certificate holder would enhance the existing Oregon Trail historical marker near Biggs in cooperation with the Sherman County Historical Society (Condition (52)). Wind turbines might be visible from some locations within the John Day River corridor and along the Scenic Byway. Construction noise and wind turbine noise may be audible at some locations on segments of the historic trail alignments and within the John Day River corridor. Short-term traffic delays may occur on parts of the Scenic Byway due to construction traffic, but traffic impact during operation of the proposed KWP would be insignificant. These impacts are not likely to interfere significantly with the recreational opportunities for hunting, rafting, boating, fishing, sightseeing, nature and wildlife photography, bicycling, horseback riding, hiking or camping within the analysis area.

Conclusions of Law

The Council finds that the design, construction and operation of the proposed facility, taking into account mitigation and subject to the conditions stated in this order, are not likely to result in significant adverse impact to important recreational opportunities in the analysis area. The Council concludes that the proposed facility complies with the Recreation Standard. There are no conditions specifically related to this finding, but other conditions may serve to mitigate the impact of the facility on the enjoyment of recreational opportunities (for example, Conditions (52), (98), (99) and (100)).

(f) Public Health and Safety Standards for Wind Energy Facilities

OAR 345-024-0010

* * *

(2) To issue a site certificate for a proposed wind energy facility, the Council must find that the applicant:

(a) Can design, construct and operate the facility to exclude members of the public from close proximity to the turbine blades and electrical equipment;

(b) Can design, construct and operate the facility to preclude structural failure of the tower or blades that could endanger the public safety and to have adequate safety devices and testing procedures designed to warn of impending failure and to minimize the consequences of such failure.

Findings of Fact

Because the proposed facility would be located on private property, public access would be limited. Turbine towers would be located at least 450 feet from any residence or public road (Condition (59)). Turbine blade tips would be approximately 40 meters above ground at the closest point of rotation. Towers would be smooth steel structures with no exterior ladders or access to the turbine blades. Tower entry doors would be locked (Condition (60)). There would be no public access to the nacelles or turbine tower interiors or to the electrical equipment contained therein. Generator step-up transformers would be located within locked cabinets at the base of each tower (Condition (64)).

Towers and tower foundations, as well as aboveground transmission line support structures would be designed according to applicable building codes to avoid failure or collapse (Condition (54)). During construction, the certificate holder would follow manufacturers' recommended handling instructions and procedures to prevent damage to towers or blades that could lead to failure (Condition (61)).

The certificate holder would have an operational safety monitoring program and would inspect turbine blades on a regular basis for signs of wear (Condition (62)). All turbines would have self-monitoring devices, linked to sensors at the O&M building to alert operators to potentially dangerous conditions (Condition (63)).

Electric transformers and other equipment associated with the two proposed substations would be enclosed by a fence with a locked gate and otherwise be made inaccessible to the public (Condition (58)). Warning signs would be posted as required by law for the safety of the public (Condition (98)).

Conclusions of Law

The Council finds that KIII can design, construct and operate the facility to exclude members of the public from close proximity to the turbine blades and electrical equipment. The Council further finds that KIII can design, construct and operate the facility to preclude structural failure of the tower or blades that could endanger the public safety and to have adequate safety devices and testing procedures designed to warn of impending failure and to minimize the consequences of such failure. The Council finds that a site certificate for the facility should include Conditions (54), (58), (59), (60), (61), (62), (63), (64) and (98). Based on these findings and conditions, the Council concludes that the proposed facility complies with the Public Health and Safety Standards for Wind Energy Facilities.

(g) Siting Standards for Wind Energy Facilities

OAR 345-024-0015

To issue a site certificate for a proposed wind energy facility, the Council must find that the applicant:

(1) Can design and construct the facility to reduce visual impact by methods including, but not limited to:

(a) Not using the facility for placement of advertising, except that advertising does not include the manufacturer's label or signs required by law;

(b) Using the minimum lighting necessary for safety and security purposes and using techniques to prevent casting glare from the site, except as otherwise required by the Federal Aviation Administration or the Oregon Department of Transportation, Transportation Development Branch, Aeronautics Section; and

(c) Using only those signs necessary for facility operation and safety and signs required by law;

(2) Can design and construct the facility to restrict public access by the following methods:

(a) For a horizontal-axis wind energy facility with tubular towers, using locked access sufficient to prevent unauthorized entry to the interior of the tower;

(b) For a horizontal-axis wind energy facility with lattice-type towers:

(A) Removal of wind facility tower climbing fixtures to 12 feet from the ground;

(B) Installation of a locking, anti-climb device on the wind facility tower; or

(C) Installation of a protective fence at least 6 feet high with a locking gate; or

(c) For a vertical-axis wind energy facility, installation of a protective fence at least 6 feet high with a locking gate;

(3) Can design and construct facility to reduce cumulative adverse environmental impacts in the vicinity to the extent practicable by measures including, but not limited to, the following, where applicable:

(a) Using existing roads to provide access to the facility site, or if new roads are needed, minimizing the amount of land used for new roads and locating them to reduce adverse environmental impacts;

(b) Combining transmission lines and points of connection to local distribution lines;

(c) Connecting the facility to existing substations, or if new substations are needed, minimizing the number of new substations; and

(d) Avoiding, to the extent practicable, the creation of artificial habitat for raptors or raptor prey. Artificial habitat may include, but is not limited to:

(A) Above-ground portions of foundations surrounded by soil where weeds can accumulate;

(B) Electrical equipment boxes on or near the ground that can provide shelter and warmth; and

(C) Horizontal perching opportunities on the towers or related structures.

Findings of Fact

A. Visual Impact

The wind turbines would be mounted on tubular steel towers of uniform height. The towers would be uniformly painted a neutral gray or white color. No advertising signs would be posted at the facility. Turbine components may be printed with the manufacturer's logo. There would be no signs at the facility except signs required by law or necessary for health and safety purposes (Condition (98)).

Turbines would have the minimum lighting required by the Federal Aviation Agency including any revised guidelines. The O&M building would have low impact (focused downward) exterior lighting for safety and security purposes (Condition (100)).

B. Restriction of Public Access

Because the wind turbines would be located on private property, public access to the site would be limited. Each tower would have a locked entry door at ground level restricting access to authorized personnel (Condition (60)). The facility would be a horizontal-axis wind energy facility with tubular towers, and therefore OAR 345-024-0015(2)(b) and (c) do not apply.

C. Cumulative Environmental Effects

The proposed KWP (up to 165 turbines) is located near the Klondike I (16 turbines) and Klondike II (50 turbines) projects that are already in operation. In addition, a site certificate application for the proposed Biglow Canyon Wind Farm (up to 225 turbines) is currently under Council review. The nearby Biglow project site is north of the KWP site. If the maximum number of proposed KWP and Biglow wind turbines are approved and built, there would be a cumulative total of 456 wind turbines in the immediate area.

Access Roads

KIII considered and analyzed potential adverse environmental impacts in locating the proposed new access roads. The construction of new roads would be limited to locations within the lease boundary. In addition, improvements would be made to some existing public roads, including grading and graveling. Road construction and improvement would not significantly impact any wetlands, other waters of the state or fish and wildlife habitat.

Transmission Lines and Substations

Transmission lines to collect the power generated by individual wind turbines would be predominantly underground, although a maximum of 5.5 miles of collector line might be build aboveground due to geotechnical constraints. Approximately half of this line (18.3 miles) would be constructed within existing county road right-of-way. Power from the eastern section of the facility would be routed to a collector substation about 0.75 miles west of Webfoot. From this collector substation, aboveground power lines, hung on single wood or steel poles of a type similar to other power lines in the area, would carry the power approximately 3.5 miles to the BPA Klondike Schoolhouse Substation. Power from the western section of the facility would be routed underground to a new substation next to the BPA Klondike Schoolhouse Substation. There would be a single point of connection with the BPA transmission system at that substation.

Raptor Protection

The facility would be designed to avoid creating artificial habitat for raptors or raptor prey. Turbine pad areas would be graveled to reduce the potential for erosion and weed infestation (Condition (78)). An ongoing weed control plan would be implemented (Condition (89)). Pad-mounted transformers at each turbine would be designed to avoid use by raptors or prey species as artificial habitat (64)). The turbines will use tubular towers rather than lattice towers to avoid creating horizontal perching opportunities. All transmission support poles would conform to raptor protection guidelines recommended by the Avian Powerline Interaction Committee and would have anti-perching devices (Condition (90)). Meteorological towers will be free-standing 80-meter pole structures with no guy wires.

Conclusions of Law

The Council finds that the proposed design and construction of the KWP would reduce visual impact, restrict public access and reduce cumulative adverse environmental impacts in accordance with the requirements of OAR 345-024-0015. The Council finds that a site certificate for the facility should include Conditions (60), (64), (78), (89), (90) (98) and (100). Based on these findings and conditions, the Council concludes that the proposed facility complies with the Council's Siting Standards for Wind Energy Facilities.

(h) Siting Standards for Transmission Lines

OAR 345-024-0090

To issue a site certificate for a facility that includes any high voltage transmission line under Council jurisdiction, the Council must find that the applicant:

(1) Can design, construct and operate the proposed transmission line so that alternating current electric fields do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public;

(2) Can design, construct and operate the proposed transmission line so that induced currents resulting from the transmission line and related or supporting facilities will be as low as reasonably achievable.

Findings of Fact

This standard addresses safety hazards associated with electric fields around transmission lines.[78] The proposed KWP includes an aboveground 230-kV transmission line approximately 3.5 miles in length from the collector substation near Webfoot to a facility substation near the BPA Klondike Schoolhouse substation. This transmission line would run parallel to Klondike Lane but would lie outside the public right-of-way on private land. In addition, the proposed facility includes approximately 38 miles of 34.5-kV transmission line (collector line) to transport the power from each turbine to the substations. Most of the collector line would be underground, but up to 5.5 miles of the collector line might be built in aboveground segments.

The electric fields around transmission lines are directly proportional to the voltage in the transmission line and inversely proportional to distance from the line (the higher the voltage, the stronger the field; the greater the distance, the weaker the field). The Council has adopted a safety standard for electric field strength of not more than 9 kV per meter at one meter above the ground surface in areas accessible to the public (OAR 345-024-0090). In addition, electric fields can induce a voltage in objects within the electric field. Unless proper precautions are taken, induced voltages might result in an electric shock when a person or animal touches the object and creates a path for a current to flow to the ground. Grounding minimizes the danger by providing an alternative path for the electric current. Passing current through the grounding wire minimizes the current that would otherwise flow through a person or animal that comes in contact with the object. OAR 345-024-0090 requires certificate holders to design and operate transmission lines so that induced currents will be as low as reasonably achievable. The applicant calculated electric field strength using "Corona and

[78] Magnetic field effects are addressed below under Public Health and Safety in Section V.1(e).

Field Effect Program (Version 3)," a software tool developed by the Bonneville Power Administration.

Aboveground 230-kV Transmission Line

The applicant calculated that the average electric field beneath the aboveground 230-kV line would not exceed 2.6 kV per meter at one meter above ground.[79] The applicant intends to provide appropriate grounding of fences that are parallel to the transmission line and of any metal-roofed buildings in proximity to the line. The certificate holder would take appropriate precautions to minimize the risk of electric shock from induced currents (Conditions (18) and (87)).

Aboveground 34.5-kV Transmission Line

The aboveground 34.5-kV line would include segments of single-circuit or double-circuit line (Condition (84)). The maximum electric field at one meter above ground for single-circuit line is estimated to be 0.29 kV per meter and for double-circuit line, 0.7 kV per meter.[80] The certificate holder would take appropriate precautions to minimize the risk of electric shock from induced voltages (Conditions (18) and (87)).

Underground 34.5-kV Transmission Line

The proposed facility includes up to 38 miles of underground collector lines, which collect the electric power produced from each wind turbine and transmit that power to a substation. The applicant states that there would be no measurable electric field at the surface of the ground above the underground transmission lines, because the electric field would be contained within the insulation of the transmission cable. As explained by the applicant, "Each cable has a semi-conducting insulation shield, and a grounded concentric neutral made up of multiple strands of copper wire that encircle the cable just under the outer jacket."[81] Further, because there would be no electric field near them, the underground transmission lines would not pose a potential hazard from induced voltage.

Conclusions of Law

The Council finds that KIII can design, construct and operate the proposed transmission lines so that alternating current electric fields do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public. The Council further finds that KIII can design, construct and operate the proposed transmission lines so that induced currents resulting from the transmission lines and related or supporting facilities will be as low as reasonably achievable. The Council finds that a site certificate for the facility should include Conditions (18), (84) and (87). Based on these findings and conditions, the Council concludes that the proposed facility complies with the Siting Standards for Transmission Lines.

[79] App Supp, Tab AA, Item ii, and App Supp Tab AA, Item iii.
[80] App Supp, Tab AA, Item iv.
[81] App Supp, Tab AA, Item i.

4. Standards to Protect Wildlife

(a) Threatened and Endangered Species

OAR 345-022-0070

To issue a site certificate, the Council, after consultation with appropriate state agencies, must find that:

(1) For plant species that the Oregon Department of Agriculture has listed as threatened or endangered under ORS 564.105(2), the design, construction, operation and retirement of the proposed facility, taking into account mitigation:

(a) Are consistent with the protection and conservation program, if any, that the Oregon Department of Agriculture has adopted under ORS 564.105(3); or

(b) If the Oregon Department of Agriculture has not adopted a protection and conservation program, are not likely to cause a significant reduction in the likelihood of survival or recovery of the species; and

(2) For wildlife species that the Oregon Fish and Wildlife Commission has listed as threatened or endangered under ORS 496.172(2), the design, construction, operation and retirement of the proposed facility, taking into account mitigation, are not likely to cause a significant reduction in the likelihood of survival or recovery of the species.

Findings of Fact

KIII provided information about compliance with the Council's Threatened and Endangered Species Standard in Exhibit Q of the application. The analysis area for threatened or endangered plant[82] and wildlife species[83] is the area within the site boundary and 5 miles from the site boundary.

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[82] ORS 564.100 defines "endangered" and "threatened" plant species as follows:

"Endangered species" means:

(a) Any native plant species determined by the department to be in danger of extinction throughout any significant portion of its range.

(b) Any native plant species listed as an endangered species pursuant to the federal Endangered Species Act of 1973 (P.L. 93-205, 16 U.S.C. 1531 et seq.), as amended.

"Threatened species" means:

(a) Any native plant species the director determines by a finding of fact is likely to become an endangered species within the foreseeable future throughout any significant portion of its range.

(b) Any native plant species listed as a threatened species pursuant to the federal Endangered Species Act of 1973 (P.L. 93-205, 16 U.S.C. 1531 et seq.), as amended.

[83] ORS 496.004 defines "endangered" and "threatened" wildlife species as follows:

"Endangered species" means:

(a) Any native wildlife species determined by the commission to be in danger of extinction throughout any significant portion of its range within this state.

(b) Any native wildlife species listed as an endangered species pursuant to the federal Endangered Species Act of 1973 (P.L. 93-205, 16 U.S.C. 1531), as amended.

"Threatened species" means:

(a) Any native wildlife species the commission determines is likely to become an endangered species within the foreseeable future throughout any significant portion of its range within this state.

(b) Any native wildlife species listed as a threatened species pursuant to the federal Endangered Species Act of 1973 (P.L. 93-205, 16 U.S.C. 1531), as amended.

KIII contacted the U.S. Fish and Wildlife Service (USFWS) and the Oregon Natural Heritage Information Center (ONHIC) to request information on threatened, endangered and sensitive species within the 5-mile analysis area. KIII reviewed available wildlife literature and scientific data and contacted ODFW to request information on fish and wildlife habitat requirements and distribution in the area. In addition, KIII contacted the Oregon Department of Agriculture (ODA) for information about plant distribution and protection and conservation programs.

Plant Identification and Survey Protocol

Eagle Cap Consulting, Inc., conducted an investigation for rare plants in the analysis area.[84] The survey included a thorough literature review and consultation with USFWS, ONHIC and other sources. "Target" species for the investigation included plants listed at threatened or endangered by USFWS, as well as plants that have been formally proposed for federal listing. In addition, target species included all vascular plant taxa defined as threatened or endangered by the ODA and species contained on lists 1, 2 or 3 of the ONHIC rare plant lists.

The analysis area is predominantly cultivated agricultural land under dry land wheat production. A few native plant communities remain, mostly along the plateau margins and steep side slopes of Grass Valley Canyon. These areas consist of sagebrush and rabbitbrush-dominated shrub lands and native bunchgrass grasslands. Agricultural areas that are enrolled under the CRP occur as narrow strips in previously plowed drainage ways and as large blocks in other areas.

Eagle Cap performed field surveys in May 2005 and in May 2006. The 2005 field survey was designed to take in all ground potentially disturbed by construction or operation of the proposed KWP, including all land within at least 150 feet on both sides of the centerline of all proposed turbine strings, underground and overhead electrical lines and access roads (resulting in survey corridors at least 300 feet wide). The rare plant survey area also included the entire proposed disturbance footprint (plus an additional 150-foot buffer) of non-linear components (including staging areas, substation sites, etc.) and the proposed mitigation area. Table 1 in the Eagle Cap investigation report listed the target species.

At the request of the Department, the applicant hired Eagle Cap to perform a second field survey in 2006 in areas suitable for target plant species within the proposed micrositing corridors but not previously surveyed. The field investigation did not locate any rare plant target species within the survey area.[85]

No target plant species were found during the 2005 and 2006 field surveys, and the investigators found that the area had low potential to support any of these species. Based on the field surveys conducted by Eagle Cap, the design, construction, operation and retirement of the proposed KWP is unlikely to have any impact on state or federally listed threatened or endangered plant species within the areas searched.

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[84] Eagle Cap Consulting, *An Investigation of Rare Plant Resources Associated with the Proposed Klondike III Wind Project, Sherman County, Oregon,* App Supp, Tab Q, Item iii.

[85] Eagle Cap Consulting, *An Investigation of Rare Plant Resources Associated with the Expanded Analysis Area of the Proposed Klondike III Wind Project, Sherman County, Oregon* (May 12, 2006).

As recommended in the Eagle Cap report, the applicant proposed measures to mitigate possible indirect effects to plant species of concern in the vicinity. The proposed measures include a plan for control of noxious weeds (Condition (89)) and a comprehensive fire control plan (Condition (66)).

Fish and Wildlife Identification and Survey Protocol

KIII requested database information from the USFWS and the ONHIC on the potential for occurrence of threatened, endangered and sensitive species within the 5-mile analysis area (the area within the site boundary and five miles beyond the site boundary). In addition, KIII conducted a literature search and consulted with ODFW regarding species distribution and habitat requirements. Based on the literature review and consultations, KIII identified the threatened or endangered species that have the potential to exist in the analysis area. These species are listed in Table 6.

Table 6: Threatened and Endangered Species That May Occur in the Analysis Area

Species	Status
Birds	
Bald Eagle (*Haliaeetus leucocephalus*)	Federal and state threatened species
American Peregrine Falcon (*Falco peregrinus anatum*)	State endangered species; no federal listing
Mammals	
Washington Ground Squirrel	State endangered species; federal candidate species
Fish	
Steelhead – Mid-Columbia River ESU, summer run (Oncorhynchus mykiss)	Federal threatened species; state sensitive-vulnerable species
Steelhead – Snake River Basin ESU	Federal threatened species; no state listing
Steelhead – Upper Columbia River ESU	Federal endangered species; no state listing
Sockeye Salmon – Salmon River Tributary to the Snake River (Oncorhynchus nerka)	Federal endangered species; no state listing
Chinook Salmon – Snake River ESU, spring/summer and fall runs (Oncorhynchus tshawytscha)	Federal and state threatened species
Chinook Salmon – Upper Columbia River ESU	Federal endangered species

In addition to the literature review, the applicant performed wildlife surveys as described in the *Biological Protocol: Klondike III Wind Power Project: February 8, 2005* (App Appendix Q-6). In summary, these surveys included:

- Ground surveys consisting of walking transect searches within 1,000 feet of all project components in habitat suitable to "target species" (KIII developed the list of target species in consultation with ODFW. The target species were: bald eagle, peregrine falcon, golden eagle, burrowing owl, loggerhead shrike, all raptor species, long-billed curlew and white-tailed jackrabbit.)
- Nocturnal surveys to identify the presence of jackrabbits.

- Avian baseline survey: winter and spring avian use based on standard point counts and in-transit observations.[86]

- Avian baseline raptor nesting survey, consisting of two helicopter surveys within a two-mile radius of the project area (late May/early April and early June) and a ground survey in the vicinity of any Swainson's or ferruginous hawk nests observed during the aerial surveys. Additional raptor nest surveys will be conducted by the applicant in the spring of 2006.

In addition, the applicant analyzed existing mortality data for bats in the analysis area to evaluate the potential impacts to bat populations from construction and operation of the proposed facility.[87] The USFWS database lists seven "species of concern" bat species that have potential to occur within the analysis area.[88] Monitoring data from the first year of operation of the Klondike I wind power project identified six bat fatalities associated with the project and a statistical bat fatality rate of 1.16 bats per turbine per year. This rate is below the average bat fatality rate for new generation wind projects in the United States (1.5 per turbine per year) and comparable to the bat fatality rate at the Stateline Wind Project (1.12 per turbine per year).[89] Of the four Klondike I bat fatalities that could be identified by species, only one (silver-haired bat) is a "species of concern."[90]

Potential Impacts on Threatened or Endangered Wildlife Species

The proposed facility would have no significant impact on any of the fish species listed in Table 6 because of the lack of fish habitat within or near the site boundary. Suitable habitat for the Washington ground squirrel (WGS) includes native grassland and shrub-steppe habitat. Small areas of these habitat types occur within the site boundary, but there have been no reported sightings of WGS west of the John Day River. The ONHIC reported a single WGS sighting within the analysis area in 1979, approximately two miles from the site on the east side of the John Day River. Because there is little suitable habitat within the site boundary and there have been no reported WGS sightings on the west side of the John Day River, ODFW concluded that an on-site pre-construction survey for WGS is unnecessary.[91]

Bald Eagle

The bald eagle is a federal and state-listed threatened species. The critical nesting period for the bald eagle is from January 1 to August 15. Based on the literature, no bald eagle nests, roosting areas or critical habitat areas exist within the analysis area.

The bald eagle wintering period is from November 15 to March 15. Wintering bald eagles favor undisturbed areas where food is abundant. Wintering bald eagles may roost communally at night near major foraging areas, typically isolated areas within old growth

[86] Avian baseline surveys, including point counts and raptor nest surveys, were performed by ABR, Inc. and reported in *Baseline Avian Use at the Proposed Klondike III Wind Power Project, Oregon , Winter 2004 - Spring 2005, Final Report* (June 2005), App Supp, Tab P, Item viii.
[87] The applicant's analysis is in Exhibit P (App p. P-21).
[88] App Table P-2.
[89] *Stateline Wind Project Wildlife Monitoring Final Report, July 2001- December 2003,* p. 30.
[90] The silver-haired bat is designated as a federal species of concern (App Table P-2), and it is a state-listed "sensitive-undetermined" species (a species that may become threatened or endangered but whose status is unclear).
[91] E-mail from Rose Owens, ODFW, April 10, 2006.

stands. Winter raptor surveys conducted by ODFW and others in the vicinity of the proposed KWP have observed bald eagles feeding on wintering waterfowl along the Columbia River corridor but have not observed bald eagles in upland areas within or near the site boundary. No bald eagles were observed during the winter and spring avian baseline surveys in 2004-2005. Accordingly, the design, construction, operation and retirement of the proposed KWP are not expected to have any significant impact on bald eagles. Because nesting ranges and locations of bald eagles is constantly expanding, the certificate holder would review the ONHIC and USFWS databases and consult with Frank Isaacs, Oregon State University Cooperative Wildlife Unit, on an annual basis if construction of the proposed facility begins after 2006 (Condition (91)).

Peregrine Falcon

The peregrine falcon is a state-listed endangered species. The species was removed from the federal list of endangered and threatened wildlife on August 25, 1999. The critical nesting period for the peregrine falcon is mid-February through May. Peregrine falcons may occur in the analysis area year-round, but there are no known nest sites within the analysis area (the closest is about 6.5 miles from the facility site). Peregrine falcons prefer to nest on ledges found along river courses and other large bodies of water, but they will also use suitable nesting ledges on man-made structures. Prey species may exist within the site boundary where suitable habitat exists. Grain elevators in the vicinity support pigeons, which are likely prey for peregrine falcons. No peregrine falcons were observed during the winter and spring avian baseline surveys in 2004-2005. Accordingly, although the species may be present in the area, the design, construction, operation and retirement of the proposed KWP is not expected to have any significant impact on peregrine falcons. Because nesting ranges and locations of peregrine falcons is constantly expanding, the certificate holder would review the ONHIC and USFWS databases and consult with Frank Isaacs, Oregon State University Cooperative Wildlife Unit, on an annual basis if construction of the proposed facility begins after 2006 (Condition (91)).

Conclusions of Law

The Council finds that no conservation program applies and that the design, construction, operation and retirement of the proposed facility, taking into account mitigation and subject to the conditions stated in this order, do not have the potential to significantly reduce the likelihood of the survival or recovery of any threatened or endangered plant or wildlife species listed under Oregon law. The Council finds that a site certificate for the facility should include Conditions (66), (89) and (91). Based on these findings and conditions, the Council concludes that the proposed facility complies with the Threatened and Endangered Species Standard.

(b) Fish and Wildlife Habitat

OAR 345-022-0060

To issue a site certificate, the Council must find that the design, construction, operation and retirement of the facility, taking into account mitigation, are consistent with the fish and wildlife habitat mitigation goals and standards of OAR 635-415-0025 in effect as of September 1, 2000.

Findings of Fact

A. Mitigation Goals and Standards

ODFW has defined six categories of habitat in order of value to wildlife. The rule establishes mitigation goals and corresponding implementation standards for each habitat category. The habitat definitions contained in OAR 635-415-0025 are as follows.[92]

> *"Habitat Category 1" is irreplaceable, essential habitat for a fish or wildlife species, population, or a unique assemblage of species and is limited on either a physiographic province or site-specific basis, depending on the individual species, population or unique assemblage.*

The mitigation goal for Category 1 habitat is no loss of either habitat quantity or quality. This goal requires avoidance of impacts.

> *"Habitat Category 2" is essential habitat for a fish or wildlife species, population, or unique assemblage of species and is limited either on a physiographic province or site-specific basis depending on the individual species, population or unique assemblage.*

If impacts are unavoidable, the mitigation goal for Category 2 habitat is no net loss of either habitat quantity or quality *and* provision of a net benefit of habitat quantity or quality. The Council interprets this to mean that both habitat quantity and quality must be preserved and either habitat quantity or habitat quality must be improved. To achieve this goal, impacts must be avoided or unavoidable impacts must be mitigated through reliable "in-kind, in-proximity" habitat mitigation to achieve no net loss of either pre-development habitat quantity or quality.[93] In addition, a net benefit of habitat quantity or quality must be provided.

> *"Habitat Category 3" is essential habitat for fish and wildlife, or important habitat for fish and wildlife that is limited either on a physiographic province or site-specific basis, depending on the individual species or population.*

The mitigation goal for Category 3 habitat is no net loss of either habitat quantity or quality. The Council interprets this to mean that both habitat quantity and quality must be preserved. The goal is achieved by avoidance of impacts or by mitigation of unavoidable impacts through reliable "in-kind, in-proximity" habitat mitigation to achieve no net loss in either pre-development habitat quantity or quality.

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[92] The ODFW rules define habitat into two broad classifications of "essential" and "important." OAR 635-415-0005 defines "essential habitat" as "any habitat condition or set of habitat conditions which, if diminished in quality or quantity, would result in depletion of a fish or wildlife species." The rule defines "important habitat" as "any habitat recognized as a contributor to sustaining fish and wildlife populations on a physiographic province basis over time."

[93] OAR 635-415-0005 defines "in-kind habitat mitigation" as "habitat mitigation measures which recreate similar habitat structure and function to that existing prior to the development action." OAR 635-415-0005 defines "in-proximity habitat mitigation" as follows: "habitat mitigation measures undertaken within or in proximity to areas affected by a development action. For the purposes of this policy, 'in proximity to' means within the same home range, or watershed (depending on the species or population being considered) whichever will have the highest likelihood of benefiting fish and wildlife populations directly affected by the development."

"Habitat Category 4" is important habitat for fish and wildlife species.

Like Category 3, the mitigation goal for Category 4 habitat is no net loss in either existing habitat quantity or quality. The Council interprets this to mean that both existing habitat quantity and quality must be preserved. The goal is achieved by avoidance of impacts or by mitigation of unavoidable impacts. In contrast to Category 3, mitigation options are less constrained and may involve reliable "in-kind or out-of-kind, in-proximity or off-proximity" habitat mitigation to achieve no net loss in either pre-development habitat quantity or quality.

"Habitat Category 5" is habitat for fish and wildlife having high potential to become either essential or important habitat.

If impacts are unavoidable, the mitigation goal for Category 5 habitat is to provide a net benefit in habitat quantity or quality. The Council interprets this to mean that there must be some improvement in either habitat quality or quantity. The goal is achieved by avoidance of impacts or by mitigation of unavoidable impacts through actions that contribute to essential or important habitat.

"Habitat Category 6" is habitat that has low potential to become essential or important habitat for fish and wildlife.

The mitigation goal for Category 6 habitat is to minimize impacts. The goal is achieved by actions that minimize direct habitat loss and avoid impacts to off-site habitat.

B. Habitat in the Analysis Area

KIII provided information about compliance with the Habitat Standard in Exhibit P of the application. The analysis area for potential fish and wildlife habitat impacts was the area within 1,000 feet from all project components. KIII identified habitat types based on field surveys and consultation with ODFW. Aerial photography was used to create a preliminary map; KIII then determined the habitat area boundaries based on ground surveys. KIII applied the ODFW habitat categories (1 through 6) using the habitat mitigation goals and standards defined in OAR 635-415-0025. Figures P-1 through P-6 in the application identify and map the habitat types and categories within the analysis area.[94] ODFW concurs with KIII's identification of the habitat categories, except that tree groups or individual trees that contain known nest sites for raptors should be designated Category 1.[95]

After submitting the application in May 2005, the applicant requested that the site certificate authorize micrositing of turbines and other facility components within defined micrositing corridors rather than at specific points.[96] To estimate the potential impact on wildlife habitat, the applicant re-mapped the turbine locations "toward areas of greater habitat quantity or higher value habitat." Based on this "worst case" mapping, the applicant determined the maximum amount of habitat in each category that would be permanently or temporarily affected by micrositing facility components within the proposed 900-foot

[94] App Supp, Tab P, Item i. Revised Figures P-1 through P-6 were subsequently provided to correct the location of the proposed 300-foot and 900-foot corridors (e-mail from Dana Siegfried, March 1, 2006). Later, KIII modified Figure P-2 to show a redesigned access road to turbine string D (e-mail from Jesse Gronner, March 22, 2006.

[95] Letter from Rose Owens, ODFW, March 10, 2006.

[96] App Supp, Section 1, "Siegfried Memo, Turbine Corridor Micrositing (12/9/05)."

corridors.[97] Based on the applicant's analysis, the maximum area of permanent and temporary impact on higher value habitat is shown in Table 7.

Table 7 : Maximum Area of Affected Higher-Value Habitat

Habitat Type	Area of temporary impact (acres)	Area of permanent impact (acres)
Category 2		
Grassland	1.25	0.63
Shrub-steppe	0.00	0.03
Category 3		
CRP	9.99	7.29
Grassland	2.98	0.43
Shrub-steppe	1.42	0.00
Upland trees	0.00	0.03
Category 4		
Grassland	0.006	0.05
Category 6		
Developed	0.00	0.00
Agricultural	81.48	55.86
TOTAL	**97.13**	**64.32**

The footprint of the facility would have no direct impact on tree groups or individual trees that are considered Category 1 habitat. Less than one acre of Category 2 habitat would be permanently affected, and 1.25 acres of Category 2 habitat would be temporarily affected. Approximately 7.75 acres of Category 3 habitat would be permanently affected, and 14.4 acres of Category 3 habitat would be temporarily affected. Less than an acre of Category 4 habitat would be affected either temporarily or permanently. Most of the habitat that would be affected by the proposed KWP is Category 6 agricultural land.

C. Habitat Impacts during Construction and Operation

Category 2 Habitat

Category 2 grassland habitat consists of native bunchgrasses, typically dominated by bluebunch wheatgrass and Sandberg bluegrass. Other native grass species and various native forbs and yellow rabbitbrush are also present. Sagebrush, rabbitbrush and other shrubs are dense in small patches. Invasive species may be present but do not dominate. Weed cover is generally well below 20 percent. There are few patches of bare ground or soil disturbance. Many areas of grassland classified as Category 2 are found on lithosol soils or fairly shallow soils. Lithosols are generally found on south and west aspects and some ridge tops within the analysis area. Category 2 lithosols maintain enough bunchgrass structure to provide potential habitat for ground-nesting birds such as the grasshopper sparrow and long-billed curlew, foraging and dispersal habitat for white-tailed jackrabbits and potential foraging habitat for

[97] App Supp, Tab P, Item ii, Table P-3 (900). KIII modified this table to show an increase in the area permanent impact to Category 6 agricultural land due to redesign of the access road to turbine string D (e-mail from Dana Siegfried, March 22, 2006).

raptors such as Swainson's hawk and Ferruginous hawk. The majority of the Category 2 grassland habitat was found on south-facing slopes between Webfoot and Grass Valley Canyon and north of Grass Valley and Highway 206.

Category 2 shrub-steppe habitat occurs primarily on the slopes leading down to Highway 206 from the agricultural areas west of Sandon Road. It also occurs within dense sagebrush on the upper terraces of Grass Valley Canyon and, in places, extends upslope along the drainages toward the agricultural plateau. This habitat type consists of an overstory of sagebrush and an understory of native grasses and patches of invasive grasses. Although the habitat is weedy in a few places, it is the best remaining shrub-steppe habitat to be found within the vicinity and provides important habitat for wildlife.

The footprint of the proposed facility's permanent structures would potentially affect a maximum area of approximately 0.66 acres of Category 2 habitat, most of which (0.63 acres) is grassland habitat. Construction of the proposed facility would have, in addition, a temporary impact on 1.25 acres of Category 2 grassland habitat.

Based on data collected at the Stateline Wind Project and at other wind facilities in the United States, the operation of wind turbines is believed to have an adverse effect on nearby habitat that is important or essential for grassland avian species. This effect is referred to as a "displacement" effect. A study conducted at Stateline showed a statistically significant effect within the first 50 meters from wind turbine locations.[98] It is not known whether the displacement effect is permanent. The reduced use by grassland birds in the first few years after construction may be due in part to temporarily disturbed habitat near the turbines, which may need several years to establish mature vegetation. To gain a more complete understanding of the displacement effect from wind facilities, long-term, multi-year studies are needed.

At the proposed KWP site, there is Category 2 and 3 habitat near the proposed wind turbine locations that could be adversely affected by operation of the facility. The Department considered whether to recommend a grassland bird displacement study at the site and has conferred with the applicant and with ODFW on this question. If such a study were to find evidence of a displacement effect, a decision would then have to be made about what mitigation would be appropriate. Recognizing that the Council might prefer the certainty of doing mitigation now over the uncertainty of further study and a delayed decision about mitigation, the applicant has proposed to increase the size of the habitat mitigation area in lieu of a multi-year displacement study at the KWP site, as discussed below in Section IV.4(b)D at page 79.

Category 3 Habitat

Category 3 Conservation Reserve Program[99] (CRP), habitat is found throughout the analysis area. It occurs generally along steep slopes and less accessible areas. CRP areas are

[98] *Stateline Wind Project Wildlife Monitoring Final Report, July 2001- December 2003*, p. 22-23.

[99] The Conservation Reserve Program is a voluntary program for agricultural landowners. The program encourages landowners to plant long-term resource-conserving covers to improve soil, water, and wildlife resources. Through the CRP, landowners receive annual rental payments, incentive payments and annual maintenance payments for certain activities and cost-share assistance to establish approved cover on eligible cropland. The Commodity Credit Corporation within the U.S. Department of Agriculture administers the program through the Farm Service Agency.

historic agricultural fields that are in the process of being restored to grassland. Most of the CRP lands within the analysis area have had five or more years to become well developed as habitat. Weed cover is generally low to moderate. As of 2005, the CRP areas that were surveyed had developed the characteristics necessary to provide habitat for sensitive wildlife, such as density of cover and quality of forage, although the majority of planted species within the CRP are non-native species, including intermediate wheatgrass and crested wheatgrass. Although CRP lands provide important wildlife habitat, this habitat is not significantly limited on a site-specific or physiographic province level due to the abundance of CRP land within and around the analysis area.

Category 3 habitat also includes Continuous CRP (CCRP), which consists of strips of CRP along field edges and drainages. These CCRP strips are designated Category 3 because they maintain the structure necessary to provide shelter for wildlife in an area that is mostly cultivated land and may provide connection to other habitat areas.

Category 3 grasslands can be divided into those areas with shallow soils and those areas with deeper soils. The shallow soil areas are characterized by non-native grasses interspersed with some native grasses, while the deeper soil areas are dominated by a mixture of cheatgrass and native bunchgrasses. Most of the Category 3 grassland in the analysis area is in shallow soil. In these grassland areas, sparse, native bunchgrasses are mixed with a robust layer of non-native species. Bare soil and rocks are common, and the soil surface in many places is disturbed and more prone to erosion than Category 2 grassland.

Deeper soil Category 3 grasslands exist along the southern boundary of the project area. This grassland habitat contains 20 to 50 percent cheatgrass beneath sparse native bunchgrass and rabbitbrush. These areas often characterize the transition zone between the weedier Category 4 areas and less-disturbed Category 2 bunchgrass-dominated grassland habitat. These areas were designated as Category 3 because the cheatgrass between clumps of bunchgrass provides less valuable forage than native grasses. It is not the preferred habitat for sensitive grassland species and provides less forage for the prey base for target species such as Swainson's hawk.

Category 3 grassland habitat also exists adjacent to intermittent streams in agricultural areas. Although the vegetation in these areas is quite weedy, the habitat provides potential wildlife shelter and forage adjacent to intermittent water sources.

Category 3 shrub-steppe habitat occurs in the southwest corner of the analysis area within the proposed mitigation area and within tributaries to Grass Valley Canyon that do not contain riparian or wetland vegetation but do contain a dense cover of sagebrush. This habitat consists of native sagebrush and rabbitbrush with a weedy understory of cheatgrass. These areas were designated as Category 3 rather than Category 4 because of the wildlife value provided by the dense sagebrush cover in an area otherwise dominated by grasslands. Wildlife may use this habitat primarily for cover and secondarily for foraging.

Category 3 upland tree habitat is located near Emigrant Springs, Webfoot, along Klondike Lane and near residences throughout the analysis area. Most of the trees appear to have been planted as a windbreak or as shelter for cattle. Those areas not adjacent to residences are quite weedy, with cheatgrass and escaped wheat dominating the understory. Due to the presence of human disturbance and very weedy or developed understory, these upland trees are not considered irreplaceable habitat, unless they contain nest sites for raptors.

Scattered locust shrubs in areas separated from human disturbance are used by songbirds for perching and foraging but are not of sufficient size to provide nesting opportunities for sensitive species.

The footprint of the proposed facility's permanent structures would potentially affect a maximum area of approximately 7.75 acres of Category 3 habitat, primarily CRP land (7.29 acres) with small areas of Category 3 grassland (0.43 acres) and upland tree habitat (0.03 acres). The impact to upland tree habitat would not require removal of any trees or other direct impacts on trees. Areas of permanent and temporary impact to upland tree habitat involve maintenance (adding gravel and grading) of an existing road shown on Figure P-4 of the application. Figure P-4 also shows two locations where proposed facility access roads would cross intermittent streams within Category 3 grassland habitat. In one location, an access road would cross an intermittent stream just south of Klondike Lane east of the O&M building for Klondike I and II. There would be no new impact to habitat in this location because there is an existing road and culvert. In the second location, a segment of underground collector line would cross an intermittent waterway, which is part of a drainage feature north of Klondike Lane. KIII proposes to use a directional bore to avoid impact to the waterway, although there would be some temporary impact to the adjacent grassland habitat (Condition (79)).

Temporary impact during construction of the proposed facility would affect about 10 acres of Category 3 CRP land, about 3 acres of Category 3 grassland habitat and 1.42 acres of Category 3 shrub-steppe habitat.

In addition to the footprint impacts on Category 3 habitat, operation of the proposed KWP could have a displacement impact on this habitat and on Category 2 habitat, as discussed above. In lieu of conducting a displacement study, the applicant has proposed to mitigate for this potential impact, as discussed below in Section IV.4(b)D at page 79.

Category 4 Habitat

Category 4 grasslands include shallow soil areas, which are heavily grazed and very weedy with a sparse overstory of sagebrush, and deeper soil grasslands, which have patches of native bunchgrass but are dominated by cheatgrass and other weeds. In both types, the dense weed cover limits the ability of most wildlife species to use these areas for forage or cover. Category 4 deeper soil grasslands are found along the north-facing slopes of the tributary between Grass Valley and Webfoot and along the drainage adjacent to Highway 206. These areas do not provide optimal wildlife habitat, and they are susceptible to erosion and soil damage from grazing. Areas that have been heavily burned or otherwise disturbed have similar characteristics, such as several slopes in the southwest portion of the site.

The proposed facility would affect very small areas of Category 4 grassland habitat. Permanent and temporary impact would affect less than 0.1 acres.

Category 6 Habitat

Category 6 habitat within the analysis area includes non-irrigated agricultural croplands and developed areas. The agricultural areas are generally a monoculture of dryland wheat and include those areas currently in production as well as cut, fallow fields. Developed areas include residential yards and outbuildings, feed lots and corrals, equipment storage areas, existing substations and construction management offices. Developed areas are highly

disturbed and lack native vegetation. Due to the high level of disturbance, these areas are unlikely to become important or essential wildlife habitat in the foreseeable future. The proposed facility would permanently affect about 56 acres of Category 6 agricultural land and would have a temporary impact on about 82 acres.

D. Mitigation and Monitoring

Table 8 summarizes the levels of mitigation are required under the ODFW habitat mitigation goals and standards, which are discussed in more detail above at page 73:

Table 8 : ODFW Mitigation Standards

Habitat Category	Mitigation
Category 1	Avoid impact
Category 2	In-kind, in-proximity habitat mitigation to achieve no net loss of either habitat quantity or quality and provision of a net benefit of habitat quantity or quality
Category 3	In-kind, in-proximity habitat mitigation to achieve no net loss of either habitat quantity or quality
Category 4	In-kind or out-of-kind, in-proximity or off-proximity habitat mitigation to achieve no net loss in either existing habitat quantity or quality
Category 6	Minimize direct habitat loss and avoid impacts to off-site habitat

The applicant designed the proposed layout of the facility as shown on Figure C-2 in the site certificate application to avoid or minimize adverse impacts on wildlife habitat. The Council finds that the site certificate should allow the certificate holder to microsite turbines and other facility components within the 900-foot corridors shown on Figures P-1 through P-6 (as revised March 1, 2006), subject to the following requirements that address potential habitat impact (Condition (92)):

- The certificate holder shall not construct any facility components within areas of Category 1 habitat and shall avoid temporary disturbance of Category 1 habitat.
- To the extent possible, the certificate holder shall construct facility components in the locations shown on Figure C-2 of the site certificate application.
- If the certificate holder must change the layout of facility components from what is shown on Figure C-2 due to micrositing considerations, the certificate holder shall, to the extent possible, construct facility components within the 300-foot corridors shown on Figures P-1 through P-6 of the site certificate application (as revised March 1, 2006).
- The certificate holder may construct facility components outside the 300-foot corridors if necessary due to micrositing considerations, except that the certificate holder shall not construct any facility components outside the 900-foot corridors shown on Figures P-1 through P-6 of the site certificate application (as revised March 1, 2006) or cause any temporary disturbance outside those 900-foot corridors.

Micrositing considerations include the size of the turbine selected and available for the project, optimization of capture of the wind energy resource, geotechnical factors, avoidance of higher-value wildlife habitat and reduction of adverse impacts on accepted farm practices in the area. Before beginning construction, the certificate holder would provide to the Department a description of the final design layout, taking into consideration the micrositing considerations (Condition (31)).

During construction, the certificate holder would avoid or reduce construction activity that could interfere with raptor nesting in areas close to proposed turbine locations (Condition (94)). If construction is scheduled during the sensitive nesting periods for Swainson's hawk, golden eagle, ferruginous hawk or burrowing owl, an independent biological monitor will survey potential nesting areas near the proposed turbine strings. High-impact construction activities, such as blasting or other major ground disturbance, would be avoided during the nesting period until the monitor has determined that the nest locations are unoccupied (or, if occupied, that the young have fledged).

KIII has proposed mitigation for the permanent footprint impacts of the facility and for potential displacement impacts. As discussed above, the operation of wind energy facilities is believed to have a displacement impact on both native grassland and restored CRP habitat. Studies at the Stateline Wind Project indicate a reduction in suitable habitat use by grassland bird species, particularly within the first 50 meters from turbine locations. The Council approves mitigation for the potential displacement impact that might result from operation of the KWP, in lieu of a multi-year study of grassland bird displacement.

KIII searched for a suitable mitigation site in proximity to the proposed facility and considered at least four alternative locations. KIII proposed one of the alternative sites, based primarily on the current conditions of the site. The criteria that the applicant used to select the proposed mitigation site included the following:

- Overall Potential for Improvement. Land that provides functional wildlife habitat, but is degraded by weeds or non-native species can be enhanced with chemical and mechanical habitat improvement measures. Other factors such as soil depth and accessibility affect a site's overall potential for enhancement.
- Favorable soil. Areas with deeper soils offer a better seedbed for grasses than areas with shallower soils.
- Slope/Accessibility. Property with gentler slopes usually has deeper soils. It is easier to access but yet private for wildlife (limited human disturbance). Sites that can be reached with existing or proposed roads are also desirable because no new road construction is needed.
- Size and Continuity. Large blocks, or a single block of land, are easier to lease from landowners and easier to access for habitat improvement purposes. Sites with at least 10 acres of suitable land also provide contiguous wildlife habitat.
- Distance from Turbine Strings. To avoid providing habitat for small mammals that would be attractive prey for raptors, ODFW recommends that grassland should not be enhanced near turbine locations.

- Proximity to Disturbance. Areas farther from human or animal disturbance (such as homes, farm buildings and grazing areas) have a better chance for successful habitat enhancement.
- Location. A site within the existing wind-lease boundary is desirable because it eliminates the need for further surveys or leases.
- Landowner interest. Successful implementation and monitoring of habitat enhancement measures is more likely when the landowner is interested in a having a conservation easement.

Based on these criteria, KIII proposed a 30-acre area as a mitigation site.[100] KIII proposed to enhance the quality of wildlife habitat within the mitigation site by weed control and revegetation with native grass, forbs and shrub species. The goal of the habitat enhancement measures would be to improve existing Category 3 and 4 habitat to a Category 2 quality, where possible. KIII has identified at least one site in proximity to the proposed facility where sufficient contiguous acres are available that have the potential for achieving habitat enhancement. ODFW expressed concerns about whether enhancement measures could be successful at the proposed site and recommended that the applicant continue searching for a better site.

The Council finds that the proposed mitigation is feasible. To allow flexibility in the site certificate to select the best mitigation site available, the Council finds that the site certificate should require a 30-acre habitat mitigation area described herein but allow the certificate holder to determine the final location of the mitigation area before beginning facility construction. The certificate holder would select a mitigation area in proximity to the facility site in consultation with ODFW, subject to approval by the Department.

Before beginning construction of the KWP, the certificate holder would acquire the legal right to create, maintain and protect the habitat mitigation area for the life of the facility. The certificate holder would implement habitat enhancement measures on this land as described in the Habitat Mitigation Plan (Condition (97)). The certificate holder would monitor the progress of the habitat enhancement measures on an annual basis until the certificate holder and the Department agree that the area is trending toward meeting the success criteria and would continue to monitor the site every five years thereafter for the life of the KWP to assess vegetation cover and success.

The Council finds that a 30-acre mitigation area is appropriate based on the following analysis. As shown in Table 7, the permanent facility structures would occupy about 0.66 acres of Category 2 habitat, about 7.75 acres of Category 3 habitat and about 0.05 acres of Category 4 habitat. To meet the ODFW mitigation standards listed in Table 8, the applicant must show how a mitigation plan would achieve "no net loss of either habitat quantity or quality" (for the Category 2, 3 and 4 habitat affected) plus a "net benefit of habitat quantity or quality" (for the Category 2 habitat affected). For the footprint impacts, the mitigation area includes approximately 9 acres that provides protection and enhancement of habitat on a 1:1 basis for Category 3 and 4 impacts and on a 2:1 basis for impacts to Category 2 habitat. This provides a "net benefit" of habitat quantity for Category 2. The remaining land within the

[100] Figure P-2 (revised), e-mail from Sara McMahon, April 12, 2006.

mitigation area (about 21 acres) provides mitigation for potential displacement impacts. A rough calculation of potential displacement impact was done by assuming a 50-percent reduction in use by grassland birds within 50 meters of wind turbines. It was also assumed that grassland birds use CRP land at a rate that is 50-percent of their use of native grassland and upland tree habitat (and therefore that the amount of mitigation area should be half as much for CRP displacement as for native grassland displacement). It was further assumed that the final design locations of wind turbines within the micrositing corridors would be such that the maximum area of native grassland would be affected (the "worst case"). The displacement mitigation area of 21 acres provides protection and enhancement of habitat on a 1:1 basis for Category 3 impacts and on a 2:1 basis for impacts to Category 2 habitat. This provides a "net benefit" of habitat quantity for Category 2. The Council finds that this computation of the area for displacement mitigation is reasonable, considering the limited scientific knowledge at this time about the measurement and permanence of displacement impacts, but that the method of computation in this case should not set firm policy for Council consideration of future wind energy projects. The Council adopts the Department's recommendation that the Council decide the reasonable and appropriate mitigation for potential displacement impacts at wind projects on a case-by-case basis, consistent with the ODFW mitigation standards.

To meet the ODFW habitat mitigation standard for impacts to Category 6 habitat, KIII proposes to design and construct facility components that are the minimum size needed for safe operation (Condition (92)). In addition, the applicant proposes to use best management practices to prevent loss of topsoil during construction (Condition (76)), to restore agricultural topsoil to pre-construction condition after construction and to control noxious weeds in areas disturbed by construction activities (Condition (89)). Agricultural areas as well as areas of Category 2, 3 or 4 habitat that are temporarily disturbed during construction would be restored to pre-construction condition or better upon completion of construction, as described in the "Revegetation Plan" that is incorporated in this proposed order as Attachment B (Condition (81)). During operation, the certificate holder would avoid impact on cultivated land when performing facility repair and maintenance activities (Condition (47)).

Klondike III Wildlife Monitoring and Mitigation Plan

A common element of the ODFW mitigation goals and standards applicable to Category 2, 3 and 4 habitat is the protection of habitat quality as well as quantity. To address the issue of habitat quality and to ensure that the operation of the KWP complies with the Council's standard, the certificate holder would conduct wildlife monitoring (Condition (95)). The overall objectives for wildlife monitoring the KWP facility are:

- To determine whether the operation of the facility causes significant fatalities of birds and bats,
- To determine whether the operation of the facility results in a reduction of nesting activity or nesting success of raptor species, and
- To determine whether the operation of the facility results in a significant loss of habitat quality.

The details of the monitoring components, statistical analysis and data reporting are described in the Wildlife Monitoring and Mitigation Plan (WMMP) that is incorporated in this proposed order as Attachment A. The requirement of monitoring during the operation of the

KWP facilities is a necessary part of finding compliance with the Fish and Wildlife Habitat Standard. Adequate monitoring provides data necessary to evaluate the impacts of facility operation on nearby wildlife habitat. Under the terms of the WMMP, the Department may require the certificate holder to implement additional mitigation, subject to approval by the Council, if the monitoring results show significant fatalities of avian species, adverse impact to raptor nesting or other loss of habitat quality.

The WMMP includes "thresholds of concern" for four species groups: raptors, raptor species of special concern, grassland species, and State sensitive avian species listed under OAR 635-100-0040. The thresholds are expressed as fatalities per megawatt of peak generating capacity, and the certificate holder is required to calculate the average annual fatality rates for species groups after two years of monitoring. If the data show that a threshold of concern for a species group has been exceeded, the Department would determine whether additional mitigation is appropriate based on analysis of the data, consultation with ODFW and consideration of any other significant information available at the time. In addition, mitigation might be appropriate if the Department determines that fatality rates for individual avian or bat species (especially State Sensitive Species) are higher than expected and at a level of biological concern.

The Department developed the thresholds of concern for species groups in consultation with the applicant and the applicant's wildlife consultants, ODFW and the Department's own wildlife consultant. The Department also considered the analysis of monitoring results from the Stateline Wind Project. Although the threshold numbers provide a rough measure for deciding whether the Council should be concerned about observed fatality rates, the thresholds have a very limited scientific basis. The exceeding of a threshold, by itself, would not be a scientific indicator that operation of the facility would result in range-wide population level declines of any of the species affected. The thresholds are provided in the WMMP to guide consideration of additional mitigation based on two years of monitoring data.

The proposed WMMP includes data collection and analysis of fatality rates for bat species but does not set a "threshold of concern" that would require consideration of whether mitigation for bats is appropriate after two years of monitoring. To mitigate for potential adverse impacts to bat species, the applicant proposes to make financial contributions to Bat Conservation International or another bat conservation group in the Pacific Northwest to help fund research toward a better understanding of wind facility impacts to bats and to continue to develop mitigation solutions (Condition (96)).[101] In considering whether additional mitigation is appropriate for bat fatalities based on the monitoring data, the Department will take into account the mitigation that the certificate holder has already implemented.

E. Habitat Impacts and Mitigation during Retirement of the Facility

As required under Council rules, retirement would proceed according to a Council-approved final retirement plan. The retirement plan would ensure minimal impacts to fish,

[101] KIII's parent company, PPM Energy, is already contributing $5,000 a year to Bat Conservation International for 3 years for base research, plus approximately $25,000 a year for at least two years for research at PPM's Cassleman Wind Project in Pennsylvania and $50,000 a year for two years at PPM's Hoosac Wind Project in Massachusetts. PPM is also contributing $25,000 a year for four years to the Grassland/Shrub Steppe Species Collaborative to research impacts to grassland birds.

wildlife and the environment and provide for restoration of the site and temporarily disturbed areas to a useful, non-hazardous condition (Condition (9)). Retirement of the facility would include removal of facility structures and restoration of the underlying land (approximately 64 acres) to farm or habitat uses. It is anticipated that site restoration activities would temporarily affect additional habitat adjacent to the facility site as needed to accommodate the movement and placement of cranes and other heavy equipment used during facility demolition. This adjacent area is likely to be similar in size and habitat category to the area temporarily disturbed during construction. These areas of temporary disturbance would be graded and reseeded after completion of the facility demolition work. Site restoration is further described at page 16.

F. General Findings of Consistency with ODFW Goals and Standards

Design

The proposed facility would occupy a permanent footprint of approximately 64 acres. Eighty-seven percent or more of the affected habitat would be Category 6 agricultural land. The component parts of a wind facility (turbines, access roads, transmission lines and substations) must be disbursed over a wide area to capture the wind resource effectively. Locating the majority of facility components within Category 6 habitat ensures the least impact on higher-value habitat, although some amount of impact is unavoidable. The design of the proposed KWP is consistent with ODFW's habitat mitigation goals and standards (OAR 635-415-0025).

Construction

About 82 percent or more of the area that would be temporarily disturbed during construction is Category 6 habitat. Impact to intermittent streams and stream habitat would be minimal. The certificate holder would avoid construction activity within a buffer area around raptor nests during the sensitive nesting period. Upon completion of construction, areas of temporary disturbance would be restored and re-planted to pre-construction condition or better. Construction would be carried out in a manner consistent with OAR 635-415-0025.

Operation

The certificate holder would establish a habitat mitigation area and would undertake habitat enhancement activities to improve the value of the area to wildlife. The habitat area would be protected from other development during the life of the facility. Operational monitoring as described in the Wildlife Monitoring and Mitigation Plan would provide data necessary to evaluate the operational impacts of the facility on habitat quality. If analysis of monitoring data indicates significant impacts, further mitigation may be required. Taking into account the mitigation of impacts, operation of the facility would be consistent with OAR 635-415-0025.

Retirement

Retirement would include removal of facility components and restoration and revegetation of the underlying area as well as any area temporary disturbed during the demolition. Retirement would be done subject to a final retirement plan approved by the Council. The final retirement plan would provide for minimizing impact to fish and wildlife habitat. Retirement can be carried out in a manner consistent with OAR 635-415-0025.

Conclusions of Law

The Council finds that the design, construction, operation and retirement of the proposed facility, taking into account mitigation and subject to the conditions stated in this order, would be consistent with ODFW's habitat mitigation goals and standards (OAR 635-415-0025). The Council finds that a site certificate for the facility should include Conditions (9), (31), (47), (76), (81),(79), (89), (92), (93), (94), (95), (96) and (97). Based on these findings and conditions, the Council concludes that the proposed facility complies with the Council's Fish and Wildlife Habitat Standard.

5. Standards Not Applicable to Site Certificate Eligibility

Under ORS 469.501(4), the Council may issue a site certificate without making the findings required by the standards discussed in this section (Structural Standard, Historic, Cultural and Archaeological Resources Standard, Public Services Standard and Waste Minimization Standard). Nevertheless, the Council may impose site certificate conditions based on the requirements of these standards.

(a) Structural Standard

OAR 345-022-0020

(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that:

(a) The applicant, through appropriate site-specific study, has adequately characterized the site as to seismic zone and expected ground motion and ground failure, taking into account amplification, during the maximum credible and maximum probable seismic events; and

(b) The applicant can design, engineer, and construct the facility to avoid dangers to human safety presented by seismic hazards affecting the site that are expected to result from all maximum probable seismic events. As used in this rule "seismic hazard" includes ground shaking, landslide, liquefaction, lateral spreading, tsunami inundation, fault displacement, and subsidence;

(c) The applicant, through appropriate site-specific study, has adequately characterized the potential geological and soils hazards of the site and its vicinity that could, in the absence of a seismic event, adversely affect, or be aggravated by, the construction and operation of the proposed facility; and

(d) The applicant can design, engineer and construct the facility to avoid dangers to human safety presented by the hazards identified in subsection (c).

(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

** * **

Proposed Conditions

KIII provided information regarding the seismic characteristics of the site and possible seismic and geological hazards in Exhibit H of the application. The analysis area for the Structural Standard is the area within the site boundary. On behalf of the applicant, Geotechnical and Environmental Consultants (GRI) assessed the geologic and seismic conditions of the site. GRI's assessment included review of relevant available literature and information, examination of aerial photographs and a limited on-site survey. The literature review included a previous geotechnical investigation for the Klondike II wind project. GRI consulted with the Oregon Department of Geology and Mineral Industries (DOGAMI). Site-specific subsurface and geophysical investigations were not undertaken by GRI as part of this preliminary assessment. Before construction, appropriate site-specific geotechnical investigation would be performed to investigate the subsurface and foundation support conditions at the locations of the turbine towers and other significant facility structures (Condition (53)). Council rules include mandatory conditions regarding geotechnical investigation and protection of the public from seismic hazards (Conditions (12), (13) and (14)).

The site is about five miles south of the Columbia River on a high plateau area between the Deschutes and John Day Rivers. The topography is generally level ground to gently rolling slopes with steep slope areas on the northeast and southern margins. Elevation within the site boundary is 1,250 to 1,500 feet. Slopes at proposed turbine tower locations are typically less than 3 percent.[102]

GRI provided an analysis of potential seismic hazards at the site. Most of the project area consists of a mantle of fine-grained, silty soils (loess), typically four to six feet deep, over a basalt layer. As the GRI report notes: "The effect of a specific seismic event on the site is related to the type and thickness of soil overlying the bedrock and to the type and quantity of seismic energy delivered to the bedrock beneath the site by the earthquake." GRI found no obvious surface evidence of large-scale, deep-seated slope instability, faulting or ground rupture, nor did analysis of aerial photographs show evidence of these characteristics.

There is sparse quantitative information available regarding historic seismic activity in the area. Seismographic records are available from about 1940. Based on available data, GRI developed "generalized design earthquakes" for three categories of potential seismic events: subduction zone events, subcrustal events and local crustal events. For preliminary assessment purposes, GRI evaluated the effect of a subduction zone event with a moment magnitude (Mw) of 8.8 at a focal distance of 150 miles. This design earthquake was based on published estimates of the probable maximum size of subduction zone events. GRI estimated that such an event would result in peak horizontal bedrock acceleration of 0.08 g at the KWP site.[103]

GRI evaluated the effects of a subcrustal event based on published information regarding the probable maximum size of subcrustal events in the region. Based on a design earthquake of Mw 7.0 at a distance of 100 miles, GRI estimated peak horizontal bedrock acceleration of 0.04 g at the KWP site. In addition, based on an analysis of the lengths of local

[102] A more detailed geological description is included in the GRI assessment report, App Appendix H-2.
[103] Earthquake magnitude is measured in moment magnitude ("Mw"). The amount of seismic force is given in "g," a unit of force equal to the force exerted by gravity, which indicates the force to which a body is subjected when it is accelerated.

faults, GRI evaluated a Mw 6.5 earthquake at a distance of 7 miles and estimated peak horizontal bedrock accelerations at the site would be approximately 0.2 g. GRI, therefore, assumed peak horizontal bedrock acceleration of 0.12 g, "in keeping with the intent of the 2003 International Building Code" and using two-thirds of the Maximum Considered Earthquake based on the 1996 U.S. Geological Survey.

Based on a generalized subsurface profile and the peak bedrock acceleration estimates, GRI used a model to determine that a local crustal event would produce the peak horizontal ground acceleration at the site. GRI estimated a mean peak horizontal ground acceleration of 0.16 g. GRI concluded: "Based on our past experience, ground accelerations of this magnitude can be readily accommodated in the design of the turbine tower structures. It has also been our experience that transient wind loading on turbine towers and wind and ice loading on transmission line towers will be the more severe loading conditions that will govern the design of the tower structures."

In addition, GRI concluded that there is low risk of seismic hazards such as slope instability, ground rupture, liquefaction and settlement or subsidence at the site. The presence of loess soils presents a potential non-seismic risk of significant settlement if the soils are loaded by conventional spread footings and subsequently saturated. GRI believes that this risk can be mitigated by conventional foundation design methods including: (1) spread foundations below the loess, (2) drilled shaft foundations that develop support in the materials below the loess; (3) removal of the loess and replacement with compacted fill, or (4) in situ improvements of the loess soils.

DOGAMI reviewed the information in Exhibit H of the application and found the information to complete, but the agency noted that the results of pre-construction geotechnical investigations should be provided to DOGAMI. The seismic hazard assessment should be revised to integrate any new pertinent information as a result of site-specific investigations, instead of a "generalized" profile, and the profile should be extended to the site boundaries. DOGAMI further noted that the applicant's use of the 2003 International Building Code was appropriate because Oregon no longer uses "seismic zone" classifications.

(b) Historic, Cultural and Archaeological Resources

OAR 345-022-0090

(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that the construction, operation and retirement of the facility, taking into account mitigation, are not likely to result in significant adverse impacts to:

(a) Historic, cultural or archaeological resources that have been listed on, or would likely be listed on the National Register of Historic Places;

(b) For a facility on private land, archaeological objects, as defined in ORS 358.905(1)(a), or archaeological sites, as defined in ORS 358.905(1)(c); and

(c) For a facility on public land, archaeological sites, as defined in ORS 358.905(1)(c).

(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in

section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

* * *

Proposed Conditions

KIII provided information regarding historic, cultural and archaeological resources in Exhibit S of the application. The analysis area for potential impacts to these resources is the area within the site boundary. The applicant conducted a literature review and records search as well as field investigations. Archaeological Investigations Northwest, Inc. (AINW) conducted a field investigation, and a cultural resource report is included in the application.[104]

Field investigations for the project were conducted in five field sessions between January and March 2005. The field survey area was limited to 264-foot-wide survey corridors centered on the proposed alignments of turbine strings, access roads and underground utility lines and a 50-foot-wide survey corridor on the north side of Klondike Lane where the proposed aboveground 230-kV transmission line would be built. In addition, the survey area included proposed substation sites, laydown areas and existing roads that would be widened. The field survey did not include other areas within the proposed 900-foot micrositing corridors. Field investigation consisted of systematic pedestrian inspection of the survey area. No areas were excavated, because no locations within analysis area were considered likely to contain buried cultural deposits that would not be visible on the surface.

Because not all of the analysis area has been inspected by field investigation, those areas outside of the survey area described above should be inspected where construction-related impacts would occur. The Council adopts Condition (48) to ensure that the inspection is completed before construction begins.

Based on the report by AINW, there are no previously recorded archaeological resources within the analysis area. Four archaeological resources were identified in the field investigation. These resources consisted of prehistoric archaeological isolates and a small assemblage of historic-period refuse. These resources are not considered significant.[105]

The Council adopts Condition (49) that requires construction personnel to be trained in the identification of archeological or cultural materials. In accordance with state law (ORS 97.745 and 358.920), the Council adopts Condition (50) to require that earth-disturbing activities be halted if archeological objects are discovered in the course of construction of the facility.[106] The condition further requires notification of the State Historic Preservation Office and the Department and evaluation of the discovery by a qualified archaeologist.

The alignment of the Oregon Trail is a designated historic trail under both federal and Oregon statutes. The alignment crosses the northeastern portion of the KWP site. No physical evidence of the trail was observed anywhere within the analysis area during the field investigations. An earlier study reported that intact segments of the trail were still visible in the early 1980s at locations within the analysis area, but all of the reported locations of intact

[104] App Appendix S-1.
[105] App page S-2.
[106] Under OAR 736-051-0090, a person may not "knowingly and intentionally excavate, injure, destroy or alter an archeological site or object or remove an archeological object from private lands in Oregon" without a permit issued under ORS 390.235.

trail segments are within agricultural fields where farming activity is likely to have obliterated physical traces of the trail. KIII states that the designation as a National Historic Trail does not impose any restrictions on development on non-federal lands.[107]

Any intact segments of the trail are highly likely to be eligible for listing on the National Register of Historic Places and would also likely be eligible for designation as a National Historic Landmark. Accordingly, the Council adopts Condition (51) to require that construction of KWP proceed carefully in the vicinity of the mapped alignment of the Oregon Trail and that any intact physical evidence of the trail discovered during construction be protected from disturbance.

The applicant concluded that construction of turbine strings is "likely to constitute an adverse effect on the visual setting of the Oregon Trail alignment in general and any intact segments that may be extant."[108] The alignment may be a focus of visitors to Sherman County who are interested in exploring the Oregon Trail. For this reason, the Council adopts Condition (52) to offset adverse visual effects to the setting of the Oregon Trail alignment.

The field investigation identified several historic-period resources within the analysis area consisting of buildings and structures associated with private ranching operations, commercial uses or public uses. AINW recommended that most of these resources be considered not significant. Four historic resources were evaluated more closely (the Anson farmstead, the Emigrant Springs Cemetery, the Webfoot school and the Columbia Southern railroad alignment). AINW concluded that none of these resources were likely to be eligible for listing on the National Register of Historic Places.

(c) Public Services

OAR 345-022-0110

(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that the construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impact to the ability of public and private providers within the analysis area described in the project order to provide: sewers and sewage treatment, water, storm water drainage, solid waste management, housing, traffic safety, police and fire protection, health care and schools.

(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

* * *

Proposed Conditions

KIII provided information in Exhibit U about the potential impacts of the facility on public services.[109] The analysis area for public services is the area within the site boundary

[107] RAI S1, App Supp, Section 1, "Response to Request for Additional Information #1."
[108] App page S-5.
[109] App Supp, Tab U, Item iv.

and 30 miles from the site boundary, including area within the State of Washington. The analysis area includes nearly all of Sherman County and significant portions of Gilliam, Wasco and Klickitat counties. Small segments of Morrow and Yakima counties are also within 30 miles of the site boundary. There are nine incorporated cities in the analysis area: Arlington, Condon, Dufur, Grass Valley, Moro, Rufus, The Dalles, Wasco and Goldendale.

A. Sewage, Storm Water and Solid Waste

During construction of KWP, the impact on sewers and sewage treatment would be minimal. The Council adopts Condition (103) to require that the certificate holder provide and maintain portable toilets for on-site sewage handling during construction. Storm water drainage during construction would be subject to the NPDES Storm Water Discharge General Permit #1200-C, which would ensure appropriate on-site handling of storm water. There are no local storm sewers to be affected. Construction of the KWP would generate solid waste that would be removed for off-site disposal. Sunrise Disposal and Recycling provides solid waste disposal service for all of Sherman County. Solid waste would be taken to the Columbia Ridge landfill near Arlington, which has an estimated 50-year capacity.

During operation, sewage from the O&M building would be disposed of in an on-site septic system. Appropriate measures would be used to avoid or reduce erosion from storm water run-off during operation of the facility, and, as noted above, there are no local storm sewers that would be affected. Solid waste generated during operation would be insignificant and would be recycled or taken to the Columbia Ridge landfill by a licensed hauler.

B. Water

KIII estimates the volume of water used during construction of the KWP would be approximately 18 million gallons. Water would be used primarily for dust control and concrete mixing. KIII anticipates that water could come from several sources, including the City of Wasco. To show that adequate water is available in the area, KIII provided a letter from the City of Arlington, indicating that the city could supply all of the water needed for construction of the KWP.[110]

During operation, less than 5,000 gallons per day would be needed for domestic purposes at the O&M facility. This water would come from a new on-site well. The facility's use of water during operation, therefore, would have no impact on municipal water systems. The small volume of water needed for the O&M facility is not likely to have an impact on other wells that serve local landowners.

C. Housing, Police and Fire Protection, Health Care and Schools

The applicant estimates that construction of the KWP would employ a maximum of 120 workers. The applicant estimates that half of the workforce would be from outside the area. Based on experience with construction of Klondike I, the applicant believes that there is sufficient temporary housing available in Morrow, Biggs Junction, Wasco and The Dalles.

KIII estimates that a staff of up to 20 full-time and part-time employees would be needed during operation of the proposed facility. Assuming conservatively that as many as 12

[110] Letter from Tim Wetherell, City of Arlington Public Works Director, dated February 27, 2006 (attachment to e-mail from Jesse Gronner, dated February 28, 2006, regarding "water right issue").

employees would move to the area, the number of in-migrant households would be small. The applicant found an average housing vacancy rate of 13.5 percent in the nine incorporated communities in the analysis area. The permanent impact on housing therefore would be insignificant.

Each of the counties in the analysis area has police services from a county sheriff's department, and in addition, the cities of The Dalles, Goldendale and Condon have police departments. Construction and operation of Klondike I did not result in significant demand for police services, and no significant adverse impacts are anticipated from construction and operation of the KWP.

The project site is located in the North Sherman Fire Protection District based in Wasco. In addition, there are eight other fire departments or districts in the analysis area, including the cities of Condon, Moro, Rufus, Dufur and The Dalles as well as the South Sherman Rural Fire District, the Gilliam County Rural Fire District and the Klickitat Rural Fire District #7. Local farmers are often the first to respond to a fire because of the large service areas. Farmers provide fire suppression with their own equipment. The certificate holder would take steps to reduce the risk of fire during construction and operation, as discussed further at page 103. Based on interviews conducted by the applicant, the proposed facility would not adversely affect the ability of the North Sherman County Rural Fire Protection District and the Moro Rural Fire Protection District to provide fire protection or ambulance service for their service areas.

The Mid-Columbia Medical Center, located in The Dalles (approximately 35 miles from the KWP site), is a full service medical facility, providing emergency services and surgery. Ambulance service from the Moro Rural Fire Protection District would provide ambulance service in the event of an emergency on the facility site. Helicopter evacuation service is also available. In addition, Klickitat Valley Hospital in Goldendale (approximately 25 miles from the KWP site) serves Central and Eastern Klickitat County. Temporary and permanent population increases during construction and operation of the proposed facility are not likely to result in significant adverse impact on the ability of the health care service providers in the analysis area.

The Sherman County School District serves all of Sherman County with one high school located in Morrow (grades 7 through 12) and two elementary schools in Grass Valley and Wasco (grades K through 6). The district serves approximately 280 students (in 2005), although enrollment has declined in recent years. During construction, the in-migrant portion of the workforce is not expected to relocate family members to the area, and, therefore, no increased demand on schools is anticipated during construction. During operation, as many as 12 workers might move with their families into the area, but the small increase in school-age children would not significantly increase student population. Based on interviews conducted by the applicant, local school districts would be able to accommodate the new students with existing school capacity, and an increase in the number of students would be beneficial because state funding is tied to the number of students served by the district.

D. Traffic Safety

Construction-related traffic is likely to cause minor traffic delays on area highways (I-84, US 97 and OR 206) and on local roads near the site when trucks deliver turbines, construction-related equipment, concrete and other building materials. Such delays would be

short-term and temporary. During construction, flaggers would be used at appropriate locations at appropriate times to direct traffic.

Local roadways currently have very low use. The increased traffic from truck deliveries and construction workers commuting to the site is not likely to result in significant adverse impact on traffic safety. Some segments of local roads within the site boundary would be improved by graveling and grading or would be completely reconstructed and widened. The proposed improvements would improve the quality of the roads and have a beneficial impact on traffic safety.

During operation, the anticipated permanent staff of up to 20 employees would not significantly increase traffic in the analysis area. The use of area highways and local roads by employees during operation is not likely to result in a significant adverse impact on traffic safety.

(d) Waste Minimization

OAR 345-022-0120

(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that, to the extent reasonably practicable:

(a) The applicant's solid waste and wastewater plans are likely to minimize generation of solid waste and wastewater in the construction, operation, and retirement of the facility, and when solid waste or wastewater is generated, to result in recycling and reuse of such wastes;

(b) The applicant's plans to manage the accumulation, storage, disposal and transportation of waste generated by the construction and operation of the facility are likely to result in minimal adverse impact on surrounding and adjacent areas.

(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

** * **

Proposed Conditions

KIII provided information about waste minimization in Exhibit V of the site certificate application.

A. Solid Waste

Solid waste generated during construction would consist primarily of concrete waste from turbine pad construction, wood waste from wood forms used for concrete pad construction and scrap steel from turbine tower construction. Other construction wastes could include erosion control materials, such as straw bales and silt fencing, and packaging materials for turbine parts and other electrical equipment.

The applicant's plan for solid waste management during construction is described in Exhibit V. The Council adopts Condition (105), which summarizes the applicant's plan. KIII proposes to minimize the generation of solid waste during construction by detailed estimating

of materials needs and efficient construction practices. Packaging wastes (such as paper and cardboard) would be separated and recycled. Wastes generated during construction would be recycled when feasible. Non-recyclable wastes would be collected and transported to a local landfill by a licensed waste hauler.

Concrete waste would be generated on site during construction. This waste may be used as fill on site, with the agreement of the landowner. Before disposing of clean fill on site, the certificate holder would submit a request for permit exemption in accordance with OAR 340-093-0080 and any other applicable regulations. The material would be placed in an excavated hole and covered with at least 3 feet of topsoil. The surface would be graded to match existing contours. If no reuse option is available for concrete waste on site or at another location where such fill is allowed, it would be removed to a landfill by a licensed waste hauler. The Council adopts Condition (106), which addresses requirements for disposal of waste concrete.

During operation, small quantities of office waste, such as paper, food packaging and scraps, would be generated at the O&M building. In addition, there could be small quantities of solid waste from repair or replacement of electrical or turbine equipment. The applicant's plan for solid waste management during operation of the facility is described in Exhibit V. The Council adopts Condition (107), which summarizes the applicant's plan. Waste from the O&M building and other solid waste generated on site would be collected and recycled as feasible. Non-recyclable wastes would be collected and transported to a local landfill by a licensed waste hauler.

Hazardous materials that could be used on the project site during construction or operation include lubricating oils, cleaners and herbicides. Hazardous wastes, such as oily rags or similar wastes related to turbine lubrication and other maintenance, would be generated during construction and operation. The applicant would use hazardous materials in a manner that is protective of human health and the environment and would comply with all applicable local, state, and federal environmental laws and regulations. If accidental spills of hazardous materials were to occur, the spill would be cleaned up and the contaminated soil or other materials disposed of and would be treated according to applicable regulations. The Council adopts Condition (73), which addresses proper handling of hazardous materials, and Condition (74), which addresses preparation for and response to spills and accidental releases of hazardous materials.

Measures for reducing, reusing and recycling solid waste upon retirement would be addressed as part of the retirement plan that the Council must approve before retirement of the facility (Condition (9)).

B. Wastewater

During construction, wastewater would be generated from the wash down of concrete trucks after concrete loads have been emptied. The Council adopts Condition (80), which would require that wash down occur only at an existing contractor-owned batch plant or at tower foundation locations. In addition, the Council adopts Condition (103), which would require that portable toilets be provided for on-site sewage handling during construction and that they be pumped and cleaned regularly by a licensed contractor.

During operation, sewage from the O&M building would be discharged to an on-site septic system. Water used for blade washing would evaporate on site. Any wastewater generated during retirement would be addressed as part of the retirement plan that the Council must approve before retirement of the facility.

C. Impact on Surrounding and Adjacent Areas

The accumulation, storage, disposal and transportation of waste generated by construction and operation of the proposed facility would have minimal adverse impact on surrounding and adjacent areas. Most waste would be removed from the site and reused, recycled or disposed of at an appropriate facility.

Transportation of wastes to landfills or recycling facilities would involve periodic truck trips over public and private roads between the facility site and the landfill or recycling facilities. Because of the expected low volume of waste materials, these trips would not have an adverse impact on surrounding and adjacent areas.

Water used on site during construction for dust suppression and road compaction would evaporate or infiltrate into the ground. Water would not be discharged to wetlands, lakes, rivers or streams.

During construction, the certificate holder would ensure that contractors manage and monitor waste generation and recycle or dispose of wastes in an appropriate manner. During operation, the operations staff would be responsible for a waste management program, ensuring that solid waste is recycled to the extent feasible or disposed of in dumpsters and that hazardous wastes are properly disposed of in accordance with applicable regulations.

V. OTHER APPLICABLE REGULATORY REQUIREMENTS: FINDINGS AND CONCLUSIONS

1. Requirements under Council Jurisdiction

Under ORS 469.503(3) and under the Council's General Standard of Review (OAR 345-022-0000, the Council must determine that the proposed facility complies with "all other Oregon statutes and administrative rules identified in the project order, as amended, as applicable to the issuance of a site certificate for the proposed facility." Applicable Oregon statutes and administrative rules that are not otherwise addressed in Section IV of this order include the noise control regulations adopted by the Environmental Quality Commission, the Division of State Lands' regulations for removal or fill of material affecting waters of the state, the Water Resources Department's (WRD) regulations for appropriating ground water, the Oregon Department of Transportation's regulations for location and construction of buried cables within State Highway right-of-way and the Council's statutory authority to consider protection of public health and safety.

(a) Noise Control Regulations

The applicable noise control regulations are as follows:

OAR 340-035-0035

Noise Control Regulations for Industry and Commerce

(1) Standards and Regulations:

* * *

(b) New Noise Sources:

* * *

(B) New Sources Located on Previously Unused Site:

(i) No person owning or controlling a new industrial or commercial noise source located on a previously unused industrial or commercial site shall cause or permit the operation of that noise source if the noise levels generated or indirectly caused by that noise source increase the ambient statistical noise levels, L10 or L50, by more than 10 dBA in any one hour, or exceed the levels specified in Table 8, as measured at an appropriate measurement point, as specified in subsection (3)(b) of this rule, except as specified in subparagraph (1)(b)(B)(iii).

(ii) The ambient statistical noise level of a new industrial or commercial noise source on a previously unused industrial or commercial site shall include all noises generated or indirectly caused by or attributable to that source including all of its related activities. Sources exempted from the requirements of section (1) of this rule, which are identified in subsections (5)(b) - (f), (j), and (k) of this rule, shall not be excluded from this ambient measurement.

(iii) For noise levels generated or caused by a wind energy facility:

(I) The increase in ambient statistical noise levels is based on an assumed background L50 ambient noise level of 26 dBA or the actual ambient background level. The person owning the wind energy facility may conduct measurements to determine the actual ambient L10 and L50 background level.

(II) The "actual ambient background level" is the measured noise level at the appropriate measurement point as specified in subsection (3)(b) of this rule using generally accepted noise engineering measurement practices. Background noise measurements shall be obtained at the appropriate measurement point, synchronized with windspeed measurements of hub height conditions at the nearest wind turbine location. "Actual ambient background level" does not include noise generated or caused by the wind energy facility.

(III) The noise levels from a wind energy facility may increase the ambient statistical noise levels L10 and L50 by more than 10 dBA (but not above the limits specified in Table 8), if the person who owns the noise sensitive property executes a legally effective easement or real covenant that benefits the property on which the wind energy facility is located. The easement or covenant must authorize the wind energy facility to increase the ambient statistical noise levels, L10 or L50 on the sensitive property by more than 10 dBA at the appropriate measurement point.

(IV) For purposes of determining whether a proposed wind energy facility would satisfy the ambient noise standard where a landowner has not waived the standard, noise levels at the appropriate measurement point are predicted assuming that all of the proposed wind facility's turbines are operating between cut-in speed and the wind speed corresponding to the maximum sound power level established by IEC 61400-11 (version 2002-12). These predictions must be

compared to the highest of either the assumed ambient noise level of 26 dBA or to the actual ambient background L10 and L50 noise level, if measured. The facility complies with the noise ambient background standard if this comparison shows that the increase in noise is not more than 10 dBA over this entire range of wind speeds.

(V) For purposes of determining whether an operating wind energy facility complies with the ambient noise standard where a landowner has not waived the standard, noise levels at the appropriate measurement point are measured when the facility's nearest wind turbine is operating over the entire range of wind speeds between cut-in speed and the windspeed corresponding to the maximum sound power level and no turbine that could contribute to the noise level is disabled. The facility complies with the noise ambient background standard if the increase in noise over either the assumed ambient noise level of 26 dBA or to the actual ambient background L10 and L50 noise level, if measured, is not more than 10 dBA over this entire range of wind speeds.

(VI) For purposes of determining whether a proposed wind energy facility would satisfy the Table 8 standards, noise levels at the appropriate measurement point are predicted by using the turbine's maximum sound power level following procedures established by IEC 61400-11 (version 2002-12), and assuming that all of the proposed wind facility's turbines are operating at the maximum sound power level.

(VII) For purposes of determining whether an operating wind energy facility satisfies the Table 8 standards, noise generated by the energy facility is measured at the appropriate measurement point when the facility's nearest wind turbine is operating at the windspeed corresponding to the maximum sound power level and no turbine that could contribute to the noise level is disabled.

* * *

Findings of Fact

Applicable Regulations

The proposed facility would be a "new industrial or commercial noise source" under OAR 340-035-0035 because construction of the facility would begin after January 1, 1975.[111] The noise control regulations impose different limits on new noise sources constructed on a "previously used industrial or commercial site" compared to the limits imposed on new sources constructed on a "previously unused industrial or commercial site." A site is considered a "previously unused industrial or commercial site" if the site has not been not been used by any industrial or commercial noise source at any time during the 20 years preceding the construction of a new noise source on the site.[112] According to the applicant, all the equipment associated with the proposed KWP would be located on property that has not been used for industrial or commercial operations during the past 20 years. Therefore, the noise generated by the proposed project must comply with OAR 340-035-0035(1)(b)(B).

[111] OAR 340-035-0015(33) defines "new industrial or commercial noise source."
[112] OAR 340-035-0015(47) defines "previously unused industrial or commercial site." Agricultural activities are specifically excluded from this definition.

The regulation quoted above requires that the noise generated by a new wind energy facility located on a previously unused site must comply with two tests. Facility-generated noise must not increase the ambient hourly L_{10} or L_{50} noise levels at any noise sensitive receiver by more than 10 decibels (dBA[113]) when turbines are operating "between cut-in speed and the wind speed corresponding to the maximum sound power level."[114] This requirement is known as the "ambient degradation" test. To show that a proposed facility complies with this test, the applicant may use an assumed ambient hourly L_{50} noise level of 26 dBA; otherwise, the applicant must measure the actual ambient hourly noise levels at the receiver in accordance with the procedures specified in the regulation. OAR 340-035-0035(1)(b)(B)(iii)(III) relieves the applicant from having to show compliance with the ambient degradation test "if the person who owns the noise sensitive property executes a legally effective easement or real covenant that benefits the property on which the wind energy facility is located."

The potential "waiver" of the ambient degradation test does not relieve the wind facility from compliance with the second test imposed under OAR 340-035-0035(1)(b)(B). A new wind energy facility located on a previously unused site must not radiate sound levels to any noise sensitive receiver exceeding the noise limits specified in Table 8 of the regulation. This is known as the "Table 8" or "maximum allowable" test. Table 8 provides the following limits:

Statistical Noise Limits for Industrial and Commercial Sources		
Statistical Descriptor	**Maximum Permissible Statistical Noise Levels (dBA)**	
	Daytime (7:00 AM - 10:00 PM)	**Nighttime (10:00 PM - 7:00 AM)**
L_{50}	55	50
L_{10}	60	55
L_1	75	60
The hourly L_{50}, L_{10} and L_1 noise levels are defined as the noise levels equaled or exceeded 50 percent, 10 percent and 1 percent of the hour, respectively.		

The proposed energy facility would operate on a 24-hour basis. Therefore, the noise radiating from the proposed facility must not exceed the maximum allowable nighttime noise limits (10:00 PM to 7:00 AM). Consequently, to comply with the maximum allowable test, the noise radiating from the KWP must not exceed an hourly L_{50} noise level of 50 dBA at any noise sensitive receiver. For the purpose of determining whether a proposed wind facility would comply with this test, noise levels must be predicted "assuming that all of the proposed wind facility's turbines are operating at the maximum sound power level."

[113] The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network, which corresponds to the frequency response of the human ear.

[114] The regulation applies the test "as measured at an appropriate measurement point." The "appropriate measurement point," as defined by OAR 340-035-0015(3), is "25 feet (7.6 meters) toward the noise source from that point on the noise sensitive building nearest the noise source" or "that point on the noise sensitive property line nearest the noise source," whichever is farther from the source. OAR 340-035-0015(38) defines "noise sensitive property" as "real property normally used for sleeping, or normally used as schools, churches, hospitals, or public libraries." Private residences are the only "noise sensitive properties" potentially affected by the proposed KWP. We refer to these as the "noise sensitive receivers."

Compliance with the Regulations

OAR 340-035-0035(5)(g) specifically exempts noise caused by construction activities. Construction of the proposed KWP would produce localized, short duration noise levels similar to those produced by any large construction project with heavy construction equipment. Much of the project work would be far removed from any noise sensitive receivers. Nevertheless, in those areas near residences, the certificate holder should confine the noisiest construction activities to daylight hours to help mitigate noise impacts at the residences (Condition (101)).

The applicant has elected to use the assumed ambient hourly L_{50} noise level of 26 dBA for the background ambient noise level rather than to conduct noise measurements at the noise sensitive receivers in the vicinity of the project. Accordingly, to show compliance with the ambient degradation test, the noise generated by the operation of the proposed KWP wind turbines between cut-in wind speed and maximum sound power level wind speed must not cause the hourly L_{50} noise level at any noise sensitive receiver to exceed 36 dBA.

KIII proposes to use either GE 1.5-MW or Vestas 1.65-MW wind turbines. For the purpose of predicting the noise generated by the wind facility, KIII used the sound data associated with the GE 1.5-MW turbines because those turbines reportedly have the potential of generating higher maximum noise levels within the operating wind speeds associated with the two turbine types.[115] In predicting the noise from the turbines, KIII assumed the maximum sound power level of 106 dBA that is guaranteed by the manufacturer, and in predicting the noise that would be generated by substation transformers, KIII utilized a predicted maximum sound power level of 103.8 dBA.[116]

KIII identified seven noise sensitive receivers that have the potential of receiving noise from the proposed facility. To accommodate the applicant's request for flexibility to construct wind turbines within a 900-foot-wide micrositing corridor, the Department asked the applicant to predict the noise levels at the noise sensitive receivers assuming that the turbines were located at the edge of the 900-foot corridor closest to the receiver. To perform the analysis, KIII used the Sound Propagation Model for Outdoor Noise Sources (SPM 9613, Version 2) to predict turbine noise levels at the seven locations. Based on the assumed turbine locations, the predicted hourly L_{50} noise levels at five of the seven receivers would exceed the 36 dBA limit of the "ambient degradation" test, but turbine operating noise would not exceed the "maximum allowable" (Table 8) test at any of the receivers. Table 9 shows the predicted maximum noise levels[117]:

[115] E-mail from Jesse Gronner, dated January 10, 2006, regarding "Vestas noise info" (App Supp, Tab X, Item v).
[116] Memo from TW Environmental, dated January 10, 2006 (App Supp, Tab X, Item vii).
[117] The table shows results based on modeling data from TW Environmental (App Supp, Tab X, Items vii and viii).

Table 9: Predicted Noise Based on Assumed Turbine Locations

Receiver	Predicted Maximum Hourly L_{50} Noise Level (dBA)
R1	35
R2	36
R3	38
R4	43
R5	41
R6	45
R7	43

As shown in Table 9, the predicted noise levels at R3, R4, R5, R6 and R7 exceed the ambient degradation limit. The predicted noise level at R7 includes the predicted noise contributed from the transformer at the proposed Webfoot substation, assuming the substation is located nearest R7 within the 4-acre parcel with no shielding by the proposed O&M building.

The applicant identified the particular turbines that would contribute to causing the facility to generate noise in excess of the ambient degradation limit. To reduce noise from the facility to an acceptable level, these turbines would have to be eliminated or moved (within the micrositing corridors) farther away from the noise sensitive receivers. Table 10 lists the turbines and the affected noise sensitive receivers.[118]

Table 10: Turbines Potentially Contributing to Excessive Noise

Receiver	Turbine Number (Wpt)
R3	48 and 49
R4	58, 59, 60, 61, 62, 63 and 64
R5	58, 59 and 60
R6	89, 90, 91, 92, 93, 94, 97, 98, 99, 100, 101, 102, 126, 127, 128 and 136
R7	93, 94, 101, 102, 126, 127, 128, 129, 130, 131, 132, 136, 137, 138 and 139

The Council adopts Condition (102). As provided under OAR 340-035-0035(1)(b)(B)(iii)(III), the certificate holder would be relieved from having to show compliance with the ambient degradation test by obtaining a "legally effective easement or real covenant" from the affected landowner. To address compliance for those properties for which the landowner has not provided a "waiver" of the ambient degradation test, Condition (102) requires the certificate holder to present data before construction begins to demonstrate that the facility would not generate noise in excess of 36 dBA at the property when the turbines listed in Table 10 are placed in their final design locations.

Under OAR 340-035-0035(4)(a), DEQ has authority to require the owner of an operating noise source to monitor and record the statistical noise levels upon written notification. In the event of a complaint regarding noise levels during the operation of the proposed KWP, the Council has authority to act in the place of DEQ to enforce this provision

[118] Turbine location numbering corresponds to turbine locations as shown on the Turbine Location Map (App Appendix C-3).

to verify that the certificate holder is operating the facility in compliance with the noise control regulation. Under Condition (3), the certificate holder would be required to operate the facility in accordance with all applicable state laws.

Conclusions of Law

Based on the findings and conditions discussed above, the Council finds that the proposed facility would comply with the applicable state noise control regulations (OAR 340-035-0035(1)(b)(B)). The Council finds that a site certificate for the facility should include Conditions (101) and (102).

(b) Removal-Fill Law

The Oregon Removal-Fill Law (ORS 196.800 through 990) and regulations (OAR 141-085-0005 through 141-085-0090) adopted by the Department of State Lands (DSL) require a Removal/Fill Permit if 50 cubic yards or more of material is removed, filled or altered within any "waters of the state" at the proposed site.[119] The Council must determine whether a permit is needed. In addition, the U.S. Army Corps of Engineers administers Section 404 of the Clean Water Act, which regulates the discharge of fill into waters of the United States (including wetlands). Under Section 404, a federal Nationwide or Individual fill permit may be required.

Findings of Fact

KIII provided information about wetlands and other waters of the state in Exhibit J of the application. The applicant's contractor, David Evans and Associates, Inc. (DEA), conducted field investigation for wetlands following the procedures in the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). The DEA field investigation addressed the area within a 300-foot survey corridor centered on the proposed turbine strings and a 60-foot survey corridor centered on linear components outside of turbine strings (proposed new roads, existing roads requiring upgrade, underground collector system and aboveground collector line).[120] In addition, the field investigation area included the actual footprint (with no surrounding "buffer") of all proposed laydown areas and substations. DEA reviewed the entire area for possible wetlands or other waters of the state but selected 25 sample plots in areas believed to have the highest probability of containing such features (ravine bottoms, depressions and other areas that could potentially collect water). The sample plots included areas mapped as wetlands by the National Wetlands Inventory and areas mapped as intermittent or perennial drainages by the U.S. Geological Survey. DEA conducted a ground survey of the sample plots in January 2005.

The applicant provided a wetland delineation report, which summarized the field investigation.[121] DSL reviewed the applicant's delineation report and found that the report identified one wetland unit (0.13 acres) and one intermittent waterway (a drainage channel).

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[119] OAR 141-085-0010(225) defines "Waters of this State." The term includes wetlands and certain other water bodies.

[120] Although Appendix J-1 describes the "site boundary" somewhat differently, DSL subsequently concurred that the delineation report adequately addressed the area within a 300-foot survey corridor centered on turbine strings (Letter from Jill Myatt, DSL, to Jesse Gronner, January 5, 2006).

[121] Wetland Delineation Report: Klondike III Wind Project (March 2005), App Appendix J-1.

DSL found that the wetland was subject to the permit requirements of the Removal-Fill Law but that the intermittent waterway was not jurisdictional.[122]

The applicant proposes to avoid any impact on the two identified features. At locations where the proposed underground collector system would cross the drainage channel, the applicant would bore under the channel. The proposed aboveground transmission line crosses over the channel and the wetland area. The applicant would locate transmission line support structures outside of the channel and the wetland. By using these measures, there would be no removal or fill of material within the jurisdictional wetland identified by DSL and no need for a Removal/Fill Permit. For the same reason, a Section 404 federal permit would not be required because there could be no impact on any waters of the United States.

No field investigation has been done in areas within the proposed 900-foot micrositing corridors but outside the DEA investigation area described above. To ensure that a Removal/Fill Permit would not be needed for construction of the KWP anywhere within the micrositing corridor, the applicant proposed a site certificate condition that would require a pre-construction field investigation after the final turbine design locations have been identified. The Council adopts Condition (79), which would ensure that the facility would have no impact on jurisdictional waters of the state. Based on the final design layout of the facility, if construction would occur in any locations not previously investigated by DEA as described in Appendix J-1 of the application, the certificate holder would conduct a pre-construction investigation to determine whether any jurisdictional waters of the state exist in those locations. The condition requires that there be no impact on any jurisdictional water identified in the pre-construction investigation.

Conclusions of Law

Based on the findings and conditions discussed above, the Council concludes that a Removal-Fill Permit is not required. The Council finds that a site certificate for the facility should include Condition (79).

(c) Ground Water Act

Through the provisions of the Ground Water Act of 1955, ORS 537.505 to ORS 537.796, and OAR Chapter 690, the Oregon Water Resources Commission administers the rights of appropriation and use of the ground water resources of the state. Under OAR 345-022-0000(1), the Council must determine whether the proposed KWP complies with these statutes and administrative rules.

Findings of Fact

The construction and operation of the proposed KWP would not require a new or transferred water right. During construction, approximately 18 million gallons of water would be used primarily for dust suppression, road compaction and concrete mixing. The applicant anticipates that a variety of sources could supply this water. To show that adequate water is available in the area, KIII provided a letter from the City of Arlington, indicating that the city could supply all of the water needed for construction of the KWP.[123]

[122] Letter from Jill Myatt, DSL, to Jesse Gronner, September 26, 2005.
[123] Letter from Tim Wetherell, City of Arlington Public Works Director, dated February 27, 2006 (attachment to e-mail from Jesse Gronner, dated February 28, 2006, regarding "water right issue").

During operation of the facility, water would come from a new on-site well. The volume of water used would be less than 5,000 gallons per day. ORS 537.545(1)(f) provides that a new water right is not required for industrial and commercial uses of up to 5,000 gallons per day. During operation, water would be used for domestic purposes at the O&M facility and possibly for turbine blade-washing, subject to Condition (83), under which the certificate holder would demonstrate to the Department that blade-washing would be authorized under a DEQ general permit or that no permit would be required.

Conclusions of Law

Based on the findings above, the Council concludes that, subject to the conditions stated herein, the proposed use of ground water for the construction and operation of the proposed KWP complies with the Ground Water Act of 1955 and the rules of the Water Resources Department. The Council finds that a site certificate for the facility should include Condition (83).

(d) Utility Crossing of a State Highway

Under OAR Chapter 734, Division 55, the Oregon Department of Transportation regulates the location, installation, construction, maintenance and use of utility structures, including buried cables, within State Highway right-of-way. The proposed facility would include underground collector lines that would cross under Highway 206 along Smith Lane to the north of turbine string "D."[124] The certificate holder would be required to obtain the necessary permit from ODOT before beginning construction (Condition (86)).

In consultation with ODOT, the Council has authority to determine whether the applicant has met the requirements for a utility crossing permit, and the Council has authority to impose conditions in the permit.[125] ODOT would issue the permit, based on the conditions of the site certificate. ODOT retains enforcement authority over the permit.[126] ODOT has recommended that the Council find that the applicant has met the permit requirements and has provided a draft permit that includes recommended conditions.[127]

The Council finds that KIII has met the permit requirements. The Council instructs ODOT to issue a permit substantially in the form of Attachment D upon submission by the applicant of the proper application and payment of the proper fee as provided under ORS 469.401(3).

(e) Public Health and Safety

Under ORS 469.310 the Council is charged with ensuring that the "siting, construction and operation of energy facilities shall be accomplished in a manner consistent with protection of the public health and safety...." State law further provides that "the site certificate shall contain conditions for the protection of the public health and safety…." ORS 469.401(2).

[124] Figure P-1 (App Supp, Tab P, Item 1).
[125] ORS 469.503(3).
[126] ORS 469.401(3).
[127] E-mail from Patrick Smith, ODOT, April 12, 2006.

Findings of Fact

We discuss specific public health and safety standards for wind energy facilities above at page 62. In this section we discuss the issues of fire protection, magnetic fields, highway safety and coordination with the Oregon Public Utilities Commission.

A. Fire Protection

The certificate holder would develop and implement a fire management plan during construction in consultation with local fire control authorities (Condition (66)). The plan would include measures to reduce the risk of wildfire and to respond appropriately to any fires that occur on the facility site. The certificate holder would ensure that construction vehicles and equipment are operated on graveled areas to the extent possible and that open flames, such as cutting torches, are kept away from dry grass areas (Condition (68)).

Turbine towers and pad-mounted transformers would be constructed with a concrete pad around each base and a minimum of 10 feet of non-flammable ground cover on all sides (Condition (65)). The turbines would have automatic equipment protection features that would shut down the turbine if a malfunction occurs and reduce the chance of a mechanical problem causing a fire (Condition (63)). Service vehicles used for regular maintenance or construction at the site would be equipped with a shovel and portable fire extinguisher of a 4A5OBC or equivalent rating (Condition (67)).

The certificate holder would develop and implement a fire management plan during facility operation in consultation with local fire control authorities (Condition (66)). During operation, all on-site employees would receive annual fire prevention and response training by qualified instructors or members of the local fire department (Condition (70)). Employees would be instructed to keep vehicles on roads and off dry grassland, except when off-road operation is required for emergency purposes. The certificate holder would provide to the county fire department a copy of the approved site plan indicating the identification number assigned to each turbine and the location of all facility structures (Condition (69)). Fire control authorities would also receive the names and telephone numbers of facility personnel to contact in an emergency.

B. Magnetic Fields

The proposed facility would include a network of underground and aboveground electric transmission lines (collector system) and an aboveground 230-kV transmission line to carry power from the eastern section of the project to the proposed facility substation near Schoolhouse. Electric transmission lines create both electric and magnetic fields. Electric fields produced by the proposed KWP transmission lines are addressed above at page 66, and for the reasons discussed there, the electric fields would not exceed the Council's standard of 9 kV per meter at one meter above the ground surface in areas accessible to the public.

The strength of a magnetic field is a function of the current (amperage) in the electric transmission line: the higher the current, the greater the strength of the magnetic field. The magnetic field strength decreases as the distance from the conductor increases. The strength of a magnetic field fluctuates hourly and daily with changes in the amount of current in the transmission line caused by the electrical load. Magnetic field strength is measured in units of milligauss (mG). The applicant calculated magnetic field strength using "Corona and Field

Effect Program (Version 3)," a software tool developed by the Bonneville Power Administration.

The Council has previously considered the issue of whether exposure to magnetic fields might cause health risks.[128] This issue has been the subject of considerable scientific research and discussion. Based on its review in other cases, the Council has concluded that the credible evidence of a health risk from low levels of exposure to magnetic fields is inconclusive. The Council has not found sufficient information upon which to set health-based limits for exposure to magnetic fields. Nevertheless, given the uncertainty about possible health consequences, the Council has encouraged applicants to propose low-cost ways to reduce or manage public exposure to magnetic fields from transmission lines under the Council's jurisdiction. This approach is sometimes referred to as "prudent avoidance." The Council adopts Condition (88), which would reduce public exposure to magnetic fields.

Aboveground 230-kV Transmission Line

For the aboveground 230-kV line, KIII determined that the maximum magnetic field strength would occur directly beneath the line at mid-span. The analysis assumed the lowest mid-span conductor height of 30 feet. KIII determined that the maximum magnetic field strength would be 92.7 mG and that the field strength would decrease to 2.7 mG at 200 feet from the centerline.[129] There would be no residential structures within 200 feet of the transmission line.

Aboveground 34.5-kV Transmission Line

The aboveground 34.5-kV line would include segments of single-circuit or double-circuit line. The applicant calculated that the highest magnetic field (maximum current during peak load) below a single-circuit line would be 49.6 mG and below a double-circuit line would be 86.2 mG.[130]

Underground 34.5-kV Transmission Line

KIII estimated the potential magnetic field strength from the underground 34.5-kV transmission lines considering two cases: one, where the circuit is remote from other circuits, and, two, where the circuit parallels other circuits. The magnetic field strength calculation assumed that the cables would be buried underground at a depth of 48 inches. KIII determined that the maximum magnetic field strength for the underground system would be 41.05 mG and would occur for main feeder circuits isolated from other circuits, because some cancellation of fields occurs when several circuits are parallel and in proximity.[131]

[128] Final Order for the Klamath Generation Facility, September 2005; Final Order for the COB Energy Facility, January 2005; Final Order for the Summit/Westward Project, October 2002; Final Order for the Port Westward Generating Project, November 2002; Final Order for the Hermiston Power Project, March 1996; Report of the EMF Committee to the Energy Facility Siting Council, dated March 30, 1993; Final Report on Human Health Effects from Exposure to 60-Hz Electric and Magnetic Fields from High Voltage Power Lines to the Council, dated April 1990.
[129] App Supp Tab AA, Item iii.
[130] App Supp, Tab AA, Item iv.
[131] App Supp, Tab AA, Item i.

C. Highway Safety

State Highway 206 crosses the southwest part of the KWP facility site between turbine string "D" and turbine string "E."[132] In comments to the Department, ODOT expressed concern about traffic safety in the area.[133] Wind turbines located close to the highway might distract motorists' attention. ODOT recommended improvements to the highway shoulders to give motorists a safe place to stop and view the turbines. The Council adopts Condition (75), which would require the certificate holder to cooperate with ODOT to implement improvements to the highway shoulders.

D. Coordination with the PUC

The Oregon Public Utility Commission Safety and Reliability Section ("PUC") has previously requested that the Council ensure that certificate holders coordinate with PUC staff on the design and specifications of electrical transmission lines. The PUC has explained that others in the past have made inadvertent, but costly, mistakes in the design and specifications of transmission lines that could have easily been corrected early if the developer had consulted with the PUC staff responsible for the safety codes and standards. The certificate holder would be required to coordinate the design of electrical transmission lines with the PUC (Condition (85)).

Conclusions of Law

Based on the findings and conditions discussed above, the Council concludes that the siting, construction and operation of the proposed KWP facilities, subject to the conditions stated in this order, are consistent with protection of public health and safety. The Council finds that a site certificate for the facility should include Conditions (63), (65), (66), (67), (68), (69), (70), (75), (85) and (88).

2. Summary of Monitoring Requirements

This section summarizes site certificate requirements for monitoring that would apply to the proposed facility. Condition (20) requires the certificate holder to have specific monitoring programs for impacts to resources protected by Council standards and to resources addressed by other applicable statutes, administrative rules and local ordinances. The certificate holder's monitoring programs should include the requirements listed below and any other monitoring necessary to comply with site certificate conditions.

1) Cultural Resources: The certificate holder must monitor construction activities to ensure that construction personnel cease all ground-disturbing activities in the immediate area if any archaeological or cultural resources are found (Condition (50)) and to ensure that construction personnel proceed carefully in the vicinity of the mapped alignment of the Oregon Trail (Condition (51)).

2) Operational Safety: The certificate holder must have an operational safety monitoring program, including inspection of turbine blades on a regular basis for signs of wear (Condition (62)).

[132] Figure P-1 (App Supp, Tab P, Item 1).
[133] E-mail from Patrick Smith, ODOT, March 15, 2006.

3) Fire Control: The certificate holder must have a fire management plan, including monitoring the site to minimize the risk of fire and to respond appropriately to any fires that occur (Condition (66)).

4) Hazardous Materials: The certificate holder must monitor the use of hazardous materials to ensure protection of public health, safety and the environment (Condition (73)).

5) Soil Impacts: The certificate holder must implement an Erosion and Sediment Control Plan during construction to minimize adverse impacts to soils (Condition (76)) and must monitor the facility site during operation to maintain or repair erosion control measures (Condition (82)).

6) Post-Construction Revegetation: The certificate holder must restore areas temporarily disturbed during construction as described in the Revegetation Plan, including monitoring of the revegetated areas to ensure that success criteria are met (Condition (81)).

7) Weed Control: The certificate holder must monitor the facility site during operation to control the spread of noxious weeds (Condition (89)).

8) Wildlife nest avoidance: The certificate holder must monitor raptor nest locations during construction to comply with restrictions of construction activity within 1300 feet of active nests (Condition (94)).

9) Wildlife Monitoring: The certificate holder must monitor the facility site for impacts to avian and bat species in accordance with a Wildlife Monitoring and Mitigation Plan (Condition (95)).

10) Habitat Mitigation: The certificate holder must monitor the habitat mitigation site to ensure that success criteria are met and maintained for the life of the facility (Condition (97)).

3. Requirements That Are Not Under Council Jurisdiction

(a) Federally-Delegated Programs

Under ORS 469.503(3), the Council does not have jurisdiction for determining compliance with statutes and rules for which the federal government has delegated the decision on compliance to a state agency other than the Council. Nevertheless, the Council may rely on the determinations of compliance and the conditions in the federally-delegated permits issued by these state agencies in deciding whether the proposed facility meets other standards and requirements under its jurisdiction.

The applicant has applied to the Oregon Department of Environmental Quality (DEQ) for the NPDES 1200-C General Construction Storm Water permit, and DEQ has assigned the project to the 1200-C general permit.[134]

[134] E-mail from Richard Nichols, DEQ, February 13, 2006, regarding "Klondike III and Bigalow."

(b) Requirements That Do Not Relate to Siting

Under ORS 469.401(4), the Council does not have authority to preempt the jurisdiction of any state agency or local government over matters that are not included in and governed by the site certificate or amended site certificate. Such matters include design-specific construction or operating standards and practices that do not relate to siting. Nevertheless, the Council may rely on the determinations of compliance and the conditions in the permits issued by these state agencies and local governments in deciding whether the facility meets other standards and requirements under its jurisdiction.

VI. CONDITIONS REQUIRED BY COUNCIL RULES

This section lists conditions to be included in the site certificate as specifically required by OAR 345-027-0020 (Mandatory Conditions in Site Certificates), OAR 345-027-0023 (Site Specific Conditions), OAR 345-027-0028 (Monitoring Conditions) and OAR Chapter 345, Division 26 (Construction and Operation Rules for Facilities). These conditions should be read together with the specific facility conditions listed in Section VII to ensure compliance with the siting standards of OAR Chapter 345, Divisions 22 and 24, and to protect the public health and safety. References in preceding sections to specific conditions are included for convenience only. Such references do not relieve the certificate holder from the obligation to comply with all site certificate conditions. In these conditions, "Office of Energy" means the Oregon Department of Energy, and the other definitions in OAR 345-001-0010 apply.

The obligation of the certificate holder to report information to the Department or the Council under the conditions listed in this section and in Section VII is subject to the provisions of OAR 345-001-0040, which addresses information that may be exempt under the Oregon Public Records Law. To the extent permitted by law, the Department and the Council will not publicly disclose information that may be exempt from public disclosure under ORS 192.502 *et seq*. or ORS 469.560 if the certificate holder has clearly labeled such information and stated the basis for the exemption at the time of submitting the information to the Department or the Council. If the Council or the Department receives a request for the disclosure of the information, the Council or the Department, as appropriate, will make a reasonable attempt to notify the certificate holder and will refer the matter to the Attorney General for a determination of whether the exemption is applicable, pursuant to ORS 192.450.

In addition to all other conditions stated in this order, the site certificate holder is subject to all conditions and requirements contained in the rules of the Council and in local ordinances and state law in effect on the date the certificate is executed. Under ORS 469.401(2), upon a clear showing of a significant threat to the public health, safety or the environment that requires application of later-adopted laws or rules, the Council may require compliance with such later-adopted laws or rules.

The Council recognizes that many specific tasks related to the design, construction, operation and retirement of the facility will be undertaken by KIII's agents or contractors. Nevertheless, the certificate holder is responsible for ensuring compliance with all provisions of the site certificate.

(1) OAR 345-027-0020(1): The Council shall not change the conditions of the site certificate except as provided for in OAR Chapter 345, Division 27.

(2) OAR 345-027-0020(2): Except as provided in OAR 345-027-0023(6), before beginning construction, the certificate holder shall submit to the Office of Energy a legal description of the site.

(3) OAR 345-027-0020(3): The certificate holder shall design, construct, operate and retire the facility:

(a) Substantially as described in the site certificate;

(b) In compliance with the requirements of ORS Chapter 469, applicable Council rules, and applicable state and local laws, rules and ordinances in effect at the time the site certificate is issued; and

(c) In compliance with all applicable permit requirements of other state agencies.

(4) OAR 345-027-0020(4): The certificate holder shall begin and complete construction of the facility by the dates specified in the site certificate. (*See conditions (26) and (27).*)

(5) OAR 345-027-0020(5): Except as necessary for the initial survey or as otherwise allowed for transmission lines or pipelines under this section, the certificate holder shall not begin construction, as defined in OAR 345-001-0010, or create a clearing on any part of the site until the certificate holder has construction rights on all parts of the site. For the purpose of this rule, "construction rights" means the legal right to engage in construction activities. For transmission lines or pipelines, if the certificate holder does not have construction rights on all parts of the site, the certificate holder may nevertheless begin construction, as defined in OAR 345-001-0010, or create a clearing on a part of the site if:

(a) The certificate holder has construction rights on that part of the site; and

(b) The certificate holder would construct and operate part of the facility on that part of the site even if a change in the planned route of the transmission line or pipeline occurs during the certificate holder's negotiations to acquire construction rights on another part of the site.

(6) OAR 345-027-0020(6): If the Council requires mitigation based on an affirmative finding under any standards of Division 22 or Division 24 of this chapter, the certificate holder shall consult with affected state agencies and local governments designated by the Council and shall develop specific mitigation plans consistent with Council findings under the relevant standards. The certificate holder must submit the mitigation plans to the Office and receive Office approval before beginning construction or, as appropriate, operation of the facility.

(7) OAR 345-027-0020(7): The certificate holder shall prevent the development of any conditions on the site that would preclude restoration of the site to a useful, non-hazardous condition to the extent that prevention of such site conditions is within the control of the certificate holder.

(8) OAR 345-027-0020(8): Before beginning construction of the facility, the certificate holder shall submit to the State of Oregon, through the Council, a bond or letter of credit, satisfactory to the Council, in an amount specified in the site certificate to restore the site to a useful, non-hazardous condition. The certificate holder shall maintain a bond or letter of credit in effect at all times until the facility has been retired. The Council may specify different amounts for the bond or letter of credit during construction and during operation of the facility. (*See Condition (32).*)

(9) OAR 345-027-0020(9): The certificate holder shall retire the facility if the certificate holder permanently ceases construction or operation of the facility. The certificate holder shall retire the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0110. The certificate holder shall pay the actual cost to restore the site to a useful, non-hazardous condition at the time of retirement, notwithstanding the Council's approval in the site certificate of an estimated amount required to restore the site.

(10) OAR 345-027-0020(10): The Council shall include as conditions in the site certificate all representations in the site certificate application and supporting record the Council deems to be binding commitments made by the applicant.

(11) OAR 345-027-0020(11): Upon completion of construction, the certificate holder shall restore vegetation to the extent practicable and shall landscape portions of the site disturbed by construction in a manner compatible with the surroundings and proposed use. Upon completion of construction, the certificate holder shall dispose of all temporary structures not required for facility operation and all timber, brush, refuse and flammable or combustible material resulting from clearing of land and construction of the facility.

(12) OAR 345-027-0020(12): The certificate holder shall design, engineer and construct the facility to avoid dangers to human safety presented by seismic hazards affecting the site that are expected to result from all maximum probable seismic events. As used in this rule "seismic hazard" includes ground shaking, landslide, liquefaction, lateral spreading, tsunami inundation, fault displacement and subsidence.

(13) OAR 345-027-0020(13): The certificate holder shall notify the Office of Energy, the State Building Codes Division and the Department of Geology and Mineral Industries promptly if site investigations or trenching reveal that conditions in the foundation rocks differ significantly from those described in the application for a site certificate. After the Office receives the notice, the Council may require the certificate holder to consult with the Department of Geology and Mineral Industries and the Building Codes Division and to propose mitigation actions.

(14) OAR 345-027-0020(14): The certificate holder shall notify the Office, the State Building Codes Division and the Department of Geology and Mineral Industries promptly if shear zones, artesian aquifers, deformations or clastic dikes are found at or in the vicinity of the site.

(15) OAR 345-027-0020(15): Before any transfer of ownership of the facility or ownership of the site certificate holder, the certificate holder shall inform the Office of Energy of the proposed new owners. The requirements of OAR 345-027-0100 apply to any transfer of ownership that requires a transfer of the site certificate.

(16) OAR 345-027-0020(16): If the Council finds that the certificate holder has permanently ceased construction or operation of the facility without retiring the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0110, the Council shall notify the certificate holder and request that the certificate holder submit a proposed final retirement plan to the Office within a reasonable time not to exceed 90 days. If the certificate holder does not submit a proposed final retirement plan by the

specified date, the Council may direct the Office to prepare a proposed a final retirement plan for the Council's approval. Upon the Council's approval of the final retirement plan, the Council may draw on the bond or letter of credit described in section (8) to restore the site to a useful, non-hazardous condition according to the final retirement plan, in addition to any penalties the Council may impose under OAR Chapter 345, Division 29. If the amount of the bond or letter of credit is insufficient to pay the actual cost of retirement, the certificate holder shall pay any additional cost necessary to restore the site to a useful, non-hazardous condition. After completion of site restoration, the Council shall issue an order to terminate the site certificate if the Council finds that the facility has been retired according to the approved final retirement plan.

(17) OAR 345-027-0023(4): If the energy facility or related or supporting facility is a transmission line, the certificate holder shall restore the reception of radio and television at residences and commercial establishments in the primary reception area to the level present prior to operations of the transmission line, at no cost to residents experiencing interference resulting from the transmission line.

(18) OAR 345-027-0023(5): If the facility includes any high voltage transmission line under Council jurisdiction:

(a) The certificate holder shall design, construct and operate the transmission line in accordance with the requirements of the National Electrical Safety Code (American National Standards Institute, Section C2, 1997 Edition); and

(b) The certificate holder shall develop and implement a program that provides reasonable assurance that all fences, gates, cattle guards, trailers, or other objects or structures of a permanent nature that could become inadvertently charged with electricity are grounded or bonded throughout the life of the line.

(19) OAR 345-027-0023(6): If the proposed energy facility is a pipeline or a transmission line or has, as a related or supporting facility, a pipeline or transmission line, the Council shall specify an approved corridor in the site certificate and shall allow the certificate holder to construct the pipeline or transmission line anywhere within the corridor, subject to the conditions of the site certificate. If the applicant has analyzed more than one corridor in its application for a site certificate, the Council may, subject to the Council's standards, approve more than one corridor. Before beginning operation of the facility, the certificate holder shall submit to the Office a legal description of the permanent right-of-way where the applicant has built the pipeline or transmission line within an approved corridor. The site of the pipeline or transmission line subject to the site certificate is the area within the permanent right-of-way.

(20) OAR 345-027-0028: The following general monitoring conditions apply:

(a) The certificate holder shall consult with affected state agencies, local governments and tribes and shall develop specific monitoring programs for impacts to resources protected by the standards of divisions 22 and 24 of this chapter and resources addressed by applicable statutes, administrative rules and local ordinances. The certificate holder must submit the monitoring programs to the Office of Energy and receive Office approval before beginning construction or, as appropriate, operation of the facility.

(b) The certificate holder shall implement the approved monitoring programs described in section (a) and monitoring programs required by permitting agencies and local governments.

(c) For each monitoring program described in sections (a) and (b), the certificate holder shall have quality assurance measures approved by the Office before beginning construction or, as appropriate, before beginning commercial operation.

(d) If the certificate holder becomes aware of a significant environmental change or impact attributable to the facility, the certificate holder shall, as soon as possible, submit a written report to the Office describing the impact on the facility and any affected site certificate conditions.

(21) OAR 345-026-0048: Following receipt of the site certificate, the certificate holder shall implement a plan that verifies compliance with all site certificate terms and conditions and applicable statutes and rules. As a part of the compliance plan, to verify compliance with the requirement to begin construction by the date specified in the site certificate, the certificate holder shall report promptly to the Office of Energy when construction begins. Construction is defined in OAR 345-001-0010. In reporting the beginning of construction, the certificate holder shall describe all work on the site performed before beginning construction, including work performed before the Council issued the site certificate, and shall state the cost of that work. For the purpose of this exhibit, "work on the site" means any work within a site or corridor, other than surveying, exploration or other activities to define or characterize the site or corridor. The certificate holder shall document the compliance plan and maintain it for inspection by the Office of Energy or the Council.

(22) OAR 345-026-0080: The certificate holder shall report according to the following requirements:

(a) General reporting obligation for non-nuclear facilities under construction or operating:

(i) Within six months after beginning construction, and every six months thereafter during construction of the energy facility and related or supporting facilities, the certificate holder shall submit a semiannual construction progress report to the Council. In each construction progress report, the certificate holder shall describe any significant changes to major milestones for construction. The certificate holder shall include such information related to construction as specified in the site certificate. When the reporting date coincides, the certificate holder may include the construction progress report within the annual report described in this rule;

(ii) The certificate holder shall, within 120 days after the end of each calendar year after beginning construction, submit an annual report to the Council addressing the subjects listed in this rule. The Council secretary and the certificate holder may, by mutual agreement, change the reporting date.

(b) To the extent that information required by this rule is contained in reports the certificate holder submits to other state, federal or local agencies, the certificate holder may submit excerpts from such other reports to satisfy this rule. The Council reserves the right to request full copies of such excerpted reports.

(c) In the annual report, the certificate holder shall include the following information for the calendar year preceding the date of the report:

(i) Facility Status: An overview of site conditions, the status of facilities under construction, and a summary of the operating experience of facilities that are in operation. In this section of the annual report, the certificate holder shall describe any unusual events, such as earthquakes, extraordinary windstorms, major accidents or the

like that occurred during the year and that had a significant adverse impact on the facility;

(ii) Reliability and Efficiency of Power Production: For electric power plants,

(A) The plant availability and capacity factors for the reporting year. If equipment failures or plant breakdowns had a significant impact on those factors, the certificate holder shall describe them and its plans to minimize or eliminate their recurrence;

(B) The efficiency with which the power plant converts fuel into electric energy. If the fuel chargeable to power heat rate was evaluated when the facility was sited, the certificate holder shall calculate efficiency using the same formula and assumptions, but using actual data; and

(C) The facility's annual hours of operation by fuel type and, every five years after beginning operation, a summary of the annual hours of operation by fuel type as described in OAR 345-024-0590(5);

(iii) Status of Surety Information: Documentation demonstrating that bonds or letters of credit as described in the site certificate are in full force and effect and will remain in full force and effect for the term of the next reporting period;

(iv) Industry Trends: A discussion of any significant industry trends that may affect the operations of the facility;

(v) Monitoring Report: A list and description of all significant monitoring and mitigation activities performed during the previous year in accordance with site certificate terms and conditions, a summary of the results of those activities, and a discussion of any significant changes to any monitoring or mitigation program, including the reason for any such changes;

(vi) Compliance Report: A description of all instances of noncompliance with a site certificate condition. For ease of review, the certificate holder shall, in this section of the report, use numbered subparagraphs corresponding to the applicable sections of the site certificate;

(vii) Facility Modification Report: A summary of changes to the facility that the certificate holder has determined do not require a site certificate amendment in accordance with OAR 345-027-0050; and

(viii) Nongenerating Facility Carbon Dioxide Emissions: For nongenerating facilities that emit carbon dioxide, a report of the annual fuel use by fuel type and annual hours of operation of the carbon dioxide emitting equipment as described in OAR 345-024-0630(4).

(23) OAR 345-026-0100: The certificate holder shall promptly notify the Office of Energy of any changes in major milestones for construction, decommissioning, operation or retirement schedules. Major milestones are those identified by the certificate holder in its construction, retirement or decommissioning plan.

(24) OAR 345-026-0105: The certificate holder and the Office of Energy shall exchange copies of all correspondence or summaries of correspondence related to compliance with statutes, rules and local ordinances on which the Council determined compliance, except for material withheld from public disclosure under state or federal law or under Council rules. The certificate holder may submit abstracts of reports in place of full reports; however, the certificate holder shall provide full copies of abstracted reports and any summarized correspondence at the request of the Office of Energy.

(25) OAR 345-026-0170: The certificate holder shall notify the Office of Energy within 72 hours of any occurrence involving the facility if:

(a) There is an attempt by anyone to interfere with its safe operation;

(b) A natural event such as an earthquake, flood, tsunami or tornado, or a human-caused event such as a fire or explosion affects or threatens to affect the public health and safety or the environment; or

(c) There is any fatal injury at the facility.

VII. SPECIFIC FACILITY CONDITIONS

The conditions listed in this section include conditions based on representations in the site certificate application and supporting record. The Council deems these representations to be binding commitments made by the applicant. These conditions are required under OAR 345-027-0020(10). The certificate holder must comply with these conditions in addition to the conditions listed in Section VI. This section includes other specific facility conditions the Council finds necessary to ensure compliance with the siting standards of OAR Chapter 345, Divisions 22 and 24, and to protect the public health and safety. For conditions that require subsequent review and approval of a future action, ORS 469.402 authorizes the Council to delegate the future review and approval to the Department if, in the Council's discretion, the delegation is warranted under the circumstances of the case.

1. Certificate Administration Conditions

(26) The certificate holder shall begin construction of the facility within three years after the effective date of the site certificate. Under OAR 345-015-0085(9), a site certificate is effective upon execution by the Council Chair and the applicant. The Council may grant an extension of the deadline to begin construction in accordance with OAR 345-027-0030 or any successor rule in effect at the time the request for extension is submitted.

(27) The certificate holder shall complete construction of the facility within five years after the effective date of the site certificate. Construction is complete when: 1) the facility is substantially complete as defined by the certificate holder's construction contract documents, 2) acceptance testing has been satisfactorily completed and 3) the energy facility is ready to begin continuous operation consistent with the site certificate. The certificate holder shall promptly notify the Department of the date of completion of construction. The Council may grant an extension of the deadline for completing construction in accordance with OAR 345-027-0030 or any successor rule in effect at the time the request for extension is submitted.

(28) The certificate holder shall construct a facility substantially as described in the site certificate and may select one of two turbine types: the GE 1.5-megawatt wind turbine or the Vestas V82 1.65-megawatt wind turbine.

(29) The certificate holder shall obtain all necessary state and local permits or approvals required for construction, operation and retirement of the facility or ensure that its contractors obtain the necessary state and local permits or approvals.

(30) Before beginning construction, the certificate holder shall notify the Department in advance of any work on the site that does not meet the definition of "construction" in

OAR 345-001-0010 or ORS 469.300 and shall provide to the Department a description of the work and evidence that its value is less than $250,000.

(31) Before beginning construction and after considering all micrositing factors, the certificate holder shall provide to the Department a detailed map of the proposed facility, showing the final locations where facility components are proposed to be built in relation to the 300-foot and 900-foot corridors shown on Figures P-1 through P-6 of the site certificate application (as revised March 1, 2006). In accordance with Condition (2), the certificate holder must submit a legal description of the site to the Department. For the purposes of this site certificate, the term "legal description" means a description of location by reference to a map and geographic data that clearly and specifically identifies the physical location of all parts of the facility. Notwithstanding OAR 345-027-0020(2), for the purposes of this site certificate, construction of parts of a wind facility within micrositing corridors is comparable to construction of pipelines or transmission lines within Council-approved corridors as described in OAR 345-027-0023(6). Before beginning operation of the facility, the certificate holder shall submit to the Department a legal description for those parts of the facility constructed within micrositing corridors. The final site of the facility includes the final turbine site corridors and other facility components as described in the final order on the site certificate application and in this site certificate.

(32) Before beginning construction, the certificate holder shall submit to the State of Oregon through the Council a bond or letter of credit in the amount of $2.201 million (in 2005 dollars) naming the State of Oregon, acting by and through the Council, as beneficiary or payee.

(a) The certificate holder shall adjust the amount of the bond or letter of credit annually, using the following calculation:

(i) Adjust the gross cost of $7,098,773 (2005 dollars) to present value, using the U.S. Gross Domestic Product Implicit Price Deflator, Chain-Weight, as published in the Oregon Department of Administrative Services' "Oregon Economic and Revenue Forecast" or by any successor agency (the "Index"). If at any time the Index is no longer published, the Council shall select a comparable calculation to adjust 2005 dollars to present value.

(ii) Adjust the estimated scrap value by an index factor derived from the Producer Price Index values, not seasonally adjusted, reported by the U.S. Department of Labor, Bureau of Labor Statistics, "Commodities: Metals and metal Products: Carbon steel scrap" (Series ID: WPU101211). Using the average monthly index value for the 12 months ending with December of the year preceding the year in which the adjustment is made as the numerator and the average monthly index value for the 12 months ending with December 2005 (277.2) as the denominator, multiply the estimated scrap value of $149 per ton (2005 dollars) by the resulting factor. If at any time the Producer Price Index Values are no longer published, the Council shall select a comparable calculation to adjust the estimated scrap value.

(iii) Multiply the adjusted scrap value (ii) per ton by 36,367.65 tons and subtract the resulting value from the adjusted gross cost (i).

(iv) Add 1 percent of the subtotal (iii) for the adjusted performance bond amount, 10 percent of the subtotal (iii) for the adjusted administration and project management

costs, and 20 percent of the subtotal (iii) for the adjusted future developments contingency.

(v) Add the subtotal (iii) to the sum of percentages (iv) and round the resulting total to the nearest $1,000 to determine the adjusted financial assurance amount for the reporting year.

(b) The certificate holder shall use a form of bond or letter of credit approved by the Council.

(c) The certificate holder shall use an issuer of the bond or letter of credit approved by the Council.

(d) The certificate holder shall describe the status of the bond or letter of credit in the annual report submitted to the Council under Condition (22).

(e) The bond or letter of credit shall not be subject to revocation or reduction before retirement of the facility site.

(33) If the certificate holder elects to use a bond to meet the requirements of Condition (32), the certificate holder shall ensure that the surety is obligated to comply with the requirements of applicable statutes, Council rules and this site certificate when the surety exercises any legal or contractual right it may have to assume construction, operation or retirement of the energy facility. The certificate holder shall also ensure that the surety is obligated to notify the Council that it is exercising such rights and to obtain any Council approvals required by applicable statutes, Council rules and this site certificate before the surety commences any activity to complete construction, operate or retire the energy facility.

(34) Before beginning construction, the certificate holder shall notify the Department of the identity and qualifications of the engineering, procurement and construction ("EPC") contractor(s) for specific portions of the work. The certificate holder shall select EPC contractors that have substantial experience in the design and construction of similar facilities. The certificate holder shall report to the Department any change of major construction contractors.

(35) The certificate holder shall contractually require all construction contractors and subcontractors involved in the construction of the facility to comply with all applicable laws and regulations and with the terms and conditions of the site certificate. Such contractual provisions shall not operate to relieve the certificate holder of responsibility under the site certificate.

(36) During construction, the certificate holder shall have an on-site assistant construction manager who is qualified in environmental compliance to ensure compliance with all construction-related site certificate conditions. During operation, the certificate holder shall have a project manager who is qualified in environmental compliance to ensure compliance with all ongoing site certificate conditions. The certificate holder shall notify the Department of the name, telephone number, fax number and e-mail address of these managers and shall keep the Department informed of any change in this information.

(37) Within 72 hours after discovery of conditions or circumstances that may violate the terms or conditions of the site certificate, the certificate holder shall report the conditions or circumstances to the Department.

(38) Notwithstanding OAR 345-027-0050(2), an amendment of the site certificate is required if the proposed change would increase the electrical generation capacity of the facility and would increase the number of wind turbines or the dimensions of existing wind turbines.

2. Land Use Conditions

(39) The certificate holder shall construct the public road improvements described in the site certificate application to meet or exceed road standards for the road classifications in the County's Transportation System Plan and Zoning Ordinance because roads will require a more substantial section to bear the weight of the vehicles and turbine components than would usually be constructed by the County.

(40) The certificate holder shall cooperate with the Sherman County Road Department to ensure that any unusual damage or wear caused by construction of the facility is repaired by the certificate holder. Upon completion of construction, the certificate holder shall restore the county roads to at least their pre-project condition, to the satisfaction of the county public works department.

(41) The certificate holder shall ensure that no equipment or machinery is parked or stored on any county road except while in use.

(42) The certificate holder shall not locate any aboveground facility structure (including wind turbines, O&M building, substations and meteorological towers but not including aboveground transmission lines and junction boxes) within 30 feet from any property line or within 50 feet from the right-of-way of any arterial or major collector road or street and shall not allow any architectural feature, as described in Sherman County Zoning Ordinance Section 4.2, to project into these required setbacks by more than 2 feet.

(43) The certificate holder shall locate aboveground transmission lines, junction boxes, access roads and temporary construction laydown and staging areas to minimize disturbance with farming practices and, wherever feasible, shall place turbines and transmission interconnection lines along the margins of cultivated areas to reduce the potential for conflict with farm operations. The certificate holder shall place aboveground transmission lines and junction boxes along public road rights-of-way to the extent practicable.

(44) The certificate holder shall include traffic control procedures in contract specifications for construction of the facility. The certificate holder shall require flaggers to be at appropriate locations at appropriate times during construction to direct traffic and to ensure minimal conflicts between harvest and construction vehicles. The certificate holder shall submit a final transportation plan to Sherman County before beginning construction.

(45) Before beginning construction of the facility, the certificate holder shall record Farm Management Easements on the properties on which the certificate holder locates wind power generation facilities. The certificate holder shall record these easements in the real property records of Sherman County and shall file copies of the recorded easements with the Sherman County Planning Director.

(46) The certificate holder shall remove from Special Farm Assessment the properties on which it locates the facility and shall pay all property taxes due and payable after the Special Farm Assessment is removed from such properties.

(47) During operation, the certificate holder shall avoid impact on cultivated land to the extent reasonably possible when performing facility repair and maintenance activities.

3. Cultural Resource Conditions

(48) Before beginning construction, the certificate holder shall provide to the Department a map showing the final design locations of all components of the facility and areas that would be temporarily disturbed during construction and also showing the areas that Archaeological Investigations Northwest, Inc. (AINW) surveyed in 2005, as described in the site certificate application. The certificate holder shall hire qualified personnel to conduct field investigation of all areas of permanent or temporary disturbance that AINW did not previously survey and shall provide a written report of the field investigation to the Department. If any significant historic, cultural or archaeological resources are found during the field investigation, the certificate holder shall ensure that construction and operation of the facility will have no impact on the resources. The certificate holder shall instruct all construction personnel to avoid the areas where the resources were found and shall implement other appropriate measures to protect the resources.

(49) The certificate holder shall ensure that a qualified person instructs construction personnel in the identification of cultural materials.

(50) The certificate holder shall ensure that construction personnel cease all ground-disturbing activities in the immediate area if any archaeological or cultural resources are found during construction of the facility until a qualified archaeologist can evaluate the significance of the find. The certificate holder shall notify the Department and the State Historic Preservation Office (SHPO) of the find. If the archaeologist determines that the resource is significant, the certificate holder shall make recommendations to the Council for mitigation, including avoidance or data recovery, in consultation with the Department, SHPO and other appropriate parties. The certificate holder shall not restart work in the affected area until the certificate holder has demonstrated to the Department that it has complied with the archaeological permit requirements administered by SHPO.

(51) The certificate holder shall ensure that construction personnel proceed carefully in the vicinity of the mapped alignment of the Oregon Trail. If any intact physical evidence of the trail is discovered, the certificate holder shall avoid any disturbance to the intact segments, by redesign, re-engineering or restricting the area of construction activity. The certificate holder shall promptly notify the Department and the State Historic Preservation Office (SHPO) of the discovery. The certificate holder shall consult with the Department and with SHPO to determine appropriate mitigation measures.

(52) To offset adverse visual effects to the setting of the Oregon Trail alignment, the certificate holder shall:

(a) Document the pre-construction setting of the Oregon Trail alignment from the John Day River canyon to Biggs through photographs and videotape; and

(b) Enhance the existing Oregon Trail historical marker off I-84 at Biggs with an additional educational and interpretive display in cooperation with the Sherman County Development League and the Sherman County Historical Society.

4. Geotechnical Conditions

(53) Before beginning construction, the certificate holder shall conduct a site-specific geotechnical investigation and shall report its findings to the Oregon Department of Geology & Mineral Industries (DOGAMI). The certificate holder shall conduct the geotechnical investigation after consultation with DOGAMI and in general accordance with the site-specific seismic hazard report and the engineering geologic report guidelines that have been adopted by the Oregon Board of Geologist Examiners. The guidelines are available through the Board and in the DOGAMI publication O-00-04 (2000).

(54) The certificate holder shall design and construct the facility in accordance with requirements set forth by the State of Oregon's Building Code Division and any other applicable codes and design procedures.

(55) The certificate holder shall design, engineer and construct the facility to avoid dangers to human safety presented by non-seismic hazards. As used in this condition, "non-seismic hazards" include settlement, landslides, flooding and erosion.

5. Hazardous Materials, Fire Protection & Public Safety Conditions

(56) The certificate holder shall notify the Department within 72 hours of any accidents including mechanical failures on the site associated with construction or operation of the facility that may result in public health and safety concerns.

(57) Before beginning construction, the certificate holder shall submit a Notice of Proposed Construction or Alteration to the Federal Aviation Administration (FAA) identifying the proposed final locations of the turbines and related or supporting facilities. The certificate holder shall notify the Department of the FAA's response as soon as it has been received.

(58) To protect the public from electrical hazards, the certificate holder shall enclose the facility substations with appropriate fencing and locked gates.

(59) The certificate holder shall not locate turbine towers within 450 feet of any residence or public road.

(60) The certificate holder shall construct turbine towers that are smooth steel structures with no exterior ladders or access to the turbine blades and shall install locked access doors accessible only to authorized personnel.

(61) The certificate holder shall follow manufacturers' recommended handling instructions and procedures to prevent damage to towers or blades that could lead to failure.

(62) The certificate holder shall have an operational safety monitoring program and shall inspect turbine blades on a regular basis for signs of wear. The certificate holder shall repair turbine blades as necessary to protect public safety.

(63) The certificate holder shall install and maintain self-monitoring devices on each turbine, connected to a fault annunciation panel or supervisory, control and data acquisition (SCADA) system at the operations and maintenance building, to alert operators to potentially dangerous conditions, and the certificate holder shall immediately remedy any dangerous conditions. The certificate holder shall maintain automatic equipment protection features in each turbine that would shut down the turbine and reduce the chance of a mechanical problem causing a fire.

(64) The certificate holder shall install generator step-up transformers at the base of each tower in locked cabinets designed to protect the public from electrical hazards and to avoid creation of artificial habitat for raptor prey.

(65) The certificate holder shall construct turbines on concrete foundations and shall cover the ground within a minimum 10-foot radius with non-flammable material. The certificate holder shall maintain the non-flammable pad area covering during operation of the facility.

(66) During construction and operation of the facility, the certificate holder shall develop and implement fire management plans in consultation with local fire control authorities to minimize the risk of fire and to respond appropriately to any fires that occur on the facility site. In developing the fire management plans, the certificate holder should take into account the dry nature of the region and should address risks on a seasonal basis.

(67) During construction and operation of the facility, the certificate holder shall ensure that service vehicles are equipped with a shovel and portable fire extinguisher of a 4A5OBC or equivalent rating.

(68) During construction, the certificate holder shall ensure that construction vehicles and equipment are operated on graveled areas to the extent possible and that open flames, such as cutting torches, are kept away from dry grass areas.

(69) Upon the beginning of operation of the facility, the certificate holder shall provide to the North Sherman County Rural Fire Protection District and to the Moro Rural Fire Protection District copies of the approved site plan indicating the identification number assigned to each turbine and the location of all facility structures. During operation of the facility, the certificate holder shall provide to the North Sherman County Rural Fire Protection District and to the Moro Rural Fire Protection District the names and telephone numbers of facility personnel available to respond on a 24-hour basis in case of an emergency on the facility site.

(70) During operation, the certificate holder shall ensure that all on-site employees receive annual fire prevention and response training by qualified instructors or members of the local fire department and that all employees are instructed to keep vehicles on roads and off dry grassland, except when off-road operation is required for emergency purposes.

(71) During construction, the certificate holder shall require that all on-site construction contractors develop and implement a site health and safety plan that informs workers and others on-site what to do in case of an emergency and that includes the locations of fire extinguishers and nearby hospitals, important telephone numbers and first aid techniques.

(72) During operation, the certificate holder shall develop and implement a site health and safety plan that informs employees and others on-site what to do in case of an emergency and that includes the locations of fire extinguishers and nearby hospitals, important telephone numbers and first aid techniques.

(73) The certificate holder shall use hazardous materials in a manner that protects public health, safety and the environment and shall comply with all applicable local, state and federal environmental laws and regulations.

(74) If a spill or release of hazardous materials occurs during construction or operation of the facility, the certificate holder shall notify the Department within 72 hours and shall clean up the spill or release and dispose of any contaminated soil or other materials according to applicable regulations. The certificate holder shall make sure that spill kits containing items such as absorbent pads are located on equipment and storage facilities to respond to accidental spills and shall instruct employees handling hazardous materials in the proper handling, storage and cleanup of these materials.

(75) Before beginning construction, the certificate holder shall cooperate with the Oregon Department of Transportation to implement public safety improvements to the shoulders of State Highway 206 by bearing the cost of constructing two viewpoint turn-offs (one on each side of the highway) within the highway right-of-way in suitable locations from where the public may safely view the wind turbines without entering private property or interfering with facility operations.

6. Water, Soils, Streams & Wetlands Conditions

(76) The certificate holder shall conduct all construction work in compliance with an Erosion and Sediment Control Plan (ESCP) satisfactory to the Oregon Department of Environmental Quality and as required under the National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge General Permit #1200-C. The certificate holder shall include in the ESCP any procedures necessary to meet local erosion and sediment control requirements and storm water management requirements.

(77) During construction, the certificate holder shall limit truck traffic to designated existing and improved road surfaces to avoid soil compaction, to the extent possible.

(78) The certificate holder shall cover turbine pad areas with gravel or other non-erosive material immediately following exposure during construction and shall maintain the pad area covering during operation of the facility.

(79) During construction, the certificate holder shall avoid impacts to waters of the state in the following manner:

(a) The certificate holder shall bore under the intermittent drainage channel identified in Appendix J-1 of the site certificate application in any location where the underground collector system would cross the channel.

(b) The certificate holder shall locate transmission line support structures outside of the drainage channel and the wetland identified in Appendix J-1 of the site certificate application in any location where an aboveground transmission line crosses over the channel or the wetland area.

(c) After the final turbine design locations have been identified, if construction would occur in any locations not previously investigated as described in Appendix J-1 of the

application, the certificate holder shall conduct a pre-construction investigation to determine whether any jurisdictional waters of the state exist in those locations. The certificate holder shall submit a written report on the pre-construction investigation to the Department of Energy and to the Department of State Lands for approval before beginning construction and shall ensure that construction of the facility would have no impact on any jurisdictional water identified in the pre-construction investigation.

(80) During construction, the certificate holder shall ensure that the wash down of concrete trucks occurs only at a contractor-owned batch plant or at tower foundation locations. If such wash down occurs at tower foundation locations, then the certificate holder shall ensure that wash down wastewater does not run off the construction site into otherwise undisturbed areas and that the wastewater is disposed of on backfill piles and buried underground with the backfill over the tower foundation.

(81) The certificate holder shall restore areas that are temporarily disturbed during construction according to the methods, monitoring procedures and success criteria described in the Revegetation Plan that is incorporated in the Final Order on the Application as Attachment B and as amended from time to time. During operation, the certificate holder shall restore areas that are temporarily disturbed during facility maintenance or repairs according to the same methods and monitoring procedures.

(82) During facility operation, the certificate holder shall routinely inspect and maintain all roads, pads and trenched areas and, as necessary, maintain or repair erosion control measures.

(83) During operation, the certificate holder shall not use any water or chemicals for washing turbine blades unless the certificate holder demonstrates to the satisfaction of the Department before any blade-washing begins that:

(a) Oregon Department of Environmental Quality (DEQ) regulations do not require a permit for the proposed blade-washing activity or, if a permit is required, that the proposed blade-washing activity is authorized under a general permit issued by DEQ; and

(b) In conducting blade-washing activities, the certificate will use water only from its approved on-site well and that the use of water will not exceed 5,000 gallons per day.

7. Transmission Line & EMF Conditions

(84) The certificate holder shall install the 34.5-kV collector system underground to the extent practical. Where geotechnical conditions or other engineering considerations require, the certificate holder may install segments of the collector system aboveground in developed or agricultural areas that are Category 6 habitat, but the total length of aboveground segments must not exceed 5.5 miles. The certificate holder shall construct aboveground segments of the collector system using single or double circuit monopole design as described in the site certificate application and shall not locate any aboveground segments within 200 feet of any existing residence.

(85) At least 30 days before beginning preparation of detailed design and specifications for the electrical transmission lines, the certificate holder shall consult with the Oregon Public Utility Commission staff to ensure that transmission line designs and specifications are consistent with applicable codes and standards.

(86) Before beginning construction, the certificate holder shall obtain a permit, substantially in the form of the draft permit incorporated in the Final Order on the Application as Attachment D, from the Oregon Department of Transportation authorizing the location, installation, construction, maintenance and use of buried cables within the right-of-way of State Highway 206.

(87) To protect public safety, the certificate holder shall design and maintain the transmission lines so that:

(a) Alternating current electric fields during operation do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public.

(b) Induced voltages during operation are as low as reasonably achievable.

(88) The certificate holder shall take reasonable steps to reduce or manage human exposure to electromagnetic fields, including but not limited to:

(a) Constructing the 230-kV transmission line to ensure that conductors have a minimum clearance of 30 feet from the ground at mid-span under maximum sag conditions.

(b) Constructing aboveground segments of the 34.5-kV transmission line to ensure that conductors have a minimum clearance of 25 feet from the ground at mid-span under maximum sag conditions.

(c) Constructing underground segments of the 34.5-kV transmission line at least 36-inches below the surface of the ground.

(d) Providing to landowners a map of underground and overhead transmission lines on their property and advising landowners of possible health risks.

8. Plants, Wildlife & Habitat Protection Conditions

(89) During construction and operation of the facility, the certificate holder shall implement a plan to control the introduction and spread of noxious weeds. The certificate shall develop the weed control plan in consultation with the Sherman County Weed Control Manager.

(90) The certificate holder shall design all aboveground transmission line support structures following the practices suggested by the Avian Powerline Interaction Committee (APLIC 1996, referenced in the site certificate application, p. P-33) and shall install anti-perching devices on transmission pole tops and cross arms where the poles are located within ½ mile of turbines.

(91) If construction begins after 2006, the certificate holder shall review the ONHIC and USFWS databases and consult with Frank Isaacs, Oregon State University Cooperative Wildlife Unit (or other expert designated by ODFW) on an annual basis before beginning construction to determine whether bald eagles or peregrine falcons have been observed in or near the site of the facility. The certificate holder shall report the results of the database review and consultation to the Department and to ODFW and, if there have been new observations of bald eagles or peregrine falcons in the area, the certificate holder shall implement appropriate measures to protect the species from adverse impact, as approved by the Department and ODFW.

(92) The certificate holder may construct turbines and other facility components within the 900-foot corridors shown on Figures P-1 through P-6 of the site certificate application

(as revised March 1, 2006), subject to the following requirements addressing potential habitat impact:

(a) The certificate holder shall not construct any facility components within areas of Category 1 habitat and shall avoid temporary disturbance of Category 1 habitat.

(b) The certificate holder shall design and construct facility components that are the minimum size needed for safe operation of the energy facility.

(c) To the extent possible, the certificate holder shall construct facility components in the locations shown on Figure C-2 of the site certificate application.

(d) If the certificate holder must change the layout of facility components from what is shown on Figure C-2 due to micrositing considerations, the certificate holder shall, to the extent possible, construct facility components within the 300-foot corridors shown on Figures P-1 through P-6 of the site certificate application (as revised March 1, 2006).

(e) The certificate holder may construct facility components outside the 300-foot corridors if necessary due to micrositing considerations, except that the certificate holder shall not construct any facility components outside the 900-foot corridors shown on Figures P-1 through P-6 of the site certificate application (as revised March 1, 2006) or cause any temporary disturbance outside those 900-foot corridors.

(93) The certificate holder shall implement measures to mitigate impacts to sensitive wildlife habitat during construction including, but not limited to, the following:

(a) Preparing maps to show sensitive areas, such as nesting or denning areas for sensitive wildlife species, that are off limits to construction personnel.

(b) Ensuring that a qualified person instructs construction personnel to be aware of wildlife in the area and to take precautions to avoid injuring or destroying wildlife or significant wildlife habitat.

(c) Avoiding unnecessary road construction, temporary disturbance and vehicle use.

(94) During construction, the certificate holder shall protect the area within a 1300-foot buffer around active nests of the following species during the sensitive period, as provided in this condition:

Species	Sensitive Period	Early Release Date
Swainson's hawk	April 1 to August 15	May 31
Golden eagle	February 1 to August 31	May 31
Ferruginous hawk	March 15 to August 15	May 31
Burrowing owl	April 1 to August 15	July 15

During the year in which construction occurs, the certificate holder shall use a protocol approved by the Oregon Department of Fish and Wildlife (ODFW) to determine whether there are any active nests of these species within a half-mile of any areas that would be disturbed during construction. If a nest is occupied by any of these species after the beginning of the sensitive period, the certificate holder shall not engage in high-impact construction activities (activities that involve blasting, grading or other major ground disturbance) or allow high levels of construction traffic within 1300 feet of the nest site. In addition, the certificate holder will flag the boundaries of the 1300-foot buffer area and shall instruct construction personnel to avoid any unnecessary activity within the buffer area. The certificate holder shall hire an independent biological monitor to observe the active nest sites during the sensitive period for signs of disturbance and to notify the Department of any non-compliance with this condition. If the monitor

observes nest site abandonment or other adverse impact to nesting activity, the certificate holder shall implement appropriate mitigation, in consultation with ODFW and subject to the approval of the Department, unless the adverse impact is clearly shown to have a cause other than construction activity. The certificate holder may begin or resume high-impact construction activities before the ending day of the sensitive period if any known nest site is not occupied by the early release date. If a nest site is occupied, then the certificate holder may begin or resume high-impact construction before the ending day of the sensitive period with the approval of ODFW, after the young are fledged. The certificate holder shall use a protocol approved by ODFW to determine when the young are fledged (the young are independent of the core nest site).

(95) The certificate holder shall conduct wildlife monitoring as described in the Wildlife Monitoring and Mitigation Plan that is incorporated in the Final Order on the Application as Attachment A and as amended from time to time.

(96) To mitigate for potential adverse impacts to bat species, the certificate holder shall contribute $10,000 per year for three years, beginning in the first year of operation, to fund research toward better understanding wind facility impacts to bats and to develop mitigation solutions. In consultation with the Oregon Department of Energy and the Oregon Department of Fish and Wildlife, the certificate holder shall select an appropriate bat conservation organization to receive this funding.

(97) Before beginning construction of the facility, the certificate holder shall acquire the legal right to create, maintain and protect a habitat mitigation area for the life of the facility by means of an outright purchase, conservation easement or similar conveyance and shall provide a copy of the documentation to the Department. Within the habitat mitigation area, the certificate holder shall improve the habitat quality as described in the Habitat Mitigation Plan that is incorporated in the Final Order on the Application as Attachment C and as amended from time to time.

9. Visual Effects Conditions

(98) To reduce the visual impact of the facility, the certificate holder shall:

(a) Mount nacelles on smooth, hollow steel towers, approximately 20 feet in diameter at the base.

(b) Paint all towers uniformly in a neutral white or light gray color.

(c) Paint the substation buildings in a neutral color to blend with the surrounding landscape.

(d) Not allow any advertising to be used on any part of the facility or on any signs posted at the facility, except that the turbine manufacturer's logo may appear on turbine nacelles.

(e) Use only those signs required for facility safety or required by law, except that the certificate holder may erect a sign near the operations and maintenance building to identify the wind energy facility.

(f) Maintain any signs allowed under this condition in good repair.

(99) The certificate holder shall design and construct the operation and maintenance building to be generally consistent with the character of similar buildings used by commercial

farmers or ranchers in the area and shall paint the building in a neutral color to blend with the surrounding landscape.

(100) The certificate holder shall not use exterior nighttime lighting except:

(a) The minimum turbine tower lighting required by the Federal Aviation Administration.

(b) Security lighting at the operations and maintenance building and at the substations, provided that such lighting is shielded or downward-directed to reduce glare.

(c) Minimum lighting necessary for repairs or emergencies.

10. Noise Control Conditions

(101) To reduce noise impacts at nearby residential areas, the certificate holder shall:

(a) Confine the noisiest operation of heavy construction equipment to the daylight hours.

(b) Require contractors to install and maintain exhaust mufflers on all combustion engine-powered equipment; and

(c) Establish a complaint response system at the construction manager's office to address noise complaints.

(102) Before beginning construction, the certificate holder shall present information demonstrating to the satisfaction of the Department that the requirements of either (a) or (b) have been met at properties R3, R4, R5, R6 and R7 (as shown on the Noise Buffer and Receptor Locations map in the Application Supplement, Tab X, Item vi):

(a) The certificate holder has obtained a legally effective easement or real covenant pursuant to which the owner of the property authorizes the certificate holder's operation of the facility to increase ambient statistical noise levels L_{10} and L_{50} by more than 10 dBA at the appropriate measurement point. A legally effective easement or real covenant shall: include a legal description of the burdened property (the noise sensitive property); be recorded in the real property records of the county; expressly benefit the certificate holder; expressly run with the land and bind all future owners, lessees or holders of any interest in the burdened property; and not be subject to revocation without the certificate holder's written approval.

(b) For any property for which the certificate holder has not obtained a legally effective easement or real covenant as described in (a), the certificate holder has identified the final design locations of all turbines to be built and has performed a noise analysis, in accordance with OAR 340-035-0035(1)(b)(B)(iii)(IV), demonstrating that the total noise generated by the facility would meet the ambient degradation test at the appropriate measurement point when all turbines are placed in their final design locations. The certificate holder shall perform the noise analysis using the Sound Propagation Model for Outdoor Noise Sources (SPM 9613, Version 2) and shall assume the following input parameters:

(i) The maximum sound power level guaranteed by the manufacturer.

(ii) Temperature of 52° F (11° C).

(iii) Relative humidity of 70 percent.

(iv) No ground effect.

(v) No barrier effects.

11. Waste Management Conditions

(103) The certificate holder shall provide portable toilets for on-site sewage handling during construction and shall ensure that they are pumped and cleaned regularly by a licensed contractor who is qualified to pump and clean portable toilet facilities.

(104) During operation, the certificate holder shall discharge sanitary wastewater generated at the O&M building to a licensed on-site septic system in compliance with county permit requirements. The certificate holder shall design the septic system design with a capacity that is less than 2,500 gallons per day.

(105) The certificate holder shall implement a waste management plan during construction that includes but is not limited to the following measures:

(a) Training employees to minimize and recycle solid waste.

(b) Minimizing the generation of wastes from construction through detailed estimating of materials needs and through efficient construction practices.

(c) Recycling steel and other metal scrap.

(d) Recycling wood waste.

(e) Recycling packaging wastes such as paper and cardboard.

(f) Collecting non-recyclable waste for transport to a landfill by a licensed waste hauler.

(g) Segregating all hazardous wastes such as used oil, oily rags and oil-absorbent materials, mercury-containing lights and lead-acid and nickel-cadmium batteries for disposal by a licensed firm specializing in the proper recycling or disposal of hazardous wastes.

(106) The certificate holder may dispose of waste concrete on site with the permission of the landowner and in accordance with OAR 340-093-0080 and other applicable regulations. The certificate holder shall dispose of waste concrete on site by placing the material in an excavated hole, covering it with at least three feet of topsoil and grading the area to match existing contours. If the waste concrete is not disposed of on site, the certificate holder shall arrange for proper disposal in a landfill.

(107) The certificate holder shall implement a waste management plan during operation that includes but is not limited to the following measures:

(a) Training employees to minimize and recycle solid waste.

(b) Recycling paper products, metals, glass and plastics.

(c) Collecting non-recyclable waste for transport to a landfill by a licensed waste hauler.

(d) Segregating all hazardous wastes such as used oil, oily rags and oil-absorbent materials, mercury-containing lights and lead-acid and nickel-cadmium batteries for disposal by a licensed firm specializing in the proper recycling or disposal of hazardous wastes.

VIII. GENERAL CONCLUSION

The applicant has submitted an application to construct a wind energy facility consisting of 165 wind turbines having a combined nominal electric generating capacity of not more than 272.25 megawatts. The Council finds that a site certificate for the facility

should include the conditions listed in Sections VI and VII of this order. The Council finds that a preponderance of evidence on the record supports the following conclusions:

1. The proposed KWP facility complies with the requirements of the Oregon Energy Facility Siting statutes, ORS 469.300 to ORS 469.520.
2. The proposed KWP facility complies with the standards adopted by the Council pursuant to ORS 469.501.
3. The facility complies with the statewide planning goals adopted by the Land Conservation and Development Commission.
4. The proposed KWP facility complies with all other Oregon statutes and administrative rules identified in the project order as applicable to the issuance of a site certificate for the proposed facility.

Based on the findings of fact, reasoning, conditions and conclusions of law in this order, the Council concludes that the applicant has satisfied the requirements for issuance of a site certificate for the proposed KWP, subject to the conditions stated in this order.

IX. ORDER

The Council hereby orders that a site certificate be issued to Klondike Wind Power III LLC for the proposed Klondike III Wind Project, subject to the terms and conditions set forth above.

Issued this 30th day of June, 2006.

THE OREGON ENERGY FACILITY SITING COUNCIL

By: _____
Hans Neukomm
Council Chair

Attachments
Attachment A: Wildlife Monitoring and Mitigation Plan
Attachment B: Revegetation Plan
Attachment C: Habitat Enhancement Plan
Attachment D: Draft ODOT Permit

Notice of the Right to Appeal

You have the right to appeal this order to the Oregon Supreme Court pursuant to ORS 469.403. To appeal you must file a petition for judicial review with the Supreme Court within 60 days from the day this order was served on you. If this order was personally delivered to you, the date of service is the date you received this order. If this order was mailed to you, the date of service is the date it was mailed, not the day you received it. If you do not file a petition for judicial review within the 60-day time period, you lose your right to appeal.

Klondike III Wind Project: Wildlife Monitoring and Mitigation Plan

[JUNE 30, 2006]

This plan describes wildlife monitoring that the certificate holder shall conduct during operation of the Klondike III Wind Project (KWP).[1] The monitoring objectives are to determine whether the facility causes significant fatalities of birds and bats and to determine whether the facility results in a loss of habitat quality. The KWP facility consists of 165 wind turbines, three non-guyed meteorological towers and other related or supporting facilities as described in the site certificate.

The certificate holder shall use experienced personnel to manage the monitoring required under this plan and properly trained personnel to conduct the monitoring, subject to approval by the Oregon Department of Energy (Department) as to professional qualifications. For all components of this plan except PPM Energy's Klondike III Wind Project Wildlife Reporting and Handling System, the certificate holder shall hire an independent third party (not employees of the certificate holder) to perform monitoring tasks.

The Wildlife Monitoring and Mitigation Plan for the Klondike III Wind Project has the following components:

1) Fatality monitoring program including:
    a) Removal trials
    b) Searcher efficiency trials
    c) Fatality search protocol
    d) Statistical analysis
2) Raptor nesting surveys
3) Avian use surveys
4) PPM Energy's Klondike III Wind Project Wildlife Reporting and Handling System

Following is a discussion of the components of the monitoring plan, statistical analysis methods for fatality data, data reporting and potential mitigation.

The selection of the mitigation actions that the certificate holder may be required to implement under this plan should allow for flexibility in creating appropriate responses to monitoring results that cannot be known in advance. If the Department determines that mitigation is needed, the certificate holder shall propose appropriate mitigation actions to the Department and shall carry out mitigation actions approved by the Department, subject to review by the Oregon Energy Facility Council (Council).

[1] This plan is incorporated by reference in the site certificate for the KWP and must be understood in that context. It is not a "stand-alone" document. This plan does not contain all mitigation required of the certificate holder.

1. Fatality Monitoring

(a) Definitions and Methods

Seasons

This plan uses the following dates for defining seasons:

Season	Dates
Spring Migration	March 16 to May 15
Summer/Breeding	May 16 to August 15
Fall Migration	August 16 to October 31
Winter	November 1 to March 15

Search Plots

The certificate holder shall conduct fatality monitoring within search plots. The certificate holder, in consultation with the Oregon Department of Fish and Wildlife (ODFW), shall select search plots based on a systematic sampling design that ensures that the selected search plots are representative of the habitat conditions in different parts of the site. Each search plot will contain one turbine. Search plots will be square or circular. Circular search plots will have a radius of 242 meters centered on the turbine location. Square search plots will be of sufficient size to contain a circle with a radius of 242 meters centered on the turbine location. The certificate holder shall provide maps of the search plots to the Department before beginning fatality monitoring at the facility. The certificate holder shall use the same search plots for each search conducted during a monitoring year.

Scheduling

In each monitoring year, the certificate holder shall conduct fatality monitoring searches at the rates of frequency shown below. Over the course of one monitoring year, the certificate holder would conduct 16 searches, as follows:

Season	Frequency
Spring Migration	2 searches per month (4 searches)
Summer/Breeding	1 search per month (3 searches)
Fall Migration	2 searches per month (5 searches)
Winter	1 search per month (4 searches)

Sample Size

The sample size for fatality monitoring is the number of turbines searched per monitoring year. The certificate holder shall search a minimum of 55 turbines during the first monitoring year. The certificate holder shall search a minimum of 55 different turbines during the second monitoring year. Over two monitoring years, 110 of the 165 turbines will be searched.

(b) Removal Trials

The objective of the removal trials is to estimate the length of time avian and bat carcasses remain in the search area. Carcass removal studies will be conducted during each season in the vicinity of the search plots. Estimates of carcass removal rates will be used to adjust carcass counts for removal bias. “Carcass removal” is the disappearance of a carcass from

the search area due to predation, scavenging or other means such as farming activity. Removal rates will be estimated by habitat and season.

The certificate holder shall conduct carcass removal trials within each of the seasons defined above during the years in which fatality monitoring occurs. During the first year in which fatality monitoring occurs, trials will occur in at least eight different calendar weeks in a year, with at least one calendar week between starting dates. Trials will be spread throughout the year to incorporate the effects of varying weather, farming practices and scavenger densities. At least two trials will be started in each season. Each trial will use at least 20 carcasses. For each trial, at least 5 small bird carcasses and at least 5 large bird carcasses will be distributed in cultivated agriculture habitat and at least 3 small bird carcasses and at least 3 large bird carcasses will be distributed in non-cultivated habitat (grassland/shrub steppe and CRP). In a year, approximately 100 carcasses will be placed in cultivated agriculture and approximately 60 in non-cultivated grassland/shrub steppe or CRP for a total of approximately 160 trial carcasses. The number of removal trials may be reduced to one per season (80 trial carcasses) during the second year of fatality monitoring, subject to approval by the Department, if the certificate holder can demonstrate that the calculation of fatality rates will continue to have statistical validity with the reduced sample size.

The "small bird" size class will use carcasses of house sparrows, starlings, commercially available game bird chicks or legally obtained native birds to simulate passerines. The "large bird" size class will use carcasses of raptors provided by agencies, commercially available adult game birds or cryptically colored chickens to simulate raptors, game birds and waterfowl. If fresh bat carcasses are available, they may also be used.

To avoid confusion with turbine-related fatalities, planted carcasses will not be placed in fatality monitoring search plots. Planted carcasses will be placed in the vicinity of search plots but not so near as to attract scavengers to the search plots. The planted carcasses will be located randomly within the carcass removal trial plots.

Carcasses will be placed in a variety of postures to simulate a range of conditions. For example, birds will be: 1) placed in an exposed posture (e.g., thrown over the shoulder), 2) hidden to simulate a crippled bird (e.g., placed beneath a shrub or tuft of grass) and, 3) partially hidden. Trial carcasses will be marked discreetly for recognition by searchers and other personnel. Trial carcasses will be left at the location until the end of the carcass removal trial.

It is expected that carcasses will be checked as follows, although actual intervals may vary. Carcasses will be checked for a period of 40 days to determine removal rates. They will be checked approximately every day for the first 4 days, and then on day 7, day 10, day 14, day 20, day 30 and day 40. This schedule may vary depending on weather and coordination with the other survey work. At the end of the 40-day period, the trial carcasses and scattered feathers will be removed.

(c) Searcher Efficiency Trials

The objective of searcher efficiency trials is to estimate the percentage of bird and bat fatalities that searchers are able to find. The certificate holder shall conduct searcher efficiency trials on the fatality monitoring search plots in both grassland/shrub-steppe and cultivated agriculture habitat types. Searcher efficiency will be estimated by habitat type and season. Estimates of searcher efficiency will be used to adjust carcass counts for detection bias.

Searcher efficiency trials will be conducted in each season as defined above, during the years in which the fatality monitoring occurs. Trials will be spread throughout the year to incorporate the effects of varying weather, farming practices and scavenger densities. At least two trials will be conducted in each season. Each trial will use approximately 20 carcasses, although the number will be variable so that the searcher will not know the total number of trial carcasses being used in any trial. For each trial, both small bird and large bird carcasses will be used in approximately equal numbers. "Small bird" and "large bird" size classes and carcass selection are as described above for the removal trials. A greater proportion of the trial carcasses will be distributed in cultivated agriculture habitat than in non-cultivated habitat (grassland/shrub steppe and CRP). In a year, approximately 100 carcasses will be placed in cultivated agriculture and approximately 60 in non-cultivated grassland/shrub steppe or CRP for a total of approximately 160 trial carcasses. The number of searcher efficiency trials may be reduced to one per season (80 trial carcasses) during the second year of fatality monitoring, subject to approval by the Department, if the certificate holder can demonstrate that the calculation of fatality rates will continue to have statistical validity with the reduced sample size.

Personnel conducting searches will not know in advance when trials are conducted; nor will they know the location of the trial carcasses. If suitable trial carcasses are available, trials during the fall season will include several small brown birds to simulate bat carcasses. Legally obtained bat carcasses will be used if available.

On the day of a standardized fatality monitoring search (described below) but before the beginning of the search, efficiency trial carcasses will be placed at random locations within areas to be searched. If scavengers appear attracted by placement of carcasses, the carcasses will be distributed before dawn.

Efficiency trials will be spread over the entire season to incorporate effects of varying weather and vegetation growth. Carcasses will be placed in a variety of postures to simulate a range of conditions. For example, birds will be: 1) placed in an exposed posture (thrown over the shoulder), 2) hidden to simulate a crippled bird and 3) partially hidden.

Each non-domestic carcass will be discreetly marked so that it can be identified as an efficiency trial carcass after it is found. The number and location of the efficiency trial carcasses found during the carcass search will be recorded. The number of efficiency trial carcasses available for detection during each trial will be determined immediately after the trial by the person responsible for distributing the carcasses.

If new searchers are brought into the search team, additional detection trials will be conducted to ensure that detection rates incorporate searcher differences.

(d) Coordination with the Biglow Canyon Wind Farm

The proposed Biglow Canyon Wind Farm lies to the north of the Klondike III Wind Power Project on similar terrain and habitat. If the Council approves site certificates for both facilities and requires similar wildlife monitoring, coordination of removal trials and searcher efficiency trials would be possible. Subject to the approval of both certificate holders and the Department, the number of trials at each site and the number of trial carcasses used at each site can be reduced by combining the removal data and efficiency data from both projects, if the certificate holder can demonstrate that the calculation of fatality rates would continue to have

statistical validity for both facilities and that combining the data would not affect any other requirements of the monitoring plans for either facility.

(e) Fatality Monitoring Search Protocol

The objective fatality monitoring is to estimate the number of bird and bat fatalities that are attributable to facility operation. The goal of bird and bat fatality monitoring is to obtain a precise estimate of the fatality rate and associated variances. The certificate holder shall conduct fatality monitoring using standardized carcass searches. The certificate holder shall conduct fatality monitoring for two years (32 searches), beginning one month after the start of commercial operation of the KWP.

The certificate holder shall use a worst-case analysis to resolve any uncertainty in the results and to determine whether the data indicate that additional mitigation should be considered. The Department may require additional, targeted monitoring if the data indicate the potential for significant impacts that cannot be addressed by worst-case analysis and appropriate mitigation. On an annual basis, the certificate holder shall report an estimate of fatalities in seven categories: 1) all birds, 2) small birds, 3) large birds, 4) raptors, 5) grassland birds, 6) nocturnal migrants, 7) State Sensitive Species listed under OAR 635-100-0040 and 8) bats. The certificate holder shall calculate fatality rates using the statistical methods described in Section (f).

The certificate holder shall estimate the number of avian and bat fatalities attributable to operation of the facility based on the number of avian and bat fatalities found at the facility site. All carcasses located within areas surveyed, regardless of species, will be recorded and, if possible, a cause of death determined based on blind necropsy results. If a different cause of death is not apparent, the fatality will be attributed to facility operation. The total number of avian and bat carcasses will be estimated by adjusting for removal and searcher efficiency bias.

Personnel trained in proper search techniques ("the searchers") will conduct the carcass searches by walking parallel transects within the search plots.[2] Transects will be initially set at 6 meters apart in the area to be searched. A searcher will walk at a rate of approximately 45 to 60 meters per minute along each transect searching both sides out to three meters for casualties. Search area and speed may be adjusted by habitat type after evaluation of the first searcher efficiency trial. The searchers will record the condition of each carcass found, using the following condition categories:

- Intact – a carcass that is completely intact, is not badly decomposed and shows no sign of being fed upon by a predator or scavenger
- Scavenged – an entire carcass that shows signs of being fed upon by a predator or scavenger, or portions of a carcass in one location (e.g., wings, skeletal remains, legs, pieces of skin, etc.)
- Feather Spot – 10 or more feathers at one location indicating predation or scavenging or 2 or more primary feathers

All carcasses (avian and bat) found during the standardized carcass searches will be photographed, recorded and labeled with a unique number. Each carcass will be bagged and frozen for future reference and possible necropsy. A copy of the data sheet for each carcass will

[2] Where search plots are adjacent, the search area may be rectangular.

be kept with the carcass at all times. For each carcass found, searchers will record species, sex and age when possible, date and time collected, location, condition (e.g., intact, scavenged, feather spot) and any comments that may indicate cause of death. Searchers will photograph each carcass as found and will map the find on a detailed map of the search area showing the location of the wind turbines and associated facilities. The certificate holder shall coordinate collection of state endangered, threatened or protected species with ODFW. The certificate holder shall coordinate collection of federal endangered, threatened or protected species with the U.S. Fish and Wildlife Service (USFWS). The certificate holder shall obtain appropriate collection permits from ODFW and USFWS.

The searchers might discover carcasses incidental to formal carcass searches (e.g., while driving within the project area). For each incidentally discovered carcass, the searcher shall identify, photograph, record data and collect the carcass as would be done for carcasses within the formal search sample during scheduled searches. If the incidentally discovered carcass is found within a formal search plot, the fatality data will be included in the calculation of fatality rates. If the incidentally discovered carcass is found outside a formal search plot, the data will be reported separately. The certificate holder shall coordinate collection of incidentally discovered state endangered, threatened or protected species with ODFW. The certificate holder shall coordinate collection of incidentally discovered federal endangered, threatened or protected species with the USFWS.

Any injured native birds found on the facility site will be carefully captured by a trained project biologist or technician and transported to Jean Cypher (wildlife rehabilitator) in The Dalles, the Blue Mountain Wildlife Rehabilitation Center in Pendleton or the Audubon Bird Care Center in Portland in a timely fashion. The certificate holder shall pay costs, if any, charged for time and expenses related to care and rehabilitation of injured native birds found on the site, unless the cause of injury is clearly demonstrated to be unrelated to the facility operations.

(f) Statistical Methods for Fatality Estimates

The estimate of the total number of wind facility-related fatalities is based on:

(1) The observed number of carcasses found during standardized searches during the two monitoring years for which the cause of death is attributed to the facility.[3]
(2) Searcher efficiency expressed as the proportion of planted carcasses found by searchers.
(3) Removal rates expressed as the estimated average probability a carcass is expected to remain in the study area and be available for detection by the searchers during the entire survey period.

Definition of Variables

The following variables are used in the equations below:

c_i the number of carcasses detected at plot *i* for the study period of interest (e.g., one year) for which the cause of death is either unknown or is attributed to the facility

n the number of search plots

[3] If a different cause of death is not apparent, the fatality will be attributed to facility operation.

	k	the number of turbines searched (includes the turbines centered within each search plot and a proportion of the number of turbines adjacent to search plots to account for the effect of adjacent turbines on the 90-meter search plot buffer area)
	$\bar{c}$	the average number of carcasses observed per turbine per year
	s	the number of carcasses used in removal trials
	s_c	the number of carcasses in removal trials that remain in the study area after 40 days
	se	standard error (square of the sample variance of the mean)
	t_i	the time (days) a carcass remains in the study area before it is removed
	$\bar{t}$	the average time (days) a carcass remains in the study area before it is removed
	d	the total number of carcasses placed in searcher efficiency trials
	p	the estimated proportion of detectable carcasses found by searchers
	I	the average interval between searches in days
	$\hat{\pi}$	the estimated probability that a carcass is both available to be found during a search and is found
	m_t	the estimated annual average number of fatalities per turbine per year, adjusted for removal and observer detection bias
	C	nameplate energy output of turbine in megawatts (MW)

Observed Number of Carcasses

The estimated average number of carcasses ($\bar{c}$) observed per turbine per year is:

$$\bar{c} = \frac{\sum_{i=1}^{n} c_i}{k}. \qquad (1)$$

Estimation of Carcass Removal

Estimates of carcass removal are used to adjust carcass counts for removal bias. Mean carcass removal time ($\bar{t}$) is the average length of time a carcass remains at the site before it is removed:

$$\bar{t} = \frac{\sum_{i=1}^{s} t_i}{s - s_c}. \qquad (2)$$

This estimator is the maximum likelihood estimator assuming the removal times follow an exponential distribution and there is right-censoring of data. Any trial carcasses still remaining at 40 days are collected, yielding censored observations at 40 days. If all trial carcasses are

removed before the end of the trial, then s_c is 0, and $\bar{t}$ is just the arithmetic average of the removal times. Removal rates will be estimated by carcass size (small and large) and season.

Estimation of Observer Detection Rates

Observer detection rates (i.e., searcher efficiency rates) are expressed as *p*, the proportion of trial carcasses that are detected by searchers. Observer detection rates will be estimated by carcass size and season.

Estimation of Facility-Related Fatality Rates

The estimated per turbine annual fatality rate (m_t) is calculated by:

$$m_t = \frac{\bar{c}}{\hat{\pi}}, \tag{3}$$

where $\hat{\pi}$ includes adjustments for both carcass removal (from scavenging and other means) and observer detection bias assuming that the carcass removal times t_i follow an exponential distribution. Under these assumptions, this detection probability is estimated by:

$$\hat{\pi} = \frac{\bar{t} \cdot p}{I} \cdot \left[\frac{\exp\left(I / \bar{t} \right) - 1}{\exp\left(I / \bar{t} \right) - 1 + p} \right]. \tag{4}$$

The estimated per MW annual fatality rate (m) is calculated by:

$$m = \frac{m_t}{C}. \tag{5}$$

The certificate holder shall calculate fatality estimates for: (1) all birds, (2) small birds, (3) large birds, (4) raptors, (5) grassland birds, (6) nocturnal migrants 7) State Sensitive Species listed under OAR 635-100-0040 and 8) bats. The final reported estimates of *m*, associated standard errors and 90% confidence intervals will be calculated using bootstrapping (Manly 1997). Bootstrapping is a computer simulation technique that is useful for calculating point estimates, variances and confidence intervals for complicated test statistics. For each iteration of the bootstrap, the plots will be sampled with replacement, trial carcasses will be sampled with replacement and $\bar{c}$, $\bar{t}$, p, $\hat{\pi}$ and m will be calculated. A total of 5,000 bootstrap iterations will be used. The reported estimates will be the means of the 5,000 bootstrap estimates. The standard deviation of the bootstrap estimates is the estimated standard error. The lower 5th and upper 95th percentiles of the 5000 bootstrap estimates are estimates of the lower limit and upper limit of 90% confidence intervals.

Nocturnal Migrant and Bat Fatalities

Differences in observed nocturnal migrant and bat fatality rates for lit turbines, unlit turbines that are adjacent to lit turbines and unlit turbines that are not adjacent to lit turbines will be compared graphically and statistically.

(g) Mitigation

Mitigation may be appropriate if fatality rates exceed a "threshold of concern." For the purpose of determining whether a threshold has been exceeded, the certificate holder shall calculate the average annual fatality rates for species groups after two years of monitoring. Based on current knowledge of the species that are likely to use the habitat in the area of the facility, the following thresholds apply to the Klondike III facility:

Species Group	**Threshold of Concern** (fatalities per MW)
Raptors (All eagles, hawks, falcons and owls, including burrowing owls.)	0.09
Raptor species of special concern (Swainson's hawk, ferruginous hawk, peregrine falcon, golden eagle, bald eagle, burrowing owl and any federal threatened or endangered raptor species.)	0.06
Grassland species (All native bird species that rely on grassland habitat and are either resident species, occurring year round, or species that nest in the area, excluding horned lark, burrowing owl and northern harrier.)	0.59
State sensitive avian species listed under OAR 635-100-0040 (Excluding raptors listed above.)	0.2

If the data show that a threshold of concern for a species group has been exceeded, the certificate holder shall implement additional mitigation if the Department determines that mitigation is appropriate based on analysis of the data, consultation with ODFW and consideration of any other significant information available at the time. In addition, mitigation may be appropriate if the Department determines that fatality rates for individual avian or bat species (especially State Sensitive Species) are higher than expected and at a level of biological concern. If mitigation is appropriate, the certificate holder, in consultation with the Department and ODFW, shall propose mitigation measures designed to benefit the affected species. The certificate holder shall implement mitigation as approved by the Council. The Department may recommend additional, targeted data collection if the need for mitigation is unclear based on the information available at the time. The certificate holder shall implement such data collection as approved by the Council.

Mitigation should be designed to benefit the affected species group. Mitigation may include, but is not limited to, protection of nesting habitat for the affected group of native species through a conservation easement or similar agreement. Tracts of land that are intact and functional for wildlife are preferable to degraded habitat areas. Preference should be given to protection of land that would otherwise be subject to development or use that would diminish the wildlife value of the land. In addition, mitigation measures might include: enhancement of the protected tract by weed removal and control; increasing the diversity of native grasses and forbs; planting sagebrush or other shrubs; constructing and maintaining artificial nest structures for raptors; improving wildfire response; and local research that will aid in understanding more about the species and conservation needs. In considering whether additional mitigation is appropriate for bat fatalities, the Department will take into account the mitigation that the certificate holder has already implemented under Condition 96 of the site certificate (a contribution of $10,000 per year for three years, beginning in the first year of operation, to fund

research toward better understanding wind facility impacts to bats and to develop mitigation solutions).

2. Raptor Nest Surveys

The objectives of raptor nest surveys are to estimate the size of the local breeding populations of tree or other above-ground-nesting raptor species in the vicinity of the facility and to determine whether operation of the facility results in a reduction of nesting activity or nesting success in the local populations of the following raptor species: Swainson's hawk, golden eagle and ferruginous hawk.

(a) Survey Protocol

For the species listed above, aerial and ground surveys will be used to gather nest success statistics on active nests, nests with young and young fledged. The certificate holder will share the data with state and federal biologists. The certificate holder will conduct two years of post-construction raptor nest surveys. One year of surveys will be done in the first nesting season after construction is completed. The second year of surveys will be done in the fourth year after construction is completed.

During each monitoring year, the certificate holder will conduct a minimum of one helicopter survey in late May or early June and additional surveys as described in this section. All nests discovered during pre-construction surveys and any nests discovered during post-construction surveys, whether active or inactive, will be given identification numbers. Nest locations will be recorded on U.S. Geological Survey 7.5-minute quadrangle maps. Global positioning system coordinates will be recorded for each nest. Locations of inactive nests will be recorded as they may become occupied during future years.

The certificate holder shall conduct the aerial surveys within the Klondike III site and a 2-mile buffer around the turbines to determine nest occupancy. Determining nest *occupancy* will likely require two helicopter visits to each nest. For occupied nests, the certificate holder shall determine nesting *success* by a minimum of one ground visit to determine species, number of young and nesting success. "Nesting success" means that the young have successfully fledged (the young are independent of the core nest site). Nests that cannot be monitored due to the landowner denying access will be checked from a distance where feasible.

(b) Mitigation

The certificate holder shall analyze the raptor nesting data collected after two monitoring years to determine whether a reduction in either nesting success or nest use has occurred in the vicinity of the Klondike III facility. If the analysis indicates a reduction in nesting success by Swainson's hawk, golden eagle or ferruginous hawk within 2 miles of the facility, then the certificate holder shall propose appropriate mitigation and shall implement mitigation as approved by the Council. At a minimum, if the analysis shows that any of these species has abandoned a nest territory within ½ mile of the facility or has not fledged any young over the two-year period within a ½ mile of the facility, the certificate holder shall assume the abandonment or unsuccessful fledging is the result of the facility unless another cause can be demonstrated convincingly.

Given the very low buteo nesting densities in the area, statistical power to detect a relationship between distance from a wind turbine and nesting parameters (e.g., number of fledglings per reproductive pair) will be very low. Therefore, impacts may have to be judged based on trends in the data, results from other wind energy facility monitoring studies and literature on what is known regarding the populations in the region.

If the analysis shows that mitigation is appropriate, the certificate holder shall propose mitigation for the affected species in consultation with the Department and ODFW. Mitigation should be designed to benefit the affected species or contribute to overall scientific knowledge and understanding what stimulates nest abandonment. Mitigation may be designed to proceed in phases over several years. It may include, but is not limited to, additional raptor nest monitoring, protection of natural nest sites from human disturbance or cattle activity (preferably within two miles of the facility) or participation in research projects designed to improve scientific understanding of the needs of the affected species.

(c) Long-term Raptor Nest Monitoring and Mitigation Plan

In addition to the two years of post-construction raptor nest surveys described in paragraph (a), the certificate holder shall conduct long-term raptor nest surveys at five-year intervals for the life of the facility. The certificate holder shall conduct the first long-term raptor nest survey in the ninth year after construction is completed. In conducting long-term surveys, the certificate holder shall follow the same survey protocol that is described above in paragraph (a) unless the certificate holder proposes an alternative protocol that is approved by the Department. In developing an alternative protocol, the certificate holder shall consult with ODFW and may collaborate with the certificate holder for any other wind energy facility.

The certificate holder shall analyze the long-term survey data as described above in paragraph (b). If the analysis shows that mitigation is appropriate, the certificate holder shall propose mitigation for the affected species in consultation with the Department and ODFW as described in paragraph (b) and shall implement mitigation as approved by the Council. Any reduction in nesting success could be due to operation of the KWP, operation of another wind facility in the vicinity or some other cause. The reduction shall be attributed to the KWP if the wind turbine closest to the affected nest site is a KWP turbine unless the certificate holder demonstrates, and the Department agrees, that the reduction was due to a different cause.

3. Avian Use Surveys

During each fatality monitoring search, observers will record birds detected in a ten-minute period at approximately one-third of the turbines within the fatality monitoring sample using standard variable circular plot point count survey methods. The purpose of observing and recording avian use while conducting the fatality monitoring is to identify additional species that may not have been listed in the original baseline survey report. In addition, avian use surveys provide a basis to evaluate, in general terms, whether the species with the highest fatality numbers are also the most common species at the site.

4. PPM Energy's Klondike III Wind Project Wildlife Reporting and Handling System

PPM Energy's Klondike III Wind Project Wildlife Reporting and Handling System (WRHS) is a monitoring program to search for and handle avian and bat casualties found by maintenance personnel during construction and operation of the facility. A similar system is in

place for Klondike I and II. Construction and maintenance personnel will be trained in the methods. This monitoring program includes the initial response, the handling and the reporting of bird and bat carcasses discovered incidental to construction and maintenance operations ("incidental finds").

All carcasses discovered by maintenance personnel will be photographed and recorded. If maintenance personnel discover incidental finds at turbines that are not within search plots for the fatality monitoring searches, the data will be reported separately from fatality monitoring data. For such incidental finds, the maintenance personnel will notify a project biologist. The project biologist must be a qualified independent professional biologist who is not an employee of the certificate holder. The project biologist (or the project biologist's experienced wildlife technician) will collect the carcass or will instruct maintenance personnel to have an on-site carcass handling permittee collect the carcass. The certificate holder's on-site carcass handling permitee must be a person who is listed on state and federal scientific or salvage collection permits and who is available to process (collect) the find on the day it is discovered. The find must be processed on the same day as it is discovered.

If maintenance personnel discover carcasses within search plots, the data will be included in the calculation of fatality rates. The maintenance personnel will notify a project biologist. The project biologist will collect the carcass or will instruct maintenance personnel to have an on-site carcass handling permittee collect the carcass. As stated above, the on-site permittee must be available to process the find on the day it is discovered. The certificate holder shall coordinate collection of state endangered, threatened or protected species with ODFW. The certificate holder shall coordinate collection of federal endangered, threatened or protected species with the USFWS.

5. Data Reporting

The certificate holder will report the monitoring data and analysis to the Department. Monitoring data include fatality data, raptor nest survey data, avian use point counts and data on incidental finds by fatality searchers and KWP personnel. The report may be included in the annual report required under OAR 345-026-0080 or may be submitted as a separate document at the same time the annual report is submitted. In addition, the certificate holder shall provide to the Department any data or record generated in carrying out this monitoring plan upon request by the Department.

The certificate holder shall notify USFWS and ODFW immediately in the event that any federal or state endangered or threatened species are killed or injured on the facility site.

The public will have an opportunity to receive information about monitoring results and to offer comment. Within 30 days after receiving the annual report of monitoring results, the Department will make the report available to the public on its website and will specify a time in which the public may submit comments to the Department.[4]

[4] The certificate holder may establish a Technical Advisor Committee (TAC) but is not required to do so. If the certificate holder establishes a TAC, the TAC may offer comments to the Council about the results of the monitoring required under this plan.

6. Amendment of the Plan

This Wildlife Monitoring and Mitigation Plan may be amended from time to time by agreement of the certificate holder and the Council. Such amendments may be made without amendment of the site certificate. The Council authorizes the Department to agree to amendments to this plan and to mitigation actions that may be required under this plan. The Department shall notify the Council of all amendments and mitigation actions, and the Council retains the authority to approve, reject or modify any amendment of this plan or mitigation action agreed to by the Department.

Klondike III Wind Project: Revegetation Plan

[JUNE 30, 2006]

I. Introduction

This plan describes methods and standards for restoration of areas temporarily disturbed during the construction, maintenance or repair of the Klondike III Wind Project (KWP).[1] The objective of revegetation is to restore the temporarily disturbed areas to pre-construction condition or better. Restoration of these areas is required by the site certificate for the facility.

An estimated 97 acres of land will be temporarily affected during construction of the facility.[2] Approximately 82 acres of the temporarily disturbed area is cultivated agricultural land and the remainder is grassland, shrub-steppe or CRP.[3] The certificate holder shall maintain erosion and sediment control measures put in place during construction until the affected areas are restored as described in this plan and the risk of erosion has been eliminated.

This plan has been prepared to guide the revegetation efforts. Seed mixes, planting methods and weed control techniques have been developed for the project area in consultation with the Oregon Department of Fish and Wildlife (ODFW). The plan specifies monitoring procedures to evaluate revegetation success and recommended remediation if revegetation appears unsuccessful in certain areas.

II. Description of the Project Area

The facility is located in Sherman County, Oregon. The project area is on private agricultural land used primarily for dry land winter wheat production. Soils are typically loess formations of well-drained, moderately permeable, fertile silt loams over basalt. Some areas are used for livestock grazing. Depth to bedrock is generally 20 to 60 inches. The area receives approximately 11 inches of precipitation annually, most of which occurs between October 1 and March 31.

The project area is within the Deschutes-Columbia Plateau physiographic province. Topography within the area is typically gently rolling to level ground with steep slope areas at the northeast and southern margins of the site. Elevation ranges from 1,250 to 1,500 feet. Most of the native vegetation in the project area has been modified by human activities. Very little native plant area exists, occurring predominantly along the plateau margins and steep side slopes of Grass Valley Canyon. Plant communities in these areas consist of sagebrush and rabbitbrush dominated shrub lands and native bunchgrass grasslands, each with varying degrees of invasive species present. CRP areas have been planted with a mix of native and non-native bunch grasses.

III. Revegetation Methods

The certificate holder shall restore areas of temporary disturbance by preparing the soil and seeding using common application methods. The certificate holder shall use mulching and other appropriate practices to control erosion and sediment during facility construction and

[1] This plan is incorporated by reference in the site certificate for the KWP and must be understood in that context. It is not a "stand-alone" document. This plan does not contain all mitigation required of the certificate holder.
[2] In addition to the area permanently occupied by facility structures (approximately 64 acres).
[3] "CRP" is formerly cultivated land that the landowner has enrolled in the Conservation Reserve Program.

during revegetation work. The certificate holder shall restore agricultural topsoil to pre-construction condition. The certificate holder shall select the seed mix to apply based on the pre-construction land use, as described below.

1. Seed Planting Methods

Restoration of temporarily disturbed areas should begin as soon as possible after completion of facility construction, maintenance or repair activity in the area to be restored. Planting should be done at the appropriate time of year based on weather conditions and the time of year when ground disturbance occurs. The certificate holder shall choose planting methods based on site-specific factors such as slope, erosion potential and the size of the area in need of revegetation. Disturbed ground may require chemical or mechanical weed control before weeds have a chance to go to seed. Two common application methods are described as follows.

(a) Broadcasting

Broadcast the seed mix at the specified application rate. Where feasible, apply half of the total mix in one direction and the second half of mix in direction perpendicular to first half. Apply weed free straw from a certified field or sterile straw at a rate of two tons per acre immediately after applying seed. Crimp straw into the ground to a depth of two inches using a crimping disc or similar device. As an alternative to crimping, a tackifier may be applied using hydroseed equipment at a rate of 100 pounds per acre. Prior to mixing the tackifer, visually inspect the tank for cleanliness. If remnants from previous hydroseed applications exist, wash tank to remove remnants. Include a tracking dye with the tackifier to visibly aid uniform application. Broadcasting should not be used if winds exceed five miles per hour.

(b) Drilling

Using an agricultural or range seed drill, drill seed at 70 percent of the recommended application rate to a depth of ¼ inch or as recommended by the seed supplier. Where feasible, apply half of the total mix in one direction and the second half of mix in direction perpendicular to first half. If mulch has been previously applied, seed may be drilled through the mulch provided the drill is capable of penetrating the straw resulting in seed-to-soil contact conducive for germination.

2. Seed Mix

(a) Seed Mix 1 – Dry Land Wheat

The certificate holder shall seed temporarily disturbed agricultural areas with wheat or other crop seed. The certificate holder shall consult with the landowner and farm operator to determine species composition, seed and fertilizer application rates and application methods.

(b) Seed Mix 2 – CRP

The certificate holder shall seed temporarily disturbed CRP areas with a mix compatible with the CRP goals. The certificate holder shall consult with ODFW and the landowner to determine the species composition, application rate, use of fertilizers and application methods.

(c) Seed Mix 3 – Grassland

The certificate holder shall apply Seed Mix 3 to all temporarily disturbed areas that are not cultivated farmland or CRP areas. The composition and application rate of Seed Mix 3 will

be determined in consultation with ODFW and the landowners and will be subject to the approval of the Oregon Department of Energy (Department). The certificate holder shall use seed provided by a reputable supplier and complying with the Oregon Seed Law. The mix should contain native species selected based on relative availability and compatibility with local growing conditions. Factors that will be taken into consideration are soil erosion potential, soil type, seed availability and the need for using native or native-like species.

IV. Monitoring

1. Monitoring Procedures

In the year following each seeding, the certificate holder shall employ a qualified investigator (an independent botanist or revegetation specialist) to examine all seeded grassland and CRP areas to assess vegetation cover (species, structural stage, etc.) and progress toward meeting the success criteria. The qualified investigator shall revisit the revegetation areas on an annual basis until the certificate holder and the Department agree that the areas are trending toward meeting the success criteria. Thereafter, the qualified investigator shall revisit the revegetation areas every five years for the life of the KWP to assess vegetation cover and success. The certificate holder shall report the investigator's findings and recommendations regarding revegetation progress and success to the Department on an annual basis as part of the annual report on the KWP.

In consultation with the ODFW, the certificate holder's qualified investigator shall choose reference sites near the revegetated areas to represent the target conditions for the revegetation effort. The target conditions for each revegetated area are conditions that would be realistically attainable for the area. Land use patterns, soil type, local terrain and noxious weed densities should be considered in selecting reference sites. It is likely that several reference sites will be necessary to adequately represent the various habitat conditions within the project area.

Once the reference sites are chosen, they will be used for comparison during all subsequent monitoring visits, unless some event (such as wildfire) significantly changes vegetation conditions so that a particular reference site no longer represents a realistically attainable goal for the associated revegetated area. In that case, the qualified investigator shall choose a new reference site.

At each monitoring location, the investigator shall evaluate the following parameters (both within the revegetated area and within the reference site):

- Degree of erosion due to construction activities (high, moderate or low).
- Average number of stems of desirable vegetation per square foot.

The investigator shall evaluate the revegetated area and the reference site separately to determine revegetation success.

2. Success Criteria

A temporarily disturbed grassland or CRP area is successfully revegetated when the average desirable vegetation stem density within the revegetated area is greater than, or equal to, that observed in the comparable reference site. Desirable vegetation means those species included in the seed mix or native or naturalized species common to similar areas.

In each monitoring report to the Department, the certificate holder shall provide an assessment of revegetation success in grassland or CRP restoration areas. The Department may require reseeding or other corrective measures in those areas that do not meet the success criteria. The Department may exclude small areas from the reseeding requirement, if erosion from construction activities is low, if total vegetative cover (of native and non-native species together) exceeds 30% and if weed encroachment has made native seed establishment impossible.

Cultivated agricultural areas are successfully revegetated if the replanted areas achieve crop production comparable to adjacent non-disturbed cultivated areas. The certificate holder shall consult with the landowner or farmer to determine whether these areas have been successfully revegetated and shall report to the Department on the success of revegetation in these areas.

V. Amendment of the Plan

This Revegetation Plan may be amended from time to time by agreement of the certificate holder and the Oregon Energy Facility Siting Council ("Council"). Such amendments may be made without amendment of the site certificate. The Council authorizes the Department to agree to amendments to this plan. The Department shall notify the Council of all amendments, and the Council retains the authority to approve, reject or modify any amendment of this plan agreed to by the Department.

Klondike III Wind Project: Habitat Mitigation Plan

[JUNE 30, 2006]

I. Introduction

This plan describes methods and standards for enhancement of an area of land near the Klondike III Wind Project (KWP) to mitigate for the permanent impacts of the KWP on wildlife habitat.[1] The certificate holder shall enhance the mitigation site as described in this plan and shall place the site into a conservation easement for the life of the KWP facility. The objective of the enhancement methods is to improve the habitat value of the mitigation area and to protect the area for wildlife use for the life of the facility.

This plan has been prepared to guide the habitat enhancement efforts. The plan specifies monitoring procedures to evaluate enhancement success and recommended remediation if enhancement is unsuccessful in any part of the mitigation site.

II. Description of the Permanent Impacts

The KWP would permanently affect approximately 64 acres. Most of the area of permanent impact (approximately 56 acres) would be within currently cultivated agricultural fields. This area is lower-value habitat (Category 6). The KWP facility would occupy approximately 8.5 acres of higher-value habitat. The actual area of each habitat category that the KWP will permanently occupy will depend on the final design layout of the facility after consideration of micrositing factors. The area of permanent impact includes habitat in Categories 2, 3 and 4.

Data collected at other wind energy facilities indicate that the operation of wind turbines may adversely affect the quality of nearby habitat that is important or essential for grassland avian species. Conducting a study at the KWP to determine whether operation of the facility will have a displacement effect on grassland birds would take several years. If the study concluded that an adverse impact had occurred, additional mitigation would be needed. In lieu of conducting a multi-year study, the certificate holder will provide additional mitigation, based on the assumed likelihood that operation of the KWP would reduce the quality of nearby habitat that is important or essential for grassland bird species. The affected habitat near the KWP wind turbines includes habitat in Categories 2 and 3.

As defined by the fish and wildlife habitat mitigation goals and standards of the Oregon Department of Fish and Wildlife (ODFW), the affected habitat and corresponding mitigation goals are as follows:

- **Category 2:** essential habitat for a fish or wildlife species, population, or unique assemblage of species that is limited either on a physiographic province or site-specific basis depending on the individual species, population or unique assemblage.

  Mitigation Goal: no net loss of either habitat quantity or quality and provision of a net benefit of habitat quantity or quality.

[1] This plan is incorporated by reference in the site certificate for the KWP and must be understood in that context. It is not a "stand-alone" document. This plan does not contain all mitigation required of the certificate holder.

- **Category 3:** essential habitat for fish and wildlife, or important habitat for fish and wildlife that is limited either on a physiographic province or site-specific basis, depending on the individual species or population.

  Mitigation Goal: no net loss of either habitat quantity or quality.

- **Category 4:** important habitat for fish and wildlife species.

  Mitigation Goal: no net loss in either existing habitat quantity or quality.

III. Calculation of Mitigation Area

The area that is needed to mitigate for the amount of higher-value habitat occupied by KWP turbines and related facilities is determined by the "footprint" of the KWP within each habitat category. The amount of additional area needed to mitigate for a displacement effect that is uncertain cannot be precisely calculated. To determine a reasonable area for displacement mitigation, a rough calculation of potential displacement impact was done by assuming a 50-percent reduction in use by grassland birds within 50 meters of wind turbines.[2] It was also assumed that grassland birds use Conservation Reserve Program (CRP) land at a rate that is 50-percent of their use of native grassland and upland tree habitat (and therefore that the amount of mitigation area should be half as much for CRP displacement as for native grassland displacement). It was further assumed that the final design locations of wind turbines within the micrositing corridors would be such that the maximum area of native grassland would be affected (the "worst case"). For both footprint and displacement impacts within Category 2 habitat, the mitigation area was calculated on a 2:1 ratio to meet the ODFW goal of a "net benefit of habitat quantity or quality." The area of impact within each affected habitat category and the corresponding mitigation area for each category are as follows:

<u>Category 2</u>
Footprint impacts: 0.7 acres
Displacement impacts: 2.9 acres
Mitigation area: 3.6 acres x 2 = 7.2 acres

<u>Category 3 (grassland and upland tree habitat)</u>
Footprint impacts: 0.5 acres
Displacement impacts: 2.7 acres
Mitigation area: 3.2 acres

<u>Category 3 (CRP)</u>
Footprint impacts: 7.3 acres
Displacement impacts: 24.6 acres
Mitigation area: (7.3 + (50% x 24.6)) = 19.6 acres

<u>Category 4</u>
Footprint impacts: 0.1 acres
Displacement impacts: 0 acres
Mitigation area: 0.1 acres

<u>Total mitigation area (rounded): 30 acres</u>

[2] The method of determining a reasonable mitigation area as described in this plan is not intended to be a precise formula or a precedent for determining appropriate mitigation for any other facility.

The rough calculation of potential displacement impact described above was based in part on data collected at the Stateline Wind Project and reported in the *Stateline Wind Project Wildlife Monitoring Final Report, July 2001 - December 2003* (2003 report). Additional data will be collected at Stateline in 2006 and (if any Stateline 3 turbines are built) in 2010. If analysis of this additional data demonstrates a statistically significant displacement effect on grassland bird species that is greater than the displacement effect described in the 2003 report, then the certificate holder shall assume that the Klondike III facility is having a greater displacement effect on grassland species than was assumed when the site certificate was issued and shall propose additional mitigation. The Department shall recommend appropriate mitigation to the Council, and the certificate holder shall implement mitigation as approved by the Council.

IV. Description of the Mitigation Site

The certificate holder shall select a 30-acre mitigation site in proximity to the facility where habitat enhancement is feasible. The certificate holder shall determine the final location of the mitigation area consistent with this plan in consultation with ODFW and the affected landowners and subject to the approval of the Oregon Department of Energy (Department). The certificate holder shall acquire the legal right to create, maintain and protect the habitat mitigation area for the life of the facility by means of an outright purchase, conservation easement or similar conveyance and shall provide a copy of the documentation to the Department.

V. Habitat Enhancement Methods

The goal of habitat enhancement is to improve the habitat quality of the mitigation site to achieve, over time, a Category 2 quality over most, if not all, of the site. The mitigation site may include land that has been managed under a CRP contract, which may previously have been planted with non-native species, including intermediate wheatgrass *(Agropyron intermedium*) and crested wheatgrass (*Agropyron cristatum*). It is common to find non-native species such as cheat grass between the planted grasses on CRP land. The goal of habitat enhancement is to diversify the vegetation on the mitigation site to provide long-term, structurally mature, functional grassland habitat.

If the selected mitigation site includes CRP land, the certificate holder will work with the Farm Service Agency (FSA) and the landowner to develop habitat improvement measures for the site that would benefit wildlife. The certificate holder would consult with the FSA before performing any work on land under a CRP contract to ensure consistency with the intent of the CRP contract.

Weed control on the mitigation site will contribute to lessening noxious weed expansion on the site and on any nearby grassland, CRP or cultivated agricultural land and would result in lessening competition to the desirable seeded and naturalized vegetation as recovery progresses. The enhancement measures would proceed in phases. Before or during construction of the KWP, the certificate holder shall begin the enhancement measures. The first phase is to clear non-native species and weeds through a combination of spraying and mowing, followed by planting with desirable grasses, forbs and woody shrubs. After the new vegetation is established, the quality of the habitat will be maintained for the life of the KWP by continued weed control, fire control and reseeding as necessary. The certificate holder shall repeat enhancement measures as necessary to meet the success criteria. The following steps summarize the process:

1) Herbicide application. Herbicides would be sprayed on existing vegetation and newly emerging weeds to prevent them from seeding and spreading. If Roundup is used instead of herbicides to prevent the build up of herbicide residue, it will be sprayed early and often (3 times) during the growing season. Alternating strips of CRP would be prepared for seeding with native-like species, and the remaining areas would be left in place to reduce the potential for wind erosion. In time, desirable plant seed sources in the new strips would infiltrate into the non-native strips to increase the overall species diversity.

2) Seeding and Planting. Native-like grass and forbs will be planted in the fall or early winter, so that seeds can soak up moisture during the winter. The mitigation seed mix will be determined in consultation with the landowner and ODFW. A no-till drill would be used for seeding. The no-till drill uses a series of smaller disks to create divots in the ground, and then plants the seeds in these divots with a seeding tube. The no-till drill does not require that site be tilled or disked prior to seeding. The drill would be used in several directions to mask the appearance of row crops and provide a more natural "bunchgrass" appearance over time. The certificate holder shall consult with ODFW regarding species of woody shrubs appropriate for the site. Such species could be included in the seed mix or small plants could be planted.

3) Continued Weed Control. After grasses have established, weed control methods would continue during first growing season and as needed thereafter (on both seeded and non-seeded strips). Weeds would be controlled with herbicides during the first year, which can reduce persistent weeds after seeding. Hand-pulling weeds can also be very effective for small areas but would be limited to noxious weeds listed by Sherman County. Spot-spraying can be used instead of total area spray to protect locations where young desirable forbs that may be growing.

4) Fire Control. The certificate holder will require the operations contractor to be the responsible party for wildfire suppression on the mitigation site for the life of the KWP.

VI. Monitoring

1. Monitoring Procedures

In the year following the first seeding and continuing annually thereafter until the success criteria have been met, the certificate holder shall hire a qualified investigator (an independent botanist or revegetation specialist) to examine all seeded and planted areas to assess vegetation cover (species, structural stage, etc.) and progress toward meeting the success criteria. The qualified investigator shall revisit the mitigation area on an annual basis until the certificate holder and the Department agree that the area is trending toward meeting the success criteria. Thereafter, the qualified investigator shall revisit the mitigation area every five years for the life of the KWP to assess vegetation cover and success. The certificate holder shall report the investigator's findings and recommendations regarding habitat mitigation progress and success to the Department on an annual basis as part of the annual report on the KWP.

2. Success Criteria

Areas within the mitigation site are successfully revegetated when total canopy cover of all vegetation exceeds 30 percent and at least 25 percent of the ground surface is covered by desirable species. Desirable species are native species or desirable non-native species in the

mitigation seed mix. Successful "enhancement" of the mitigation site means that a Category 2 habitat quality exists over at least 80 percent of the mitigation area.

After predominantly desirable vegetation has been established, the investigator shall verify, during subsequent visits, that the plant communities within the mitigation site continue to meet the success criteria for revegetation. In addition, the investigator, in consultation with ODFW, shall evaluate the percentage of the mitigation site that has been enhanced to a Category 2 quality.

If all or part of the habitat within the site falls below the revegetation or enhancement success criteria levels, the investigator shall recommend corrective measures. The Department may require reseeding or other corrective measures in those areas that do not meet the success criteria. The Department may exclude small areas from the reseeding requirement where the potential for erosion is low and if total vegetative cover (of native and non-native species together) exceeds 30 percent.

VII. Amendment of the Plan

This Habitat Mitigation Plan may be amended from time to time by agreement of the certificate holder and the Oregon Energy Facility Siting Council ("Council"). Such amendments may be made without amendment of the site certificate. The Council authorizes the Department to agree to amendments to this plan. The Department shall notify the Council of all amendments, and the Council retains the authority to approve, reject or modify any amendment of this plan agreed to by the Department.

Oregon Department of Transportation

APPLICATION AND PERMIT TO OCCUPY OR PERFORM OPERATIONS UPON A STATE HIGHWAY

See Oregon Administrative Rule, Chapter 734, Division 55

PERMIT NUMBER

CLASS: 1 KEY #

GENERAL LOCATION

HIGHWAY NAME AND ROUTE NUMBER: **Wasco - Heppner (US 206)**

HIGHWAY NUMBER: **300**

COUNTY: **28=SHERMAN**

BETWEEN OR NEAR LANDMARKS: **Wasco and Nish Pit**

HWY. REFERENCE MAP: **8B-11-11**

DESIGNATED FREEWAY: ☐ YES ☑ NO

IN U.S. FOREST: ☐ YES ☑ NO

APPLICANT NAME AND ADDRESS

Klondike Wind Power III LLC
c/o PPM Energy Inc
1125 NW Couch St. Ste 700
Portland, OR 97209

PURPOSE OF APPLICATION

(TO CONSTRUCT/OPERATE/MAINTAIN)

	TYPE	MIN. VERT. CLEARANCE
☐ POLE LINE		
☑ BURIED CABLE	Power & fiber optic	
☐ PIPE LINE		

☐ **NON-COMMERCIAL SIGN** — FEE AMOUNT: $150.00

☐ **MISCELLANEOUS OPERATIONS AND/OR FACILITIES AS DESCRIBED BELOW**

BOND REQUIRED: ☐ YES ☑ NO (REFERENCE: OAR 734-55 035(2)) — AMOUNT OF BOND:

INSURANCE REQUIRED: ☑ YES ☐ NO (REFERENCE: OAR 734-55 035(1)) — SPECIFIED COMP. DATE:

DETAIL LOCATION OF FACILITY (For more space attach additional sheets)

MILE POINT	TO MILE POINT	ENGINEERS STATION	TO ENGINEERS STATION	SIDE OF HWY OR ANGLE OF CROSSING	DISTANCE FROM CENTER OF PVMT	DISTANCE FROM R/W LINE	BURIED CABLE OR PIPE DEPTH/VERT.	BURIED CABLE OR PIPE SIZE AND KIND	SPAN LENGTH
3.66	3.66	190+00	190+40	90'			36" min 48" min	4 4" PVC & 2 4" PVC /w	

DESCRIPTION AND LOCATION OF NON-COMMERCIAL SIGNS OR MISCELLANEOUS OPERATIONS FACILITIES

Permit is for placing and maintaining a buried power cables and 2 fiber optic lines.

SPECIAL PROVISIONS (FOR MORE SPACE ATTACH ADDITIONAL SHEETS)

TRAFFIC CONTROL REQUIRED

♦ ☑ YES[OAR 734-55-025(6)] ☐ NO

OPEN CUTTING OF PAVED OR SURFACED AREAS ALLOWED?

♦ ☐ YES[OAR 734-55-100(2)] ☑ NO[OAR 734-55-100(1)]

♦ **AT LEAST 48 HOURS BEFORE BEGINNING WORK, THE APPLICANT OR HIS CONTRACTOR SHALL NOTIFY THE DISTRICT REPRESENTATIVE AT TELEPHONE NUMBER: 541-296-2215 OR FAX A COPY OF THIS PAGE TO THE DISTRICT OFFICE AT: 541-296-1629 SPECIFY TIME AND DATE IN THE SPACE BELOW.**

♦ A COPY OF THIS PERMIT AND ALL ATTACHMENTS SHALL BE AVAILABLE AT THE WORK AREA DURING CONSTRUCTION.

♦ **ORS 757.54 TO 757.571 REQUIRES EXCAVATORS TO LOCATE AND PROTECT ALL EXISTING UNDERGROUND UTILITIES. YOU MAY BE HELD LIABLE FOR DAMAGES. CALL FOR UTILITY LOCATES. *CALL BEFORE YOU DIG. 1-800-332-2344***

COMMENTS - ODOT USE ONLY

1. **General Provisions are part of this permit.**
2. **Fiber Optic lines must be a minimum of 48" deep.**

IF THE PROPOSED APPLICATION WILL AFFECT THE LOCAL GOVERNMENT, THE APPLICANT SHALL ACQUIRE THE LOCAL GOVERNMENT OFFICIAL'S SIGNATURE BEFORE ACQUIRING THE DISTRICT MANAGER'S SIGNATURE.

LOCAL GOVERNMENT OFFICIAL SIGNATURE		TITLE	DATE
X			
APPLICANT	**APPLICATION DATE**	**TITLE**	**TELEPHONE NO.**
X			
When this application is approved by the Department, the applicant is subject to, accepts and approves the terms and provisions contained in the attached: and the terms of Oregon Administrative Rules, Chapter 734, Division 55, which is by this reference made a part of this permit.		DISTRICT MANAGER OR REPRESENTATIVE X	APPROVAL DATE

734-3457 (5-03)

GENERAL PROVISIONS FOR POLELINE, PIPELINE, BURIED CABLE PERMITS AND MISCELLANEOUS PERMITS

(Rev) Mar 2005

APPLICANT Klondike III Wind Project HIGHWAY 300 MP 3.66

WORKSITE

☒1. Permittee shall call for utility locates before digging, 1-800-332-2344 per Oregon Administrative Rules (Chapter 952, Division 1). You may be held liable for damages.

☐2. Prior to beginning work on ODOT Region 4 right of way, permittee shall contact ODOT Region 4 Electrical Supervisor to request ODOT locates in and around ODOT facilities. Utility locates may not include ODOT facilities.

☒3. Permittee shall have a copy of this permit and all attachments at the work site. They shall be available to the District Manager or representative upon request.

☐4. Permittee shall acknowledge, in writing, it's receipt and review of Oregon Administrative Rules (Chapter 734, Division55) governing miscellaneous facilities and operations on the highway right of way as the governing provisions of this permit or agreement. Copies of this rule may be obtained from any district maintenance office.

☒4. Permittee shall review the Oregon Administrative Rules (Chapter 734 Division 55) governing miscellaneous facilities and operations on the highway right of way as the governing provisions of this permit or agreement. Web Site: http://arcweb.sos.state.or.us/rules/OARS_700/OAR_734/734_055.html.

☐6. Access control fence shall be maintained during construction and restored to its original or better condition after construction is complete.

☒7. The permittee shall not use state highway right of way to display advertising signs or merchandise of any kind.

☒8. Stopping and parking of vehicles on state highway right of way for the maintenance of adjoining property or in furtherance of any business transaction or commercial establishment is strictly prohibited.

☐9. All grass and small brush within the work area shall be rotary or flail mowed to ground level prior to the beginning of work to facilitate clean up. Disturbed areas shall be reseeded with grass native to the area in an appropriate seeding time.

☒10. Depositing of mud or debris upon any state highway is strictly prohibited and violation shall be cause for immediate cancellation of the permit. Clean up shall be at the applicant's expense. The highway shall be cleaned of all dirt and debris at the end of each work day, or more frequently if so determined by the District Manager or representative.

☒11. Permittee shall replace any landscape vegetation or fences that are destroyed. Any damage that is not fully recovered within 30 days (weather permitting) will be replaced by ODOT at the expense of the permittee. A "plant establishment" shall be understood to be part of the planting work to assure satisfactory growth of planted materials. The plant establishment period will begin when the original planting and all landscape construction has been completed and approved. The length of the establishment period will be one calendar year or as defined in the permit Special Provisions.

☐12. Permittee shall install and maintain landscaped area as shown on the attached drawings. Planting shall be limited to low-growing shrubs, grass or flowers that do not attain sufficient height to obstruct clear vision in any direction. The Oregon Department of Transportation (ODOT) retains the right to remove said landscaping at any time such removal may appear to be in the public interest, without liability or loss, injury, of damage or any nature whatsoever.

Permittee_____ ODOT REP._____Date_____

TRAFFIC

☒13. During construction or maintenance, the work area shall be protected in accordance with the current Manual on Uniform Traffic Control Devices, (MUTCD), Federal Highway Administration, US Department of Transportation, and the Oregon Department of Transportation supplements thereto. Flaggers shall have a card or certificate indicating their completion of an approved work zone traffic control course. All traffic control devices shall be maintained according to the American Traffic Safety Services Association (ATSSA), Quality Standards for Work Zone Traffic Control Devices handbook.

☐14. Permittee shall provide a detailed traffic control plan for each phase of the work, showing signs and cones. Plans shall be reviewed and approved by Oregon Department of Transportation in advance of construction or maintenance.

☒15. All damaged or removed highway signs shall be replaced by the permittee. Installation shall be according to MUTCD standards or ODOT specifications, and shall be completed as soon as possible but no later than the end of the work shift.

☐16. No lane restrictions are permitted on the roadway during the hours of darkness, on weekends, or between 6:00 AM and 9:00 AM, or 3:00 PM and 6:00 PM (Monday thru Friday) without prior approval by ODOT.

☒17. Hours of work on the roadway shall be: Daylight

DRAINAGE

☐18. On-site storm drainage shall be controlled within the permitted property. No blind connections to existing state facilities are allowed.

☐19. Excavation shall not be done on ditch slopes. Trench excavation shall either be at ditch bottom or outside ditch area. (Minimum depth at bottom of ditch shall be 36 inches; minimum depth outside of ditch shall be 42 inches).

☐20. Only earth or rock shall be used as fill material and shall slope so as not to change or adversely affect existing drainage. Fine grade and seed the finished fill with native grasses to prevent erosion, or as directed by the District Manager.

☐21. A storm drainage study stamped by an Oregon Registered Professional Engineer (PE) is required. The study must meet standards of the National Pollution Discharge Elimination Systems (NPDES) when any of the following conditions apply:

- Whenever a four inch pipe is inadequate to serve the developed area,
- development site is one acre or larger in size and directly or indirectly affects state facilities,
- or as directed by the District Manager or representative.
- An advance deposit for ODOT hydrology reviews may be required.

☐22. Permittee shall provide on-site detention for storm water runoff that exceeds that of the undeveloped site.

☐23. All water discharged to an ODOT drainage system shall be treated prior to discharge. All requests for connection to an ODOT storm system must meet any requirements of the National Pollutant Discharge Elimination System (NPDES). This may include local jurisdiction approval of on-site water quality treatment facilities and/or development of an operation and maintenance plan for any on-site water quality treatment facility, as determined by local jurisdiction.

Permittee_____ODOT REP_____Date_____

EXCAVATION/CONSTRUCTION

☒24. The following ODOT documents, where applicable and not otherwise superceded by the permit language, shall be incorporated for use in the permit: "Oregon Standard Specifications for Construction (2002)" and relevant Metric Standard Drawings. ODOT shall have authority over acceptance of all materials and workmanship performed under this permit as stated in Section 00150.00 of the "Oregon Standard Specifications for Construction (2002)." For additional Supplemental and Special Provisions please refer to: http://www.odot.state.or.us/techserv/roadway/specs/home.htm. Standard Specifications are available on this site.

☐25. Open cutting of pavement is allowed in areas specifically approved by District Manager or representative.

☐26. Backfill trench according to the attached typical drawing, marked as Exhibit ___A_____.

☐27. Open cutting of the highway is allowed with construction in accordance with OAR 734-55-0100. All excavation in paved areas shall be backfilled and the roadway surface patched before the end of each shift. In special cases where steel plates are allowed, said plates shall be pinned and a temporary cold patch applied to the edges. The permittee shall be fully responsible for monitoring and maintenance of temporary patching and steel plating.

☐28. Compaction tests shall be required for each open cut per Oregon Standard Specification for Construction. Compaction tests shall be conducted every_____ lineal feet per_____lift of continuous trench according to the Manual of Field Test Procedures (MFTP), published by ODOT. Percent Compaction shall be 95%. Upon requests results of compaction test shall be provided to District Manager or representative at applicants' expense.

☐29. Control Density Fill (CDF) shall be used as surface backfill material in place of crushed rock in open trenches that impact the travel portions of the highway. The amount of cement used shall not exceed 3.0% of the total mixture's weight. Maximum compressed strengths must not exceed 250 pounds per square inch (psi).

☐30. Surface restoration shall be a minimum of six inches of hot asphalt-concrete (AC), compacted in two-three inch lifts, or match existing pavement depth, whichever is greater. Sand-seal all edges and joints.

☒31. All aggregate shall conform to Oregon Standard Specification for Construction, Section 02630 - Base Aggregate.

☐32. Any area of cut or damaged asphalt shall be restored in accordance with the included Attachment B, "T" Cut Typical Section drawing. For a period of two years following the patching of paved surface, permittee shall be responsible for the condition of permittee's pavement patches, and during that two year period shall repair to District Manager or representative satisfaction any of the patches which become settled, cracked, broken, or otherwise faulty.

☐33. An overlay to seal an open-cut area shall be completed prior to the end of the construction season, or when minimum temperature allows per "Oregon Standard Specification for Construction" and any subsequent revisions thereto. Typical overlay shall be 1.5 inches deep and cover the affected area from edge of pavement to edge of pavement, and taper longitudinally at a fifty feet to one inch (50' : 1") ratio. Taper may be adjusted by the District Manager as required. For a period of two years following this patching of the surface, the permittee shall be responsible for the condition of said pavement patches, and during that time shall repair to the District Manager or representative's satisfaction any of the patches which become settled, cracked, broken or otherwise faulty.

☒34. Highway crossings shall be bored or jacked. Bore pits shall be located behind ditch line or in areas satisfactory to the District Manager. Unattended pits shall either be protected by a six-foot fence, backfilled, or steel plated and pinned.

Permittee_____ODOT REP_____Date_____

☒35. Permittee shall install a “tracer wire” or other similar conductive marking tape or device, if installing any non-conductive, unlocatable underground facility, in order to comply with Oregon Utilities Coordination Council (OUCC), per OAR 952-01-0070 (6).

☒36. Trench backfill outside of ditch line or in approved areas may be native soil compacted at optimum moisture in twelve inch layers to 90% or greater of the maximum density.

☒37. Native material that is found to be unsatisfactory for compaction shall be disposed of off the project and granular backfill used.

☒38. Trench backfill in rock slope or shoulder shall be crushed 1”-0 or ¾”-0 size rock compacted at optimum moisture in eight-inch layers. Compaction tests shall be conducted according to the Manual of Field Test Procedures (MFTP), published by ODOT. Percent compaction shall be 95%. At the discretion of the District Manager or representative, results of compaction tests shall be provided to District Manager or representative at applicant's expense.

☒39. Where excavation is on fill slope steeper than a two to one (2:1) ratio, slope protection shall be provided using four-inch size rock laid evenly to a minimum depth of twelve inches.

☒340. No more than 300 feet of trench longitudinally along the highway shall be left open at any one time and no trench shall be left in an open condition overnight.

☒41. Areas of disturbed cut and fill slopes shall be restored to a condition suitable to the District Manager or representative. Areas of erosion shall be inlaid with an acceptable riprap material, or as directed.

☒42. All underground utilities shall be installed with three-foot or more of horizontal clearance from existing or contract plans guardrail posts and attachments. All non-metallic water, sanitary and storm sewer pipe shall have an electrically conductive insulated Number 12-gauge copper tracer wire the full length of the installed pipe using blue wire for water and green for storm and sanitary sewer piping.

☐43. Any area of cut or damaged concrete shall be restored in accordance with the attached Typical Section-Pipe Section under sidewalk.

☒44. Utility markers and pedestals shall be placed as near the highway right-of-way line as practical. In no case shall pedestals and line markers be located within the highway maintenance area.

☒45. No cable plowing is allowed within the lateral support of the highway asphalt (i.e. at six feet lower than the edge of the asphalt, no plowing within nine feet of the edge of the asphalt).

☐46. Review by an ODOT Bridge Engineer is required for all proposed bridge and structure attachments and for utility or any facilities to be installed within sixteen feet of bridge foundations, supports, walls or related, or within the influence zone of bridge facilities.

Permittee_____ODOT REP_____Date_____

Miscellaneous:

☒47. Permittee shall be responsible and liable for (1) investigating presence/absence of any legally protected or regulated environmental resource(s) in the action area; (2) determining any and all restrictions or requirements that relate to the proposed actions, and complying with such, including but not limited to those relating to hazardous material(s), water quality constraints, wetlands, archeological or historic resources(s) state and federal threatened or endangered species, etc., (3) complying with all federal, state, and local laws, and obtaining all required and necessary permits and approvals.

☒48. If the permittee impacts a legally protected/regulated resource, permittee shall be responsible for all costs associated with such impact, including, but not limited to all costs of mitigation and rehabilitation, and shall indemnify, and hold ODOT harmless for such impacts and be responsible and liable to ODOT for any associated costs or claims that ODOT may have.

☒49. Plans are approved by ODOT in general only and do not relieve the permittee from completing construction improvements in a manner satisfactory to ODOT. The District Manager or representative may require field changes. When revisions are made in the field, permittee is responsible to provide "as built" drawings, within 60 days from completion of highway improvements, and shall submit them to the District Office issuing the permit.

☒50. Permittee shall be responsible for locating and preserving all existing survey monumentation within the work area in accordance with ORS 209.150 and/or 209.155. If monumentation or it's accessories are inadvertently or otherwise disturbed or destroyed, applicant shall be responsible for all costs and coordination associated with it's reestablishment by a professional licensed surveyor.

☐51. An advance deposit of $ _____ is required for project associated costs incurred by ODOT. Such costs will be identified and estimated by ODOT, and include, but are not limited to review of studies and calculations involving hydraulics/drainage, geotechnical, traffic and traffic control plans, signal, roadway design, bridge and other engineering support. Excess funds remaining in the account upon completion of billing will be refunded. If ODOT costs exceed the deposit amount, permittee shall be billed for the difference.

Permittee _____ODOT Rep. _____ Date _____

File:olk74/General Provisions (Rev Mar 2005)

ENERGY FACILITY SITING COUNCIL

OF THE

STATE OF OREGON

Site Certificate
for the
Klondike III Wind Project

June 30, 2006

The Oregon Energy Facility Siting Council

SITE CERTIFICATE FOR THE KLONDIKE III WIND PROJECT

I. INTRODUCTION

The Oregon Energy Facility Siting Council (Council) issues this site certificate for the Klondike III Wind Project (the facility) in the manner authorized under ORS Chapter 469. This site certificate is a binding agreement between the State of Oregon (State), acting through the Council, and Klondike Wind Power III LLC (certificate holder) authorizing the certificate holder to construct and operate the Klondike III Wind Project in Sherman County, Oregon.

The findings of fact, reasoning and conclusions of law underlying the terms and conditions of this site certificate are set forth in the Council's Final Order on the Application issued on June 30, 2006. In interpreting this site certificate, any ambiguity will be clarified by reference to the following, in order of priority: (1) this Site Certificate, (2) the Final Order on the Application and (3) the record of the proceedings that led to the Final Order on the Application.

The definitions in ORS 469.300 and OAR 345-001-0010 apply to terms used in this site certificate, except where otherwise stated or where the context clearly indicates otherwise.

II. SITE CERTIFICATION

1. To the extent authorized by state law and subject to the conditions set forth herein, the State authorizes the certificate holder to construct, operate and retire a wind energy facility, together with certain related or supporting facilities, at the site in Sherman County, Oregon, as described in Section III of this site certificate. ORS 469.401(1).
2. This site certificate is effective until it is terminated under OAR 345-027-0110 or the rules in effect on the date that termination is sought or until the site certificate is revoked under ORS 469.440 and OAR 345-029-0100 or the statutes and rules in effect on the date that revocation is ordered. ORS 469.401(1).
3. This site certificate does not address, and is not binding with respect to, matters that were not addressed in the Council's Final Order on the Application. Such matters include, but are not limited to: building code compliance, wage, hour and other labor regulations, local government fees and charges and other design or operational issues that do not relate to siting the facility (ORS 469.401(4)) and permits issued under statutes and rules for which the decision on compliance has been delegated by the federal government to a state agency other than the Council. 469.503(3).
4. Both the State and the certificate holder shall abide by local ordinances, state law and the rules of the Council in effect on the date this site certificate is executed. ORS 469.401(2). In addition, upon a clear showing of a significant threat to public health, safety or the environment that requires application of later-adopted laws or rules, the Council may require compliance with such later-adopted laws or rules. ORS 469.401(2).
5. For a permit, license or other approval addressed in and governed by this site certificate, the certificate holder shall comply with applicable state and federal laws adopted in the future to the extent that such compliance is required under the respective state agency statutes and rules. ORS 469.401(2).

6. Subject to the conditions herein, this site certificate binds the State and all counties, cities and political subdivisions in Oregon as to the approval of the site and the construction, operation and retirement of the facility as to matters that are addressed in and governed by this site certificate. ORS 469.401(3).

7. Each affected state agency, county, city and political subdivision in Oregon with authority to issue a permit, license or other approval addressed in or governed by this site certificate shall, upon submission of the proper application and payment of the proper fees, but without hearings or other proceedings, issue such permit, license or other approval subject only to conditions set forth in this site certificate. ORS 469.401(3).

8. After issuance of this site certificate, each state agency or local government agency that issues a permit, license or other approval for the facility shall continue to exercise enforcement authority over such permit, license or other approval. ORS 469.401(3).

9. After issuance of this site certificate, the Council shall have continuing authority over the site and may inspect, or direct the Oregon Department of Energy (Department) to inspect, or request another state agency or local government to inspect, the site at any time in order to ensure that the facility is being operated consistently with the terms and conditions of this site certificate. ORS 469.430.

III. DESCRIPTION

1. The Facility

(a) The Energy Facility

The energy facility is an electric power generating plant with an average electric generating capacity of approximately 91 megawatts and a peak generating capacity of not more than 272.25 megawatts that produces power from wind energy. The facility consists of not more than 165 wind turbines, each with a peak generating capacity of not more than 1.65 megawatts. Turbines are mounted on tubular steel towers. The turbine towers are about 265 feet tall at the turbine hub and have an overall height of about 400 feet including the radius swept by the turbine blades. The energy facility is described further in the Final Order on the Application.

(b) Related or Supporting Facilities

The facility includes the following related or supporting facilities described below and in greater detail in the Final Order on the Application:

- Power collection system
- Substations and interconnection system
- Meteorological towers
- Operations and maintenance building
- Control system
- Access roads
- Temporary laydown and staging areas

Power Collection System

A power collection system operating at 34.5 kilovolts (kV) transports power from each turbine to a collector substation. Most of the collection system is in underground segments but may include aboveground segments, not exceeding 5.5 miles in combined length, mounted on

monopole support structures. Power from the eastern section of the facility is transmitted to a substation near Schoolhouse on an aboveground power line operating at 230-kV approximately 3.5 miles in length, supported on wood or steel poles.

Substations and Interconnection System

The facility includes two substations. One is located near the BPA Klondike Schoolhouse Substation, and the other is located near Webfoot. The power generated by the facility interconnects with the regional transmission grid through the BPA Klondike Schoolhouse Substation.

Meteorological Towers

The facility includes three permanent meteorological (met) towers. The met towers are non-guyed steel towers approximately 80 meters in height.

Operations and Maintenance Building

The facility includes an operations and maintenance (O&M) building of approximately 5,000 square feet.

Control System

A fiber optic communications network links the wind turbines to a central computer at the O&M building. A "supervisory, control and data acquisition" (SCADA) system collects operating and performance data from each wind turbine and the project as a whole and provides remote operation of the wind turbines.

Access Roads

The facility includes access roads to provide access to the turbine strings. Access roads connect to graveled turbine turn-out and pad areas at the base of each wind turbine. The roads are approximately 20 feet wide and constructed with crushed gravel.

Temporary Laydown and Staging Areas

During construction, the facility includes temporary laydown areas used to stage construction and store supplies and equipment during construction.

2. Location of the Proposed Facility

The facility is located approximately 4 miles east of Wasco, in Sherman County, Oregon, about 5 miles south of the Columbia River. The site is in Townships 1 and 2 North and Ranges 17, 18 and 19 East Sections. The facility is located on land subject to lease agreements with several landowners.

IV. CONDITIONS REQUIRED BY COUNCIL RULES

This section lists conditions required by OAR 345-027-0020 (Mandatory Conditions in Site Certificates), OAR 345-027-0023 (Site Specific Conditions), OAR 345-027-0028 (Monitoring Conditions) and OAR Chapter 345, Division 26 (Construction and Operation Rules for Facilities). These conditions should be read together with the specific facility conditions listed in Section V to ensure compliance with the siting standards of OAR Chapter 345, Divisions 22 and 24, and to protect the public health and safety. In these conditions, "Office of Energy" means the Oregon Department of Energy, and the other definitions in OAR 345-001-0010 apply.

The obligation of the certificate holder to report information to the Department or the Council under the conditions listed in this section and in Section V is subject to the provisions of OAR 345-001-0040, which addresses information that may be exempt under the Oregon Public Records Law. To the extent permitted by law, the Department and the Council will not publicly disclose information that may be exempt from public disclosure under ORS 192.502 *et seq*. or ORS 469.560 if the certificate holder has clearly labeled such information and stated the basis for the exemption at the time of submitting the information to the Department or the Council. If the Council or the Department receives a request for the disclosure of the information, the Council or the Department, as appropriate, will make a reasonable attempt to notify the certificate holder and will refer the matter to the Attorney General for a determination of whether the exemption is applicable, pursuant to ORS 192.450.

In addition to these conditions, the site certificate holder is subject to all conditions and requirements contained in the rules of the Council and in local ordinances and state law in effect on the date the certificate is executed. Under ORS 469.401(2), upon a clear showing of a significant threat to the public health, safety or the environment that requires application of later-adopted laws or rules, the Council may require compliance with such later-adopted laws or rules.

The Council recognizes that many specific tasks related to the design, construction, operation and retirement of the facility will be undertaken by the certificate holder's agents or contractors. Nevertheless, the certificate holder is responsible for ensuring compliance with all provisions of the site certificate.

(1) OAR 345-027-0020(1): The Council shall not change the conditions of the site certificate except as provided for in OAR Chapter 345, Division 27.

(2) OAR 345-027-0020(2): Except as provided in OAR 345-027-0023(6), before beginning construction, the certificate holder shall submit to the Office of Energy a legal description of the site.

(3) OAR 345-027-0020(3): The certificate holder shall design, construct, operate and retire the facility:

(a) Substantially as described in the site certificate;

(b) In compliance with the requirements of ORS Chapter 469, applicable Council rules, and applicable state and local laws, rules and ordinances in effect at the time the site certificate is issued; and

(c) In compliance with all applicable permit requirements of other state agencies.

(4) OAR 345-027-0020(4): The certificate holder shall begin and complete construction of the facility by the dates specified in the site certificate. (*See conditions (26) and (27).*)

(5) OAR 345-027-0020(5): Except as necessary for the initial survey or as otherwise allowed for transmission lines or pipelines under this section, the certificate holder shall not begin construction, as defined in OAR 345-001-0010, or create a clearing on any part of the site until the certificate holder has construction rights on all parts of the site. For the purpose of this rule, "construction rights" means the legal right to engage in construction activities. For transmission lines or pipelines, if the certificate holder does not have construction rights on all parts of the site, the certificate holder may nevertheless begin construction, as defined in OAR 345-001-0010, or create a clearing on a part of the site if:

(a) The certificate holder has construction rights on that part of the site; and

(b) The certificate holder would construct and operate part of the facility on that part of the site even if a change in the planned route of the transmission line or pipeline occurs during the certificate holder's negotiations to acquire construction rights on another part of the site.

(6) OAR 345-027-0020(6): If the Council requires mitigation based on an affirmative finding under any standards of Division 22 or Division 24 of this chapter, the certificate holder shall consult with affected state agencies and local governments designated by the Council and shall develop specific mitigation plans consistent with Council findings under the relevant standards. The certificate holder must submit the mitigation plans to the Office and receive Office approval before beginning construction or, as appropriate, operation of the facility.

(7) OAR 345-027-0020(7): The certificate holder shall prevent the development of any conditions on the site that would preclude restoration of the site to a useful, non-hazardous condition to the extent that prevention of such site conditions is within the control of the certificate holder.

(8) OAR 345-027-0020(8): Before beginning construction of the facility, the certificate holder shall submit to the State of Oregon, through the Council, a bond or letter of credit, satisfactory to the Council, in an amount specified in the site certificate to restore the site to a useful, non-hazardous condition. The certificate holder shall maintain a bond or letter of credit in effect at all times until the facility has been retired. The Council may specify different amounts for the bond or letter of credit during construction and during operation of the facility. (*See Condition (32).*)

(9) OAR 345-027-0020(9): The certificate holder shall retire the facility if the certificate holder permanently ceases construction or operation of the facility. The certificate holder shall retire the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0110. The certificate holder shall pay the actual cost to restore the site to a useful, non-hazardous condition at the time of retirement, notwithstanding the Council's approval in the site certificate of an estimated amount required to restore the site.

(10) OAR 345-027-0020(10): The Council shall include as conditions in the site certificate all representations in the site certificate application and supporting record the Council deems to be binding commitments made by the applicant.

(11) OAR 345-027-0020(11): Upon completion of construction, the certificate holder shall restore vegetation to the extent practicable and shall landscape portions of the site disturbed by construction in a manner compatible with the surroundings and proposed use. Upon completion of construction, the certificate holder shall dispose of all temporary structures not required for facility operation and all timber, brush, refuse and flammable or combustible material resulting from clearing of land and construction of the facility.

(12) OAR 345-027-0020(12): The certificate holder shall design, engineer and construct the facility to avoid dangers to human safety presented by seismic hazards affecting the site that are expected to result from all maximum probable seismic events. As used in this rule "seismic hazard" includes ground shaking, landslide, liquefaction, lateral spreading, tsunami inundation, fault displacement and subsidence.

(13) OAR 345-027-0020(13): The certificate holder shall notify the Office of Energy, the State Building Codes Division and the Department of Geology and Mineral Industries promptly if site investigations or trenching reveal that conditions in the foundation rocks differ significantly from those described in the application for a site certificate. After the Office receives the notice, the Council may require the certificate holder to consult with the Department of Geology and Mineral Industries and the Building Codes Division and to propose mitigation actions.

(14) OAR 345-027-0020(14): The certificate holder shall notify the Office, the State Building Codes Division and the Department of Geology and Mineral Industries promptly if shear zones, artesian aquifers, deformations or clastic dikes are found at or in the vicinity of the site.

(15) OAR 345-027-0020(15): Before any transfer of ownership of the facility or ownership of the site certificate holder, the certificate holder shall inform the Office of Energy of the proposed new owners. The requirements of OAR 345-027-0100 apply to any transfer of ownership that requires a transfer of the site certificate.

(16) OAR 345-027-0020(16): If the Council finds that the certificate holder has permanently ceased construction or operation of the facility without retiring the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0110, the Council shall notify the certificate holder and request that the certificate holder submit a proposed final retirement plan to the Office within a reasonable time not to exceed 90 days. If the certificate holder does not submit a proposed final retirement plan by the specified date, the Council may direct the Office to prepare a proposed a final retirement plan for the Council's approval. Upon the Council's approval of the final retirement plan, the Council may draw on the bond or letter of credit described in section (8) to restore the site to a useful, non-hazardous condition according to the final retirement plan, in addition to any penalties the Council may impose under OAR Chapter 345, Division 29. If the amount of the bond or letter of credit is insufficient to pay the actual cost of retirement, the certificate holder shall pay any additional cost necessary to restore the site to a useful, non-hazardous condition. After completion of site restoration, the Council shall issue an order to terminate the site certificate if the Council finds that the facility has been retired according to the approved final retirement plan.

(17) OAR 345-027-0023(4): If the energy facility or related or supporting facility is a transmission line, the certificate holder shall restore the reception of radio and television at residences and commercial establishments in the primary reception area to the level present prior to operations of the transmission line, at no cost to residents experiencing interference resulting from the transmission line.

(18) OAR 345-027-0023(5): If the facility includes any high voltage transmission line under Council jurisdiction:

(a) The certificate holder shall design, construct and operate the transmission line in accordance with the requirements of the National Electrical Safety Code (American National Standards Institute, Section C2, 1997 Edition); and

(b) The certificate holder shall develop and implement a program that provides reasonable assurance that all fences, gates, cattle guards, trailers, or other objects or

structures of a permanent nature that could become inadvertently charged with electricity are grounded or bonded throughout the life of the line.

(19) OAR 345-027-0023(6): If the proposed energy facility is a pipeline or a transmission line or has, as a related or supporting facility, a pipeline or transmission line, the Council shall specify an approved corridor in the site certificate and shall allow the certificate holder to construct the pipeline or transmission line anywhere within the corridor, subject to the conditions of the site certificate. If the applicant has analyzed more than one corridor in its application for a site certificate, the Council may, subject to the Council's standards, approve more than one corridor. Before beginning operation of the facility, the certificate holder shall submit to the Office a legal description of the permanent right-of-way where the applicant has built the pipeline or transmission line within an approved corridor. The site of the pipeline or transmission line subject to the site certificate is the area within the permanent right-of-way.

(20) OAR 345-027-0028: The following general monitoring conditions apply:

(a) The certificate holder shall consult with affected state agencies, local governments and tribes and shall develop specific monitoring programs for impacts to resources protected by the standards of divisions 22 and 24 of this chapter and resources addressed by applicable statutes, administrative rules and local ordinances. The certificate holder must submit the monitoring programs to the Office of Energy and receive Office approval before beginning construction or, as appropriate, operation of the facility.

(b) The certificate holder shall implement the approved monitoring programs described in section (a) and monitoring programs required by permitting agencies and local governments.

(c) For each monitoring program described in sections (a) and (b), the certificate holder shall have quality assurance measures approved by the Office before beginning construction or, as appropriate, before beginning commercial operation.

(d) If the certificate holder becomes aware of a significant environmental change or impact attributable to the facility, the certificate holder shall, as soon as possible, submit a written report to the Office describing the impact on the facility and any affected site certificate conditions.

(21) OAR 345-026-0048: Following receipt of the site certificate, the certificate holder shall implement a plan that verifies compliance with all site certificate terms and conditions and applicable statutes and rules. As a part of the compliance plan, to verify compliance with the requirement to begin construction by the date specified in the site certificate, the certificate holder shall report promptly to the Office of Energy when construction begins. Construction is defined in OAR 345-001-0010. In reporting the beginning of construction, the certificate holder shall describe all work on the site performed before beginning construction, including work performed before the Council issued the site certificate, and shall state the cost of that work. For the purpose of this exhibit, "work on the site" means any work within a site or corridor, other than surveying, exploration or other activities to define or characterize the site or corridor. The certificate holder shall document the compliance plan and maintain it for inspection by the Office of Energy or the Council.

(22) OAR 345-026-0080: The certificate holder shall report according to the following requirements:

(a) General reporting obligation for non-nuclear facilities under construction or operating:

(i) Within six months after beginning construction, and every six months thereafter during construction of the energy facility and related or supporting facilities, the certificate holder shall submit a semiannual construction progress report to the Council. In each construction progress report, the certificate holder shall describe any significant changes to major milestones for construction. The certificate holder shall include such information related to construction as specified in the site certificate. When the reporting date coincides, the certificate holder may include the construction progress report within the annual report described in this rule;

(ii) The certificate holder shall, within 120 days after the end of each calendar year after beginning construction, submit an annual report to the Council addressing the subjects listed in this rule. The Council secretary and the certificate holder may, by mutual agreement, change the reporting date.

(b) To the extent that information required by this rule is contained in reports the certificate holder submits to other state, federal or local agencies, the certificate holder may submit excerpts from such other reports to satisfy this rule. The Council reserves the right to request full copies of such excerpted reports.

(c) In the annual report, the certificate holder shall include the following information for the calendar year preceding the date of the report:

(i) Facility Status: An overview of site conditions, the status of facilities under construction, and a summary of the operating experience of facilities that are in operation. In this section of the annual report, the certificate holder shall describe any unusual events, such as earthquakes, extraordinary windstorms, major accidents or the like that occurred during the year and that had a significant adverse impact on the facility;

(ii) Reliability and Efficiency of Power Production: For electric power plants,

(A) The plant availability and capacity factors for the reporting year. If equipment failures or plant breakdowns had a significant impact on those factors, the certificate holder shall describe them and its plans to minimize or eliminate their recurrence;

(B) The efficiency with which the power plant converts fuel into electric energy. If the fuel chargeable to power heat rate was evaluated when the facility was sited, the certificate holder shall calculate efficiency using the same formula and assumptions, but using actual data; and

(C) The facility's annual hours of operation by fuel type and, every five years after beginning operation, a summary of the annual hours of operation by fuel type as described in OAR 345-024-0590(5);

(iii) Status of Surety Information: Documentation demonstrating that bonds or letters of credit as described in the site certificate are in full force and effect and will remain in full force and effect for the term of the next reporting period;

(iv) Industry Trends: A discussion of any significant industry trends that may affect the operations of the facility;

(v) Monitoring Report: A list and description of all significant monitoring and mitigation activities performed during the previous year in accordance with site certificate terms and conditions, a summary of the results of those activities, and a discussion of any significant changes to any monitoring or mitigation program, including the reason for any such changes;

(vi) Compliance Report: A description of all instances of noncompliance with a site certificate condition. For ease of review, the certificate holder shall, in this section of the report, use numbered subparagraphs corresponding to the applicable sections of the site certificate;

(vii) Facility Modification Report: A summary of changes to the facility that the certificate holder has determined do not require a site certificate amendment in accordance with OAR 345-027-0050; and

(viii) Nongenerating Facility Carbon Dioxide Emissions: For nongenerating facilities that emit carbon dioxide, a report of the annual fuel use by fuel type and annual hours of operation of the carbon dioxide emitting equipment as described in OAR 345-024-0630(4).

(23) OAR 345-026-0100: The certificate holder shall promptly notify the Office of Energy of any changes in major milestones for construction, decommissioning, operation or retirement schedules. Major milestones are those identified by the certificate holder in its construction, retirement or decommissioning plan.

(24) OAR 345-026-0105: The certificate holder and the Office of Energy shall exchange copies of all correspondence or summaries of correspondence related to compliance with statutes, rules and local ordinances on which the Council determined compliance, except for material withheld from public disclosure under state or federal law or under Council rules. The certificate holder may submit abstracts of reports in place of full reports; however, the certificate holder shall provide full copies of abstracted reports and any summarized correspondence at the request of the Office of Energy.

(25) OAR 345-026-0170: The certificate holder shall notify the Office of Energy within 72 hours of any occurrence involving the facility if:

(a) There is an attempt by anyone to interfere with its safe operation;

(b) A natural event such as an earthquake, flood, tsunami or tornado, or a human-caused event such as a fire or explosion affects or threatens to affect the public health and safety or the environment; or

(c) There is any fatal injury at the facility.

V. SPECIFIC FACILITY CONDITIONS

The conditions listed in this section include conditions based on representations in the site certificate application and supporting record. The Council deems these representations to be binding commitments made by the applicant. These conditions are required under OAR 345-027-0020(10). The certificate holder must comply with these conditions in addition to the conditions listed in Section IV. This section includes other specific facility conditions the Council finds necessary to ensure compliance with the siting standards of OAR Chapter 345, Divisions 22 and 24, and to protect the public health and safety. For conditions that require subsequent review and approval of a future action, ORS 469.402 authorizes the Council to delegate the future review and approval to the Department if, in the Council's discretion, the delegation is warranted under the circumstances of the case.

1. Certificate Administration Conditions

(26) The certificate holder shall begin construction of the facility within three years after the effective date of the site certificate. Under OAR 345-015-0085(9), a site certificate is effective upon execution by the Council Chair and the applicant. The Council may grant an

extension of the deadline to begin construction in accordance with OAR 345-027-0030 or any successor rule in effect at the time the request for extension is submitted.

(27) The certificate holder shall complete construction of the facility within five years after the effective date of the site certificate. Construction is complete when: 1) the facility is substantially complete as defined by the certificate holder's construction contract documents, 2) acceptance testing has been satisfactorily completed and 3) the energy facility is ready to begin continuous operation consistent with the site certificate. The certificate holder shall promptly notify the Department of the date of completion of construction. The Council may grant an extension of the deadline for completing construction in accordance with OAR 345-027-0030 or any successor rule in effect at the time the request for extension is submitted.

(28) The certificate holder shall construct a facility substantially as described in the site certificate and may select one of two turbine types: the GE 1.5-megawatt wind turbine or the Vestas V82 1.65-megawatt wind turbine.

(29) The certificate holder shall obtain all necessary state and local permits or approvals required for construction, operation and retirement of the facility or ensure that its contractors obtain the necessary state and local permits or approvals.

(30) Before beginning construction, the certificate holder shall notify the Department in advance of any work on the site that does not meet the definition of "construction" in OAR 345-001-0010 or ORS 469.300 and shall provide to the Department a description of the work and evidence that its value is less than $250,000.

(31) Before beginning construction and after considering all micrositing factors, the certificate holder shall provide to the Department a detailed map of the proposed facility, showing the final locations where facility components are proposed to be built in relation to the 300-foot and 900-foot corridors shown on Figures P-1 through P-6 of the site certificate application (as revised March 1, 2006). In accordance with Condition (2), the certificate holder must submit a legal description of the site to the Department. For the purposes of this site certificate, the term "legal description" means a description of location by reference to a map and geographic data that clearly and specifically identifies the physical location of all parts of the facility. Notwithstanding OAR 345-027-0020(2), for the purposes of this site certificate, construction of parts of a wind facility within micrositing corridors is comparable to construction of pipelines or transmission lines within Council-approved corridors as described in OAR 345-027-0023(6). Before beginning operation of the facility, the certificate holder shall submit to the Department a legal description for those parts of the facility constructed within micrositing corridors. The final site of the facility includes the final turbine site corridors and other facility components as described in the final order on the site certificate application and in this site certificate.

(32) Before beginning construction, the certificate holder shall submit to the State of Oregon through the Council a bond or letter of credit in the amount of $2.201 million (in 2005 dollars) naming the State of Oregon, acting by and through the Council, as beneficiary or payee.

(a) The certificate holder shall adjust the amount of the bond or letter of credit annually, using the following calculation:

(i) Adjust the gross cost of $7,098,773 (2005 dollars) to present value, using the U.S. Gross Domestic Product Implicit Price Deflator, Chain-Weight, as published in the Oregon Department of Administrative Services' "Oregon Economic and Revenue Forecast" or by any successor agency (the "Index"). If at any time the Index is no longer published, the Council shall select a comparable calculation to adjust 2005 dollars to present value.

(ii) Adjust the estimated scrap value by an index factor derived from the Producer Price Index values, not seasonally adjusted, reported by the U.S. Department of Labor, Bureau of Labor Statistics, "Commodities: Metals and metal Products: Carbon steel scrap" (Series ID: WPU101211). Using the average monthly index value for the 12 months ending with December of the year preceding the year in which the adjustment is made as the numerator and the average monthly index value for the 12 months ending with December 2005 (277.2) as the denominator, multiply the estimated scrap value of $149 per ton (2005 dollars) by the resulting factor. If at any time the Producer Price Index Values are no longer published, the Council shall select a comparable calculation to adjust the estimated scrap value.

(iii) Multiply the adjusted scrap value (ii) per ton by 36,367.65 tons and subtract the resulting value from the adjusted gross cost (i).

(iv) Add 1 percent of the subtotal (iii) for the adjusted performance bond amount, 10 percent of the subtotal (iii) for the adjusted administration and project management costs, and 20 percent of the subtotal (iii) for the adjusted future developments contingency.

(v) Add the subtotal (iii) to the sum of percentages (iv) and round the resulting total to the nearest $1,000 to determine the adjusted financial assurance amount for the reporting year.

(b) The certificate holder shall use a form of bond or letter of credit approved by the Council.

(c) The certificate holder shall use an issuer of the bond or letter of credit approved by the Council.

(d) The certificate holder shall describe the status of the bond or letter of credit in the annual report submitted to the Council under Condition (22).

(e) The bond or letter of credit shall not be subject to revocation or reduction before retirement of the facility site.

(33) If the certificate holder elects to use a bond to meet the requirements of Condition (32), the certificate holder shall ensure that the surety is obligated to comply with the requirements of applicable statutes, Council rules and this site certificate when the surety exercises any legal or contractual right it may have to assume construction, operation or retirement of the energy facility. The certificate holder shall also ensure that the surety is obligated to notify the Council that it is exercising such rights and to obtain any Council approvals required by applicable statutes, Council rules and this site certificate before the surety commences any activity to complete construction, operate or retire the energy facility.

(34) Before beginning construction, the certificate holder shall notify the Department of the identity and qualifications of the engineering, procurement and construction ("EPC") contractor(s) for specific portions of the work. The certificate holder shall select EPC contractors that have substantial experience in the design and construction of similar facilities. The certificate holder shall report to the Department any change of major construction contractors.

(35) The certificate holder shall contractually require all construction contractors and subcontractors involved in the construction of the facility to comply with all applicable laws and regulations and with the terms and conditions of the site certificate. Such contractual provisions shall not operate to relieve the certificate holder of responsibility under the site certificate.

(36) During construction, the certificate holder shall have an on-site assistant construction manager who is qualified in environmental compliance to ensure compliance with all construction-related site certificate conditions. During operation, the certificate holder shall have a project manager who is qualified in environmental compliance to ensure compliance with all ongoing site certificate conditions. The certificate holder shall notify the Department of the name, telephone number, fax number and e-mail address of these managers and shall keep the Department informed of any change in this information.

(37) Within 72 hours after discovery of conditions or circumstances that may violate the terms or conditions of the site certificate, the certificate holder shall report the conditions or circumstances to the Department.

(38) Notwithstanding OAR 345-027-0050(2), an amendment of the site certificate is required if the proposed change would increase the electrical generation capacity of the facility and would increase the number of wind turbines or the dimensions of existing wind turbines.

2. Land Use Conditions

(39) The certificate holder shall construct the public road improvements described in the site certificate application to meet or exceed road standards for the road classifications in the County's Transportation System Plan and Zoning Ordinance because roads will require a more substantial section to bear the weight of the vehicles and turbine components than would usually be constructed by the County.

(40) The certificate holder shall cooperate with the Sherman County Road Department to ensure that any unusual damage or wear caused by construction of the facility is repaired by the certificate holder. Upon completion of construction, the certificate holder shall restore the county roads to at least their pre-project condition, to the satisfaction of the county public works department.

(41) The certificate holder shall ensure that no equipment or machinery is parked or stored on any county road except while in use.

(42) The certificate holder shall not locate any aboveground facility structure (including wind turbines, O&M building, substations and meteorological towers but not including aboveground transmission lines and junction boxes) within 30 feet from any property line or within 50 feet from the right-of-way of any arterial or major collector road or street and shall not allow any architectural feature, as described in Sherman County Zoning Ordinance Section 4.2, to project into these required setbacks by more than 2 feet.

(43) The certificate holder shall locate aboveground transmission lines, junction boxes, access roads and temporary construction laydown and staging areas to minimize disturbance with farming practices and, wherever feasible, shall place turbines and transmission interconnection lines along the margins of cultivated areas to reduce the potential for

conflict with farm operations. The certificate holder shall place aboveground transmission lines and junction boxes along public road rights-of-way to the extent practicable.

(44) The certificate holder shall include traffic control procedures in contract specifications for construction of the facility. The certificate holder shall require flaggers to be at appropriate locations at appropriate times during construction to direct traffic and to ensure minimal conflicts between harvest and construction vehicles. The certificate holder shall submit a final transportation plan to Sherman County before beginning construction.

(45) Before beginning construction of the facility, the certificate holder shall record Farm Management Easements on the properties on which the certificate holder locates wind power generation facilities. The certificate holder shall record these easements in the real property records of Sherman County and shall file copies of the recorded easements with the Sherman County Planning Director.

(46) The certificate holder shall remove from Special Farm Assessment the properties on which it locates the facility and shall pay all property taxes due and payable after the Special Farm Assessment is removed from such properties.

(47) During operation, the certificate holder shall avoid impact on cultivated land to the extent reasonably possible when performing facility repair and maintenance activities.

3. Cultural Resource Conditions

(48) Before beginning construction, the certificate holder shall provide to the Department a map showing the final design locations of all components of the facility and areas that would be temporarily disturbed during construction and also showing the areas that Archaeological Investigations Northwest, Inc. (AINW) surveyed in 2005, as described in the site certificate application. The certificate holder shall hire qualified personnel to conduct field investigation of all areas of permanent or temporary disturbance that AINW did not previously survey and shall provide a written report of the field investigation to the Department. If any significant historic, cultural or archaeological resources are found during the field investigation, the certificate holder shall ensure that construction and operation of the facility will have no impact on the resources. The certificate holder shall instruct all construction personnel to avoid the areas where the resources were found and shall implement other appropriate measures to protect the resources.

(49) The certificate holder shall ensure that a qualified person instructs construction personnel in the identification of cultural materials.

(50) The certificate holder shall ensure that construction personnel cease all ground-disturbing activities in the immediate area if any archaeological or cultural resources are found during construction of the facility until a qualified archaeologist can evaluate the significance of the find. The certificate holder shall notify the Department and the State Historic Preservation Office (SHPO) of the find. If the archaeologist determines that the resource is significant, the certificate holder shall make recommendations to the Council for mitigation, including avoidance or data recovery, in consultation with the Department, SHPO and other appropriate parties. The certificate holder shall not restart work in the affected area until the certificate holder has demonstrated to the Department that it has complied with the archaeological permit requirements administered by SHPO.

(51) The certificate holder shall ensure that construction personnel proceed carefully in the vicinity of the mapped alignment of the Oregon Trail. If any intact physical evidence of the trail is discovered, the certificate holder shall avoid any disturbance to the intact segments, by redesign, re-engineering or restricting the area of construction activity. The certificate holder shall promptly notify the Department and the State Historic Preservation Office (SHPO) of the discovery. The certificate holder shall consult with the Department and with SHPO to determine appropriate mitigation measures.

(52) To offset adverse visual effects to the setting of the Oregon Trail alignment, the certificate holder shall:

(a) Document the pre-construction setting of the Oregon Trail alignment from the John Day River canyon to Biggs through photographs and videotape; and

(b) Enhance the existing Oregon Trail historical marker off I-84 at Biggs with an additional educational and interpretive display in cooperation with the Sherman County Development League and the Sherman County Historical Society.

4. Geotechnical Conditions

(53) Before beginning construction, the certificate holder shall conduct a site-specific geotechnical investigation and shall report its findings to the Oregon Department of Geology & Mineral Industries (DOGAMI). The certificate holder shall conduct the geotechnical investigation after consultation with DOGAMI and in general accordance with the site-specific seismic hazard report and the engineering geologic report guidelines that have been adopted by the Oregon Board of Geologist Examiners. The guidelines are available through the Board and in the DOGAMI publication O-00-04 (2000).

(54) The certificate holder shall design and construct the facility in accordance with requirements set forth by the State of Oregon's Building Code Division and any other applicable codes and design procedures.

(55) The certificate holder shall design, engineer and construct the facility to avoid dangers to human safety presented by non-seismic hazards. As used in this condition, "non-seismic hazards" include settlement, landslides, flooding and erosion.

5. Hazardous Materials, Fire Protection & Public Safety Conditions

(56) The certificate holder shall notify the Department within 72 hours of any accidents including mechanical failures on the site associated with construction or operation of the facility that may result in public health and safety concerns.

(57) Before beginning construction, the certificate holder shall submit a Notice of Proposed Construction or Alteration to the Federal Aviation Administration (FAA) identifying the proposed final locations of the turbines and related or supporting facilities. The certificate holder shall notify the Department of the FAA's response as soon as it has been received.

(58) To protect the public from electrical hazards, the certificate holder shall enclose the facility substations with appropriate fencing and locked gates.

(59) The certificate holder shall not locate turbine towers within 450 feet of any residence or public road.

(60) The certificate holder shall construct turbine towers that are smooth steel structures with no exterior ladders or access to the turbine blades and shall install locked access doors accessible only to authorized personnel.

(61) The certificate holder shall follow manufacturers' recommended handling instructions and procedures to prevent damage to towers or blades that could lead to failure.

(62) The certificate holder shall have an operational safety monitoring program and shall inspect turbine blades on a regular basis for signs of wear. The certificate holder shall repair turbine blades as necessary to protect public safety.

(63) The certificate holder shall install and maintain self-monitoring devices on each turbine, connected to a fault annunciation panel or supervisory, control and data acquisition (SCADA) system at the operations and maintenance building, to alert operators to potentially dangerous conditions, and the certificate holder shall immediately remedy any dangerous conditions. The certificate holder shall maintain automatic equipment protection features in each turbine that would shut down the turbine and reduce the chance of a mechanical problem causing a fire.

(64) The certificate holder shall install generator step-up transformers at the base of each tower in locked cabinets designed to protect the public from electrical hazards and to avoid creation of artificial habitat for raptor prey.

(65) The certificate holder shall construct turbines on concrete foundations and shall cover the ground within a minimum 10-foot radius with non-flammable material. The certificate holder shall maintain the non-flammable pad area covering during operation of the facility.

(66) During construction and operation of the facility, the certificate holder shall develop and implement fire management plans in consultation with local fire control authorities to minimize the risk of fire and to respond appropriately to any fires that occur on the facility site. In developing the fire management plans, the certificate holder should take into account the dry nature of the region and should address risks on a seasonal basis.

(67) During construction and operation of the facility, the certificate holder shall ensure that service vehicles are equipped with a shovel and portable fire extinguisher of a 4A5OBC or equivalent rating.

(68) During construction, the certificate holder shall ensure that construction vehicles and equipment are operated on graveled areas to the extent possible and that open flames, such as cutting torches, are kept away from dry grass areas.

(69) Upon the beginning of operation of the facility, the certificate holder shall provide to the North Sherman County Rural Fire Protection District and to the Moro Rural Fire Protection District copies of the approved site plan indicating the identification number assigned to each turbine and the location of all facility structures. During operation of the facility, the certificate holder shall provide to the North Sherman County Rural Fire Protection District and to the Moro Rural Fire Protection District the names and telephone numbers of facility personnel available to respond on a 24-hour basis in case of an emergency on the facility site.

(70) During operation, the certificate holder shall ensure that all on-site employees receive annual fire prevention and response training by qualified instructors or members of the

local fire department and that all employees are instructed to keep vehicles on roads and off dry grassland, except when off-road operation is required for emergency purposes.

(71) During construction, the certificate holder shall require that all on-site construction contractors develop and implement a site health and safety plan that informs workers and others on-site what to do in case of an emergency and that includes the locations of fire extinguishers and nearby hospitals, important telephone numbers and first aid techniques.

(72) During operation, the certificate holder shall develop and implement a site health and safety plan that informs employees and others on-site what to do in case of an emergency and that includes the locations of fire extinguishers and nearby hospitals, important telephone numbers and first aid techniques.

(73) The certificate holder shall use hazardous materials in a manner that protects public health, safety and the environment and shall comply with all applicable local, state and federal environmental laws and regulations.

(74) If a spill or release of hazardous materials occurs during construction or operation of the facility, the certificate holder shall notify the Department within 72 hours and shall clean up the spill or release and dispose of any contaminated soil or other materials according to applicable regulations. The certificate holder shall make sure that spill kits containing items such as absorbent pads are located on equipment and storage facilities to respond to accidental spills and shall instruct employees handling hazardous materials in the proper handling, storage and cleanup of these materials.

(75) Before beginning construction, the certificate holder shall cooperate with the Oregon Department of Transportation to implement public safety improvements to the shoulders of State Highway 206 by bearing the cost of constructing two viewpoint turn-offs (one on each side of the highway) within the highway right-of-way in suitable locations from where the public may safely view the wind turbines without entering private property or interfering with facility operations.

6. Water, Soils, Streams & Wetlands Conditions

(76) The certificate holder shall conduct all construction work in compliance with an Erosion and Sediment Control Plan (ESCP) satisfactory to the Oregon Department of Environmental Quality and as required under the National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge General Permit #1200-C. The certificate holder shall include in the ESCP any procedures necessary to meet local erosion and sediment control requirements and storm water management requirements.

(77) During construction, the certificate holder shall limit truck traffic to designated existing and improved road surfaces to avoid soil compaction, to the extent possible.

(78) The certificate holder shall cover turbine pad areas with gravel or other non-erosive material immediately following exposure during construction and shall maintain the pad area covering during operation of the facility.

(79) During construction, the certificate holder shall avoid impacts to waters of the state in the following manner:

(a) The certificate holder shall bore under the intermittent drainage channel identified in Appendix J-1 of the site certificate application in any location where the underground collector system would cross the channel.

(b) The certificate holder shall locate transmission line support structures outside of the drainage channel and the wetland identified in Appendix J-1 of the site certificate application in any location where an aboveground transmission line crosses over the channel or the wetland area.

(c) After the final turbine design locations have been identified, if construction would occur in any locations not previously investigated as described in Appendix J-1 of the application, the certificate holder shall conduct a pre-construction investigation to determine whether any jurisdictional waters of the state exist in those locations. The certificate holder shall submit a written report on the pre-construction investigation to the Department of Energy and to the Department of State Lands for approval before beginning construction and shall ensure that construction of the facility would have no impact on any jurisdictional water identified in the pre-construction investigation.

(80) During construction, the certificate holder shall ensure that the wash down of concrete trucks occurs only at a contractor-owned batch plant or at tower foundation locations. If such wash down occurs at tower foundation locations, then the certificate holder shall ensure that wash down wastewater does not run off the construction site into otherwise undisturbed areas and that the wastewater is disposed of on backfill piles and buried underground with the backfill over the tower foundation.

(81) The certificate holder shall restore areas that are temporarily disturbed during construction according to the methods, monitoring procedures and success criteria described in the Revegetation Plan that is incorporated in the Final Order on the Application as Attachment B and as amended from time to time. During operation, the certificate holder shall restore areas that are temporarily disturbed during facility maintenance or repairs according to the same methods and monitoring procedures.

(82) During facility operation, the certificate holder shall routinely inspect and maintain all roads, pads and trenched areas and, as necessary, maintain or repair erosion control measures.

(83) During operation, the certificate holder shall not use any water or chemicals for washing turbine blades unless the certificate holder demonstrates to the satisfaction of the Department before any blade-washing begins that:

(a) Oregon Department of Environmental Quality (DEQ) regulations do not require a permit for the proposed blade-washing activity or, if a permit is required, that the proposed blade-washing activity is authorized under a general permit issued by DEQ; and

(b) In conducting blade-washing activities, the certificate will use water only from its approved on-site well and that the use of water will not exceed 5,000 gallons per day.

7. Transmission Line & EMF Conditions

(84) The certificate holder shall install the 34.5-kV collector system underground to the extent practical. Where geotechnical conditions or other engineering considerations require, the certificate holder may install segments of the collector system aboveground in developed or agricultural areas that are Category 6 habitat, but the total length of aboveground segments

must not exceed 5.5 miles. The certificate holder shall construct aboveground segments of the collector system using single or double circuit monopole design as described in the site certificate application and shall not locate any aboveground segments within 200 feet of any existing residence.

(85) At least 30 days before beginning preparation of detailed design and specifications for the electrical transmission lines, the certificate holder shall consult with the Oregon Public Utility Commission staff to ensure that transmission line designs and specifications are consistent with applicable codes and standards.

(86) Before beginning construction, the certificate holder shall obtain a permit, substantially in the form of the draft permit incorporated in the Final Order on the Application as Attachment D, from the Oregon Department of Transportation authorizing the location, installation, construction, maintenance and use of buried cables within the right-of-way of State Highway 206.

(87) To protect public safety, the certificate holder shall design and maintain the transmission lines so that:

(a) Alternating current electric fields during operation do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public.

(b) Induced voltages during operation are as low as reasonably achievable.

(88) The certificate holder shall take reasonable steps to reduce or manage human exposure to electromagnetic fields, including but not limited to:

(a) Constructing the 230-kV transmission line to ensure that conductors have a minimum clearance of 30 feet from the ground at mid-span under maximum sag conditions.

(b) Constructing aboveground segments of the 34.5-kV transmission line to ensure that conductors have a minimum clearance of 25 feet from the ground at mid-span under maximum sag conditions.

(c) Constructing underground segments of the 34.5-kV transmission line at least 36-inches below the surface of the ground.

(d) Providing to landowners a map of underground and overhead transmission lines on their property and advising landowners of possible health risks.

8. Plants, Wildlife & Habitat Protection Conditions

(89) During construction and operation of the facility, the certificate holder shall implement a plan to control the introduction and spread of noxious weeds. The certificate shall develop the weed control plan in consultation with the Sherman County Weed Control Manager.

(90) The certificate holder shall design all aboveground transmission line support structures following the practices suggested by the Avian Powerline Interaction Committee (APLIC 1996, referenced in the site certificate application, p. P-33) and shall install anti-perching devices on transmission pole tops and cross arms where the poles are located within ½ mile of turbines.

(91) If construction begins after 2006, the certificate holder shall review the ONHIC and USFWS databases and consult with Frank Isaacs, Oregon State University Cooperative Wildlife Unit (or other expert designated by ODFW) on an annual basis before beginning construction to determine whether bald eagles or peregrine falcons have been observed in or near the site of the facility. The certificate holder shall report the results of the database

review and consultation to the Department and to ODFW and, if there have been new observations of bald eagles or peregrine falcons in the area, the certificate holder shall implement appropriate measures to protect the species from adverse impact, as approved by the Department and ODFW.

(92) The certificate holder may construct turbines and other facility components within the 900-foot corridors shown on Figures P-1 through P-6 of the site certificate application (as revised March 1, 2006), subject to the following requirements addressing potential habitat impact:

(a) The certificate holder shall not construct any facility components within areas of Category 1 habitat and shall avoid temporary disturbance of Category 1 habitat.

(b) The certificate holder shall design and construct facility components that are the minimum size needed for safe operation of the energy facility.

(c) To the extent possible, the certificate holder shall construct facility components in the locations shown on Figure C-2 of the site certificate application.

(d) If the certificate holder must change the layout of facility components from what is shown on Figure C-2 due to micrositing considerations, the certificate holder shall, to the extent possible, construct facility components within the 300-foot corridors shown on Figures P-1 through P-6 of the site certificate application (as revised March 1, 2006).

(e) The certificate holder may construct facility components outside the 300-foot corridors if necessary due to micrositing considerations, except that the certificate holder shall not construct any facility components outside the 900-foot corridors shown on Figures P-1 through P-6 of the site certificate application (as revised March 1, 2006) or cause any temporary disturbance outside those 900-foot corridors.

(93) The certificate holder shall implement measures to mitigate impacts to sensitive wildlife habitat during construction including, but not limited to, the following:

(a) Preparing maps to show sensitive areas, such as nesting or denning areas for sensitive wildlife species, that are off limits to construction personnel.

(b) Ensuring that a qualified person instructs construction personnel to be aware of wildlife in the area and to take precautions to avoid injuring or destroying wildlife or significant wildlife habitat.

(c) Avoiding unnecessary road construction, temporary disturbance and vehicle use.

(94) During construction, the certificate holder shall protect the area within a 1300-foot buffer around active nests of the following species during the sensitive period, as provided in this condition:

Species	Sensitive Period	Early Release Date
Swainson's hawk	April 1 to August 15	May 31
Golden eagle	February 1 to August 31	May 31
Ferruginous hawk	March 15 to August 15	May 31
Burrowing owl	April 1 to August 15	July 15

During the year in which construction occurs, the certificate holder shall use a protocol approved by the Oregon Department of Fish and Wildlife (ODFW) to determine whether there are any active nests of these species within a half-mile of any areas that would be disturbed during construction. If a nest is occupied by any of these species after the beginning of the sensitive period, the certificate holder shall not engage in high-impact construction activities (activities that involve blasting, grading or other major ground

disturbance) or allow high levels of construction traffic within 1300 feet of the nest site. In addition, the certificate holder will flag the boundaries of the 1300-foot buffer area and shall instruct construction personnel to avoid any unnecessary activity within the buffer area. The certificate holder shall hire an independent biological monitor to observe the active nest sites during the sensitive period for signs of disturbance and to notify the Department of any non-compliance with this condition. If the monitor observes nest site abandonment or other adverse impact to nesting activity, the certificate holder shall implement appropriate mitigation, in consultation with ODFW and subject to the approval of the Department, unless the adverse impact is clearly shown to have a cause other than construction activity. The certificate holder may begin or resume high-impact construction activities before the ending day of the sensitive period if any known nest site is not occupied by the early release date. If a nest site is occupied, then the certificate holder may begin or resume high-impact construction before the ending day of the sensitive period with the approval of ODFW, after the young are fledged. The certificate holder shall use a protocol approved by ODFW to determine when the young are fledged (the young are independent of the core nest site).

(95) The certificate holder shall conduct wildlife monitoring as described in the Wildlife Monitoring and Mitigation Plan that is incorporated in the Final Order on the Application as Attachment A and as amended from time to time.

(96) To mitigate for potential adverse impacts to bat species, the certificate holder shall contribute $10,000 per year for three years, beginning in the first year of operation, to fund research toward better understanding wind facility impacts to bats and to develop mitigation solutions. In consultation with the Oregon Department of Energy and the Oregon Department of Fish and Wildlife, the certificate holder shall select an appropriate bat conservation organization to receive this funding.

(97) Before beginning construction of the facility, the certificate holder shall acquire the legal right to create, maintain and protect a habitat mitigation area for the life of the facility by means of an outright purchase, conservation easement or similar conveyance and shall provide a copy of the documentation to the Department. Within the habitat mitigation area, the certificate holder shall improve the habitat quality as described in the Habitat Mitigation Plan that is incorporated in the Final Order on the Application as Attachment C and as amended from time to time.

9. Visual Effects Conditions

(98) To reduce the visual impact of the facility, the certificate holder shall:

(a) Mount nacelles on smooth, hollow steel towers, approximately 20 feet in diameter at the base.

(b) Paint all towers uniformly in a neutral white or light gray color.

(c) Paint the substation buildings in a neutral color to blend with the surrounding landscape.

(d) Not allow any advertising to be used on any part of the facility or on any signs posted at the facility, except that the turbine manufacturer's logo may appear on turbine nacelles.

(e) Use only those signs required for facility safety or required by law, except that the certificate holder may erect a sign near the operations and maintenance building to identify the wind energy facility.

(f) Maintain any signs allowed under this condition in good repair.

(99) The certificate holder shall design and construct the operation and maintenance building to be generally consistent with the character of similar buildings used by commercial farmers or ranchers in the area and shall paint the building in a neutral color to blend with the surrounding landscape.

(100) The certificate holder shall not use exterior nighttime lighting except:
(a) The minimum turbine tower lighting required by the Federal Aviation Administration.
(b) Security lighting at the operations and maintenance building and at the substations, provided that such lighting is shielded or downward-directed to reduce glare.
(c) Minimum lighting necessary for repairs or emergencies.

10. Noise Control Conditions

(101) To reduce noise impacts at nearby residential areas, the certificate holder shall:
(a) Confine the noisiest operation of heavy construction equipment to the daylight hours.
(b) Require contractors to install and maintain exhaust mufflers on all combustion engine-powered equipment; and
(c) Establish a complaint response system at the construction manager's office to address noise complaints.

(102) Before beginning construction, the certificate holder shall present information demonstrating to the satisfaction of the Department that the requirements of either (a) or (b) have been met at properties R3, R4, R5, R6 and R7 (as shown on the Noise Buffer and Receptor Locations map in the Application Supplement, Tab X, Item vi):
(a) The certificate holder has obtained a legally effective easement or real covenant pursuant to which the owner of the property authorizes the certificate holder's operation of the facility to increase ambient statistical noise levels L_{10} and L_{50} by more than 10 dBA at the appropriate measurement point. A legally effective easement or real covenant shall: include a legal description of the burdened property (the noise sensitive property); be recorded in the real property records of the county; expressly benefit the certificate holder; expressly run with the land and bind all future owners, lessees or holders of any interest in the burdened property; and not be subject to revocation without the certificate holder's written approval.
(b) For any property for which the certificate holder has not obtained a legally effective easement or real covenant as described in (a), the certificate holder has identified the final design locations of all turbines to be built and has performed a noise analysis, in accordance with OAR 340-035-0035(1)(b)(B)(iii)(IV), demonstrating that the total noise generated by the facility would meet the ambient degradation test at the appropriate measurement point when all turbines are placed in their final design locations. The certificate holder shall perform the noise analysis using the Sound Propagation Model for Outdoor Noise Sources (SPM 9613, Version 2) and shall assume the following input parameters:
(i) The maximum sound power level guaranteed by the manufacturer.
(ii) Temperature of 52° F (11° C).
(iii) Relative humidity of 70 percent.
(iv) No ground effect.
(v) No barrier effects.

11. Waste Management Conditions

(103) The certificate holder shall provide portable toilets for on-site sewage handling during construction and shall ensure that they are pumped and cleaned regularly by a licensed contractor who is qualified to pump and clean portable toilet facilities.

(104) During operation, the certificate holder shall discharge sanitary wastewater generated at the O&M building to a licensed on-site septic system in compliance with county permit requirements. The certificate holder shall design the septic system design with a capacity that is less than 2,500 gallons per day.

(105) The certificate holder shall implement a waste management plan during construction that includes but is not limited to the following measures:

(a) Training employees to minimize and recycle solid waste.

(b) Minimizing the generation of wastes from construction through detailed estimating of materials needs and through efficient construction practices.

(c) Recycling steel and other metal scrap.

(d) Recycling wood waste.

(e) Recycling packaging wastes such as paper and cardboard.

(f) Collecting non-recyclable waste for transport to a landfill by a licensed waste hauler.

(g) Segregating all hazardous wastes such as used oil, oily rags and oil-absorbent materials, mercury-containing lights and lead-acid and nickel-cadmium batteries for disposal by a licensed firm specializing in the proper recycling or disposal of hazardous wastes.

(106) The certificate holder may dispose of waste concrete on site with the permission of the landowner and in accordance with OAR 340-093-0080 and other applicable regulations. The certificate holder shall dispose of waste concrete on site by placing the material in an excavated hole, covering it with at least three feet of topsoil and grading the area to match existing contours. If the waste concrete is not disposed of on site, the certificate holder shall arrange for proper disposal in a landfill.

(107) The certificate holder shall implement a waste management plan during operation that includes but is not limited to the following measures:

(a) Training employees to minimize and recycle solid waste.

(b) Recycling paper products, metals, glass and plastics.

(c) Collecting non-recyclable waste for transport to a landfill by a licensed waste hauler.

(d) Segregating all hazardous wastes such as used oil, oily rags and oil-absorbent materials, mercury-containing lights and lead-acid and nickel-cadmium batteries for disposal by a licensed firm specializing in the proper recycling or disposal of hazardous wastes.

VI. SUCCESSORS AND ASSIGNS

To transfer this site certificate or any portion thereof or to assign or dispose of it in any other manner, directly or indirectly, the certificate holder shall comply with OAR 345-027-0100.

VII. SEVERABILITY AND CONSTRUCTION

If any provision of this agreement and certificate is declared by a court to be illegal or in conflict with any law, the validity of the remaining terms and conditions shall not be affected,

and the rights and obligations of the parties shall be construed and enforced as if the agreement and certificate did not contain the particular provision held to be invalid.

VIII. GOVERNING LAW AND FORUM

This site certificate shall be governed by the laws of the State of Oregon. Any litigation or arbitration arising out of this agreement shall be conducted in an appropriate forum in Oregon.

IX. EXECUTION

This site certificate may be executed in counterparts and will become effective upon signature by the Chair of the Energy Facility Siting Council and the authorized representative of the certificate holder.

IN WITNESS WHEREOF, this site certificate has been executed by the State of Oregon, acting by and through its Energy Facility Siting Council, and by Klondike Wind Power III LLC.

ENERGY FACILITY SITING COUNCIL	KLONDIKE WIND POWER III LLC
By: _____	By: _____
Hans Neukomm, Chair Oregon Energy Facility Siting Council	Print: _____
Date: _____	Date: _____

BEFORE THE
ENERGY FACILITY SITING COUNCIL
OF THE STATE OF OREGON

In the Matter of the Application for a Site Certificate for the Biglow Canyon Wind Farm	)	FINAL ORDER

Oregon Energy Facility Siting Council

June 30, 2006

BIGLOW CANYON WIND FARM
FINAL ORDER

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

ASC	Application for a Site Certificate
ASC Supplement	Supplement to the Site Certificate Application
Biglow	Biglow Canyon Wind Farm
BLM	Bureau of Land Management
BPA	Bonneville Power Administration
Council	Energy Facility Siting Council
CRGNSA	Columbia River Gorge National Scenic Area
CRP	Conservation Reserve Program
Department	Oregon Department of Energy
dBA	The "A-weighted" sound pressure level. The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
DEQ	Oregon Department of Environmental Quality
EFU	land zoned for "exclusive farm use"
F-1	Exclusive Farm Use zone under the Sherman County Zoning Ordinance
FAA	Federal Aviation Administration
kV	kilovolt or kilovolts
LCDC	Land Conservation and Development Commission
mph	miles per hour
MW	megawatt or megawatts
m/s	meters per second
O&M Facility	Operations and Maintenance Facility
ODFW	Oregon Department of Fish and Wildlife
Orion	Orion Sherman County Wind Farm LLC
RAI	Oregon Department of Energy request for additional information
SCCP	Sherman County Comprehensive Plan
SCADA System	Supervisory Control and Data Acquisition System
SCZO	Sherman County Zoning Ordinance
SHPO	State Historic Preservation Office
USFWS	U.S. Fish and Wildlife Service

BIGLOW CANYON WIND FARM
FINAL ORDER

I. INTRODUCTION

This order addresses the application for a site certificate for the construction and operation of a proposed wind energy facility in Sherman County near Wasco, Oregon. The applicant is Orion Sherman County Wind Farm LLC (Orion). The applicant has named the proposed facility the Biglow Canyon Wind Farm (Biglow). The Energy Facility Siting Council (Council) issues this order based on its review of the application and the comments and recommendations on the application by state agencies, local governments, tribal organizations and the public.

ORS 469.320 requires a site certificate from the Energy Facility Siting Council (Council) before construction of a "facility." ORS 469.300 defines "facility" as "an energy facility together with any related or supporting facilities." Biglow would be an "energy facility" under the definition in ORS 469.300(11)(a). A "site certificate" is a binding agreement between the State of Oregon and the applicant, authorizing the applicant to construct and operate a facility on an approved site, incorporating all conditions imposed by the Council on the applicant.

It is the public policy of the State of Oregon that "the siting, construction and operation of energy facilities shall be accomplished in a manner consistent with protection of the public health and safety and in compliance with the energy policy and air, water, solid waste, land use and other environmental protection policies of this state." ORS 469.310. A site certificate issued by the Council binds the state and all counties and cities and political subdivisions of Oregon. Once the Council issues the site certificate, the responsible state agency or local government must issue any necessary permits that are addressed in the site certificate without further proceedings. ORS 469.401(3).

To issue a site certificate for a proposed facility, the Council must determine that "the facility complies with the standards adopted by the Council pursuant to ORS 469.501 or the overall public benefits of the facility outweigh the damage to the resources protected by the standards that facility does not meet." ORS 469.503(1). The Council, further, must decide whether the proposed facility complies with all other applicable Oregon statutes and administrative rules identified in the project order, excluding requirements governing design or operational issues that do not relate to siting and excluding compliance with requirements of federally delegated programs. ORS 469.401(4) and 469.503(3). In addition, the Council must include in the site certificate "conditions for the protection of the public health and safety, for the time for completion of construction, and to ensure compliance with the standards, statutes and rules described in ORS 469.501 and ORS 469.503." ORS 469.401(2).

In accordance with ORS 469.370(1), the Department issues a draft proposed order on an application. Following the issuance of that draft, the Council must conduct at least one public hearing in the affected area. At the hearing, the Council takes public comment on the

application and draft proposed order. ORS 469.370(2). Any issues that may be the basis for a contested case hearing must be raised by the public hearing comment deadline or they are waived and cannot be considered in a contested case. ORS 469.370(3).

After the public hearing and the Council's review of the draft proposed order, the Department issues the proposed order recommending approval or rejection of the application. The Department issues a public notice of the proposed order that includes notice that the Council will conduct a contested case hearing on the application. The notice specifies a deadline for requests to participate as a party in the contested case and the date for the initial prehearing conference. ORS 469.370(4). Only those who appeared in person or in writing at the public hearing on the application (described in the preceding paragraph) may request to become parties to the contested case, and only those issues that were raised on the record of the public hearing with sufficient specificity can be considered in the contested case. ORS 469.370(5).

After the conclusion of the contested case proceeding, the Council decides whether to grant a site certificate and issues a final order that either approves or rejects the application based on the standards adopted under ORS 469.501 and any additional state statutes, rules or local government ordinances determined to be applicable to the proposed facility by the project order. ORS 469.370(7).

The Council's final order is subject to judicial review by the Oregon Supreme Court. Only a party to the contested case may request judicial review, and the only issues that may be subject to judicial review are issues that parties to the contested case have raised. A petition for judicial review must be filed with the Supreme Court within 60 days after the date of service of the Council's final order. ORS 469.403.

The definitions in ORS 469.300 and OAR 345-001-0010 apply to terms used in this order.

II. PROCEDURAL HISTORY

1. Timeline

Expedited review status for a wind energy facility allows a developer to skip the Notice of Intent phase of the Council's site certificate application process. While Klondike III requested expedited review for its proposed 91-MW Klondike III Wind Project, Orion's proposed Biglow project was not eligible for the formal expedited review process because of its size of up to 450 MW. However, Orion did ask the Department informally to expedite its overall review to allow the company to participate in a competitive turbine market, meet important project deadlines and coordinate with tight Council summer meeting schedules. That request meant that the Department's review of Biglow nearly caught up with the Department's review of the Klondike III Wind Project at the Draft Proposed Order stage, despite Orion submitting its application for Biglow about five months after Klondike III submitted its application for its project.

Company	Notice of Intent Submitted	Project Order Issued	Application Submitted	Filing Date (Application determined complete)	Draft Proposed Order Issued
Klondike III	None	July 8, 2005	May 13, 2005	Feb. 6, 2006	April 13, 2006
Orion	July 22, 2005	Oct. 10, 2005	Oct. 12, 2005	March 20, 2006	May 8, 2006

Crucial to the Department's ability to meet Orion's request to reach the Draft Proposed Order stage quickly during a complex, non-expedited review process was the Department's work just performed on the Klondike Wind Project application. The proposed facilities sit adjacent to each other on similar sites that have some similar issues, and the Department was able to model parts of its Biglow order on the Klondike order. In addition, the timeline that the Draft Proposed Order met resulted in many overtime hours for the Department's staff and consultants. The Department wishes to make clear the role the overtime hours and the symbiotic relationship with Klondike played in its speedy review of the Biglow application with the good-natured hope that such speed is not pointed to as a precedent for Department action in the future on a large, non-expedited project.

2. Notice of Intent

On July 22, 2005, Orion submitted a Notice of Intent to apply to build Biglow with a maximum average electric generating capacity of about 450 megawatts.

On August 19, 2005, the Council appointed the Sherman County Board of Commissioners as the Special Advisory Group for the Orion application.

The Department held a public information meeting on the Notice of Intent on August 29, 2005, at the St. Mary's Parish Hall in Wasco. The only comments the Department received at the meeting were comments favorable toward the project.

On October 10, 2005, the Department issued a project order for Biglow.

3. Site Certificate Application

Orion submitted an application for a site certificate on October 12, 2005. On November 7, 2005, the Council appointed John W. Burgess as the Hearing Officer for the public hearing and contested case proceedings for Biglow.

On March 20, 2006, the Department determined that the application was complete based on additional information submitted by the applicant in the time since the application was submitted. As required under OAR 345-021-0055, the applicant prepared a supplement to the application and distributed copies of the supplement to the reviewing agencies who had responded to the Notice of Intent request for comments and to others identified by the Department, together with the notice described in OAR 345-015-0200. To conserve resources, the department distributed the notice without supplement to those agencies that had not

responded to the Notice of Intent with a statement saying that a supplement would be sent should the agency wish one.

The Department issued public notice of the filing of the application by publishing the notice in *The Dalles Chronicle*, a newspaper of general circulation available in the vicinity of the proposed facility. The Department mailed a notice of filing to the property owners listed in Exhibit F of the application and to persons on the Council's general mailing list and the special mailing list set up for the proposed facility, as described in OAR 345-015-0190.

In response to the notice of filing, the Department received written comments from the following state agencies:

- Oregon Department of Geology & Mineral Industries (advising that the applicant should acknowledge the geotechnical work that would be necessary prior to construction).

- Oregon Department of Fish and Wildlife (raising multiple concerns about protection of raptor nest locations, threatened and endangered species, wildlife monitoring plan components, habitat mitigation and revegetation of temporarily disturbed areas).

- Oregon Parks and Recreation Department, State Historic Preservation Office (standard review of the project and citing no adverse impact to the Oregon Trail).

- Oregon Parks and Recreation Department (asking that turbines be sited such that views from the John Day River are protected and that lighting on certain wind turbines that might be visible from the John Day Scenic Waterway be avoided, subject to FAA requirements).

- Oregon Department of State Lands (advising that no Removal-Fill Permit is required).

- Oregon Water Resources Department (advising that the proposed source of water for construction purposes may not be available).

- In addition, the Department met at his request with James Hamrick at the Oregon Parks and Recreation Department (to raise the Department's awareness of the state's Oregon Historic Trails Advisory Council and national and state historic trails in Oregon).

- The Department also received comments from the Sherman County Planning Director (recommending several site certificate conditions related to the county's Conditional Use Permit).

- The Department received comments from the Confederated Tribes of the Warm Springs Reservation of Oregon (advising of the tribes' concerns about wildlife, habitat, weed, cultural, land use and other issues).

- The Department also received several letters or e-mails, as well as several telephone calls, from a handful of Sherman County landowners concerned about the potential interference of Biglow turbines with their own plans for turbines on their properties. Some of the landowners also expressed interest in being able to gain access to the Biglow substation should it be built. The Department's response was to let landowners know that the Council's jurisdiction did not extend to "wind setback" requirements or substation access and to encourage the landowners to work out their issues directly with Orion.

- The Department received a letter from Mike Denny, representing the Blue Mountain Audubon Society, in which he expressed concern about the proposed facility's potential impacts on birds and bats.

4. Draft Proposed Order

On May 8, 2006, the Department issued a draft proposed order and a Notice of Public Hearing and Request for Comments in accordance with OAR 345-015-0220. The Department received comments from the applicant requesting specific changes to the draft proposed order and from the Oregon Department of Fish and Wildlife responding to the applicant's request for changes. A public hearing held in Wasco, Oregon, on May 31, 2006, resulted in one public comment about wake effect concerns. The deadline for written comments was June 2, 2006. The Department received written clarification comments from the Confederated Tribes of the Warm Springs Reservation of Oregon and from Sherman County. The Council reviewed the draft proposed order at a meeting on June 6, 2006, in accordance with OAR 345-015-0230. In light of the comments received and the Council discussion, the Department prepared this proposed order.

III. GENERAL FINDINGS OF FACT

1. Description of the Proposed Facility

(a) **Project Overview.**

Orion provided information about the components of the proposed facility in Exhibit B of the application. Biglow would be an electric power generating plant that would produce power from wind energy.

Biglow would consist of up to 225 wind turbines with an aggregate nominal nameplate generating capacity of 337.5 megawatts (MW) of electricity or 150 wind turbines with an aggregate nominal nameplate generating capacity of 450 MW. The average electric

generating capacity would be about 112.5 to 150 MW.[1] Turbines would be mounted on tubular steel towers ranging in height from 265 to 280 feet at the hub with an overall height of from 400 to 445 feet including the turbine blades. The turbines would be erected within up to 30 corridors and spaced to optimize the facility's output. The facility would be located on private farmland that Orion has leased from the affected landowners.

(b) The Energy Facility

ORS 469.300(11)(a)(J) defines the "energy facility" in this case as "an electric power generating plant with an average electric generating capacity of 35 megawatts or more if the power is produced from … wind energy at a single energy facility." The proposed electric power generating plant would consist of up to 225 wind turbine locations, each consisting of a turbine tower and foundation, turbine pad area, nacelle, rotor and blade assembly, and step-up transformer. The turbines would be arranged in strings as shown in Revised Figures C-2 and C-2A of the Supplement to the Site Certificate Application for the Biglow Canyon Wind Farm ("ASC Supplement").[2]

Orion is requesting a site certificate that would allow the option of using either of two possible wind turbine configurations: 225 GE 1.5-MW turbines or 150 GE 3.0-MW turbines. In the case of the 1.5-MW turbines, the turbine towers would be about 265 feet high at the rotor hub, and the blade sweep would be about 230 feet. In the case of the 3.0-MW turbines, the turbine towers would be about 280 feet high at the rotor hub, and the blade sweep would be about 265 feet. Orion is also requesting a site certificate that would enable it to make use of other turbine types in the event the GE turbines proved to be unavailable in the marketplace at the time of construction.

A wind turbine features a nacelle mounted on a tubular steel tower. The nacelle houses the generator and gearbox and supports the rotor and blades at the hub. The turbine tower supports and provides access to the nacelle. Each turbine unit sits on a pad measuring about 2,786 square feet. The pad accommodates the turbine pedestal, a step-up transformer, and a turnout area for service vehicles. The purpose of the step-up transformer is to increase the output voltage of the wind turbine to the voltage of the power collection system. Underlying the pad would be a deep concrete turbine foundation with a surface area measuring about 40 feet by 40 feet for the 1.5-MW turbines and about 80 feet by 80 feet for the 3.0-MW turbines.

(c) Related or Supporting Facilities

Orion proposes to construct the following related or supporting facilities:

- Power collection system
- Substations and interconnection system
- Meteorological towers
- Operations and maintenance building

[1] ORS 469.300(4) defines the "average electric generating capacity" of a wind energy facility as the peak generating capacity divided by 3.00.
[2] ASC Supplement Revised Figures C-2 and C-2A are incorporated in this order by this reference.

- Control system
- Access roads
- Temporary laydown and staging areas

Power Collection System. Each wind turbine would generate power at about 600 volts. The transformer sitting at the base of each wind turbine unit would increase the voltage to 34.5 kilovolts (kV). From the transformer, power would be transmitted to a central substation by means of electric cables. Most of the cables would be buried three feet or more below the surface in trenches about 3 feet wide. In areas where collector cables from several turbine strings follow the same alignment, *e.g.*, on approach to the substation, multiple sets of cables may be installed within a single trench. If the facility is fully developed, there would be about 468,000 feet (88.6 miles) of 3-wire collector cables. Generally, these cables will be above, below or adjacent to the fiber optic cables comprising the supervisory control and data acquisition system.

In some locations, the collector cables may be constructed above ground on pole or tower structures. Aboveground structures would allow the collector cables to span terrain, such as canyons, native grasslands, wetlands, and intermittent streams, thereby reducing adverse environmental impacts, or to span cultivated areas, thereby reducing adverse impacts to farming operations. Poles or towers supporting aboveground segments of the power collection system would be about 23 to 28 feet tall. Pending final site design, Orion states that the length of the aboveground segments of the power collection system would be up to but not exceeding 15 miles.

Substations and Interconnection System. Under one of its transmission alternatives, Orion would construct a new substation in the southern section of the facility site. The substation site would be a graveled, fenced area of up to 6 acres with transformers, switching equipment and a parking area. Transformers would be non-polychlorinated biphenyl (PCB) oil-filled types. The transmission line would be about 3 miles long and would interconnect with the Bonneville Power Administration (BPA) system at the existing Klondike Schoolhouse Substation.

Under its second transmission alternative, Orion would construct a new substation near the center of the facility site. The substation site would be a graveled, fenced area of up to 6 acres with transformers, switching equipment and a parking area. Transformers would be non-PCB oil-filled types. The transmission would be about 7 miles long and would interconnect with an electric transformer or switching facility to be installed at BPA's John Day Substation or Switchyard for delivery of electricity to BPA's high-voltage transmission system.

Meteorological Towers and SCADA. Orion would place up to 10 meteorological towers throughout the facility site to collect wind resource data. The towers would be up to 279 feet tall.

Operations and Maintenance Building. The site of the operations and maintenance facility would comprise about 5 acres. The O&M building would occupy about 5,000 square

feet and would include office and workshop areas, control room, kitchen, bathroom, shower, utility sink, and other typical facilities. Water for the bathroom, shower and kitchen would be obtained from an onsite well constructed by a licensed contractor in accordance with local and state requirements. Water use would not be expected to exceed 1,000 gallons per day. Domestic wastewater generated at the O&M facility would drain into an onsite septic system. A graveled parking area for employees, visitors and equipment would be located adjacent to the O&M facility.

Orion has proposed three alternative locations for the O&M facility: (1) adjacent to the substation to be located in the southern section of the facility site in the event Biglow is interconnected to the BPA transmission system by means of the Klondike Schoolhouse Substation; (2) adjacent to the substation to be located near the center of the facility site in the event Biglow is interconnected to the BPA transmission system by means of the John Day Substation; or (3) at the site of an existing house located at 97327 Emigrant Lane, Wasco, Oregon.

Control System. Orion would install a supervisory control and data acquisition (SCADA) system to assist with the remote operation of the wind turbines, to collect data from each wind turbine, and to archive wind and performance data from various sources. The SCADA system would be linked by means of fiber optic cables or other means of communication to a central computer in the O&M facility.

Access Roads. Orion would construct about 40.5 miles of new roads to provide access to the wind turbine strings, together with turnaround areas at the end of each wind turbine string. The roads would be about 28 feet wide and would be composed of crushed gravel. In addition, Orion would improve about 0.7 mile of existing roads by providing an all-weather surface and, in some cases, widening the roads to accommodate construction vehicles.

Temporary Laydown and Staging Areas. Depending on whether it proceeds with the 150-turbine or 225-turbine configuration, Orion would use a total of 186 or 261 laydown and staging areas to stage construction and store supplies and equipment during construction of the facility. It would develop one 18,500 square-foot laydown area at the site of each wind turbine, a one-acre laydown area for each wind turbine string, and six additional 5-acre laydown areas at various locations throughout the facility site. The laydown areas would have a crushed gravel surface and would be returned to their pre-construction condition following completion of construction of the facility.

2. Location of the Proposed Facility

Orion provided information about the location of the proposed facility in Exhibit C of the site certificate application. The facility site would be about 2.5 miles northeast of Wasco in Townships 1 and 2 North, Ranges 17 and 18 East, Willamette Meridian, Sherman County, Oregon. Orion provided additional information about its “Turbine Corridor Concept” in the Appendix, Turbine Corridor Request for Additional Information, included in the Supplement to the Site Certificate Application for the Biglow Canyon Wind Farm.

Revised Figures C-2 and C-2A in the ASC Supplement show the proposed locations of the facility and related or supporting facilities.

3. The Site and Site Boundary

For the purposes of analysis in the site certificate application, the "site boundary" is defined under OAR 345-001-0010(53) as "the perimeter of the site of the proposed energy facility, its related or supporting facilities, [and] all temporary laydown and staging areas." The locations of the temporary laydown and staging are shown on Revised Figure C-2 of the ASC Supplement.

Orion has requested the flexibility, within defined 500-foot-wide turbine corridors, to defer the final selection of turbine vendor, turbine size, number of turbines to be installed, and precise turbine layout until after the issuance of a site certificate and prior to commencement of construction. In the site certificate application, Orion has defined the range of possible turbine vendors, sizes and numbers. Orion has also defined the boundaries of the 500-foot-wide corridors within which the turbines would be located by means of GPS coordinates, each coordinate representing a point in degrees west longitude and degrees north latitude.[3]

In demonstrating that it would satisfy the Council's standards, Orion has used two approaches. Under the first approach, it has simply defined the "worst case" by considering the maximum possible impacts under any possible combination of turbine vendors, sizes, numbers and locations within the defined limits. Under the second approach, Orion presented formulas and methods for assessing the impacts and designating appropriate mitigation for various combinations of turbine vendors, sizes, numbers and locations within the defined limits. For those standards to which this approach would apply, Orion seeks inclusion in the site certificate of applicable formulas and methods, together with a condition that would require Orion, prior to the commencement of construction, to present to the Department a "Final Layout" defining its selection of turbine vendor, size, number and location, accompanied by Orion's resource impact calculations and proposed mitigation measures. The formulas and methods would be applied to the "Final Layout" to ensure that Orion would satisfy each of the Council's affected standards. Orion takes the position that these approaches would grant it important flexibility in terms of turbine vendor and size selection and in terms of turbine micrositing within the defined turbine corridors while ensuring that compliance with Council standards would be based on either a "worst case" methodology or an actual-impacts methodology.

For the purpose of analysis of the site certificate application, the "site boundary" would include the 500-foot-wide turbine corridors and the associated related or supporting facilities. No permanent facilities or temporary construction would be permitted outside of the 500-foot-wide turbine corridors, with the exception of the related or supporting facilities described below.

[3] Attachment 1, Corridor Boundaries, Appendix, Turbine Corridor Request for Additional Information, Supplement to the Site Certificate Application for the Biglow Canyon Wind Farm, incorporated in this order by this reference.

Before beginning construction of the facility, Orion would determine the final turbine layout and, as required by Condition (102), would submit to the Department a legal description of the facility site. OAR 345-001-0010(49) defines the facility "site" as "all land upon which a facility is located or proposed to be located." As defined under OAR 345-001-0010(19), a "facility" includes the energy facility and its related or supporting facilities. The Biglow site would include the following energy facility and related or supporting facilities:

- Turbine corridors. The site would include the area within each 500-foot-wide turbine corridor as defined by the coordinates included in Attachment 1, Corridor Boundaries, of the Appendix included in the ASC Supplement. The total area occupied by the turbine corridors would be about 2,163 acres.

- Meteorological towers and underground SCADA cables. The site would include the ten proposed meteorological towers and foundations, each occupying an area of about 900 square feet (0.02 acre), and the 20-foot-wide route of the underground SCADA data cables that would interconnect the meteorological towers with a control computer in one of three optional O&M facilities. These facilities are depicted on Revised Figures C-2 and C-2A of the ASC Supplement.

- Power collection system. The site would include the 20-foot-wide route of the underground and aboveground segments of the power collection system, as shown on Revised Figures C-2 and C-2A of the ASC Supplement. The area encompassed by the power collection system route would be about 190.20 acres. The power collection system would interconnect with one of two optional substations.

- Access roads, access road intersections and turnaround areas. The site would include all access roads, access road intersections and turnaround areas improved or newly constructed to serve the facility. These new and improved access roads, access road intersections and turnaround areas, encompassing an area of about 151.15 acres, are depicted on Revised Figures C-2 and C-2A of the ASC Supplement.

- Transmission line. The site would include one of two high-voltage transmission line alternatives, each with two optional routings. Under Alternative 1, Option A, the transmission line would occupy a 12-foot-wide corridor about 3 miles long (a total area of about 4.36 acres) and would interconnect a substation located in the south central site with the Klondike Schoolhouse Substation located south of the site by crossing diagonally over cultivated land. Under Alternative 1, Option B, the transmission line would occupy a 12-foot-wide corridor about 3 miles long (a total area of about 4.36 acres) and would interconnect a substation located in the south central site with the Klondike Schoolhouse Substation by following existing roads to avoid a diagonal crossing of cultivated land. Under Alternative 2, Option A, the transmission line would occupy a 12-foot-wide corridor about 7 miles long (a

total area of about 10.18 acres) and would interconnect a substation located near the center of the site with the BPA John Day Substation located west of the site by paralleling the Herin Lane right-of-way. Under Alternative 2, Option B, the transmission line would occupy a 12-foot-wide corridor about 7 miles long (a total of about 10.18 acres) and would interconnect a substation located near the center of the site with the BPA John Day Substation located west of the site by following a series of straight lines rather than meandering along the course of Herin Lane. The transmission line alternatives and options are depicted on Revised Figures C-2 and C-2A of the ASC Supplement.

- Substation. The site would include one of two substation alternatives, depending on Orion's choice of transmission line alternatives. If Orion proceeds with transmission line Alternative 1, the substation would be located in the south central site. If Orion proceeds with transmission line Alternative 2, the substation would be located near the center of the site. In either case, the substation would occupy about 6 acres of land. The substation alternatives are depicted on Revised Figures C-2 and C-2A of the ASC Supplement.

- O&M Facility. The site would include one of three O&M facility alternatives, depending, in part, on Orion's choice of transmission line alternatives. If Orion proceeds with transmission line Alternative 1, the O&M facility may be located adjacent to the substation in the south central site. If Orion proceeds with transmission line Alternative 2, the O&M facility may be located adjacent to the substation near the center of the site. Or, without regard to Orion's choice of transmission line alternatives, the O&M facility may be located at the site of an existing residence in the south central site. In all cases, the O&M building would measure about 5,000 square feet and would be situated on a 5-acre, gravel-covered parcel to provide parking for employees, visitors and equipment. The O&M facility alternatives are depicted on Revised Figures C-2 and C-2A of the ASC Supplement.

IV. THE COUNCIL'S SITING STANDARDS: FINDINGS AND CONCLUSIONS

The Council must decide whether Biglow complies with the facility siting standards adopted by the Council. ORS 469.503. In addition, the Council must impose conditions for the protection of the public health and safety, for the time of commencement and completion of construction, and to ensure compliance with the standards, statutes and rules addressed in the project order. ORS 469.401(2).

The Council is not authorized to determine compliance with regulatory programs that have been delegated to another state agency by the federal government. ORS 469.503(3). Nevertheless, the Council may consider these programs in the context of its own standards to ensure public health and safety, resource efficiency and protection of the environment.

The Council has no jurisdiction over design or operational issues that do not relate to siting, such as matters relating to employee health and safety, building code compliance, wage and hour or other labor regulations, or local government fees and charges. ORS 469.401(4).

1. General Standard of Review

OAR 345-022-0000

(1) To issue a site certificate for a proposed facility or to amend a site certificate, the Council shall determine that the preponderance of evidence on the record supports the following conclusions:

(a) The facility complies with the requirements of the Oregon Energy Facility Siting statutes, ORS 469.300 to ORS 469.570 and 469.590 to 469.619, and the standards adopted by the Council pursuant to ORS 469.501 or the overall public benefits of the facility outweigh the damage to the resources protected by the standards the facility does not meet as described in section (2);

(b) Except as provided in OAR 345-022-0030 for land use compliance and except for those statutes and rules for which the decision on compliance has been delegated by the federal government to a state agency other than the Council, the facility complies with all other Oregon statutes and administrative rules identified in the project order, as amended, as applicable to the issuance of a site certificate for the proposed facility. If the Council finds that applicable Oregon statutes and rules, other than those involving federally delegated programs, would impose conflicting requirements, the Council shall resolve the conflict consistent with the public interest. In resolving the conflict, the council cannot waive any applicable state statute.

** * **

We address the requirements of OAR 345-022-0000 in the findings of fact, reasoning, recommended conditions and conclusions of law discussed in the sections that follow. Upon consideration of all of the evidence in the record, we state our recommended general conclusion regarding the application in Section VII.

2. Standards About the Applicant

(a) Organizational Expertise

OAR 345-022-0010

(1) To issue a site certificate, the Council must find that the applicant has the organizational expertise to construct, operate and retire the proposed facility in compliance with Council standards and conditions of the site certificate. To conclude that the applicant has this expertise, the Council must find that the applicant has demonstrated the ability to design, construct and operate the proposed facility in compliance with site certificate conditions and in a manner that protects public health and safety and has demonstrated the ability to restore

the site to a useful, non-hazardous condition. The Council may consider the applicant's experience, the applicant's access to technical expertise and the applicant's past performance in constructing, operating and retiring other facilities, including, but not limited to, the number and severity of regulatory citations issued to the applicant.

(2) The Council may base its findings under section (1) on a rebuttable presumption that an applicant has organizational, managerial and technical expertise, if the applicant has an ISO 9000 or ISO 14000 certified program and proposes to design, construct and operate the facility according to that program.

(3) If the applicant does not itself obtain a state or local government permit or approval for which the Council would ordinarily determine compliance but instead relies on a permit or approval issued to a third party, the Council, to issue a site certificate, must find that the third party has, or has a reasonable likelihood of obtaining, the necessary permit or approval, and that the applicant has, or has a reasonable likelihood of entering into, a contractual or other arrangement with the third party for access to the resource or service secured by that permit or approval.

(4) If the applicant relies on a permit or approval issued to a third party and the third party does not have the necessary permit or approval at the time the Council issues the site certificate, the Council may issue the site certificate subject to the condition that the certificate holder shall not commence construction or operation as appropriate until the third party has obtained the necessary permit or approval and the applicant has a contract or other arrangement for access to the resource or service secured by that permit or approval.

Findings of Fact

The applicant provided evidence about its organizational expertise in Exhibit D and about permits needed for construction and operation of the proposed facility in Exhibit E of the application.

A. Applicant's Expertise

Portland General Electric has publicly announced its intention to buy Biglow should the project receive a site certificate and other approvals. However, because that transaction would not occur unless and until the Council approves a site certificate for Biglow, it is Orion's qualifications that must meet the Council's standard on organizational expertise.

The applicant, Orion Sherman County Wind Farm LLC (Orion), is a limited liability company organized in Delaware. Orion is a wholly owned subsidiary of Orion Energy LLC ("Orion Energy"), a California limited liability company. Orion Energy is a privately owned company based in Oakland whose sole business is the development, financing, construction, and operation of large-scale wind power facilities.

Orion Energy would provide the organizational, managerial and technical expertise to construct and operate Biglow. Orion Energy's wind resource team has led efforts to permit more than 1,100 MW of installed wind energy projects worldwide. Orion Energy developed, constructed and operated the 30-MW Delaware Mountains Wind Farm and the 83-MW Indian Mesa Wind Farm, both in Texas, and the 10.4-MW Green Mountain Wind Farm in Pennsylvania.

As described in Exhibit D of the ASC, Orion Energy's key personnel for the development, construction and operation of the proposed energy facility have experience in power project engineering, design, development, construction and operation. Orion Energy would hire qualified contractors with substantial experience constructing similar facilities to design and build the Biglow facility.

The applicant relies on mitigation to demonstrate compliance with Council standards. The mitigation actions necessary to demonstrate compliance with these standards are described in the site certificate conditions in Sections IV and V below. The Council finds that the applicant could successfully complete the mitigation actions, based on evidence provided by Orion, including past experience with other projects and the qualifications and experience of personnel upon whom the applicant would rely.

B. Third-Party Permits

Orion does not rely on any state or local government permit issued to a third party.

To find that Orion can comply with OAR 345-022-0010, the Council adopts the following conditions in the site certificate:

(1) Before beginning construction of the facility, the certificate holder shall notify the Department of the identity and qualifications of the engineering, procurement and construction (EPC) contractor(s) for specific portions of the work. The certificate holder shall select EPC contractors that have substantial experience in the design and construction of similar facilities. The certificate holder shall report to the Department any change of major construction contractors.

(2) The certificate holder shall contractually require all construction contractors and subcontractors involved in the construction of the facility to comply with all applicable laws and regulations and with the terms and conditions of the site certificate. Such contractual provisions shall not operate to relieve the certificate holder of responsibility under the site certificate.

(3) During construction of the facility, the certificate holder shall have an on-site assistant construction manager who is qualified in environmental compliance to ensure compliance with all construction-related site

certificate conditions. During operation, the certificate holder shall have a project manager who is qualified in environmental compliance to ensure compliance with all ongoing site certificate conditions. The certificate holder shall notify the Department of the name, telephone number, fax number and e-mail address of these managers and shall keep the Department informed of any change in this information.

(4) Within 72 hours after discovery of conditions or circumstances that may violate the terms or conditions of the site certificate, the certificate holder shall report the conditions or circumstances to the Department.

Conclusions of Law

The Council concludes that, subject to the conditions stated in this order, the applicant has demonstrated that it has the organizational expertise to construct and operate the proposed facility. The Council further concludes that no third-party permits would be required for construction or operation of the proposed facility. The Council adopts Conditions (1), (2), (3) and (4) in the site certificate. Based on these findings and recommended conditions, the Council concludes that the applicant has met the Organizational Expertise Standard.

(b) Retirement and Financial Assurance

OAR 345-022-0050
To issue a site certificate, the Council must find that:

(1) The site, taking into account mitigation, can be restored adequately to a useful, non-hazardous condition following permanent cessation of construction or operation of the facility.

(2) The applicant has a reasonable likelihood of obtaining a bond or letter of credit in a form and amount satisfactory to the Council to restore the site to a useful, non-hazardous condition.

Findings of Fact

A. Retirement

Orion has assumed that Biglow would have a useful life of 20 to 30 years. However, the facility could be re-powered by replacing existing wind turbines, towers, or other infrastructure with new, more efficient turbines or related equipment. If Biglow were to be re-powered, its useful life could be greater than 30 years.

Under OAR 345-022-0050(1), the Council must find that the site can be restored adequately to a useful, non-hazardous condition following permanent cessation of construction or operation of the facility. For the purpose of the standard, a "useful, non-hazardous condition" is a condition consistent with the applicable local comprehensive land

use plan and land use regulations. Biglow, as proposed, would be located on land zoned Exclusive Farm Use. To satisfy the standard, Orion must show that the site can be restored to a useful, non-hazardous condition suitable for agricultural use.

The certificate holder is obligated to retire the facility upon permanent cessation of construction or operation of the facility. Before restoring the site, the certificate holder must submit a final retirement plan for approval by the Council. The retirement plan must describe the activities necessary to restore the site to a useful, non-hazardous condition. After Council approval of the plan, the certificate holder would obtain the necessary authorization from the appropriate regulatory authorities before proceeding with site restoration. In addition, before beginning construction and throughout the life of the facility, the certificate holder is obligated to obtain and maintain a bond or letter of credit in an amount sufficient to ensure that funds would be available to the Council to restore the site to a useful, non-hazardous condition if the certificate holder does not retire the facility as required by Condition (109).

Restoring the site to a useful, non-hazardous condition upon retirement of the facility would include dismantling and removing the wind turbines, pad-mounted transformers, meteorological towers, transmission lines, O&M building, substation, and other aboveground equipment. After removal of the equipment, concrete turbine and meteorological tower foundations would be removed to a depth of at least 3 feet below the ground surface, and surface gravel would be removed. These areas would be backfilled and graded to restore soil and original contours, topsoil would be applied, and the disturbed areas would be planted with native plant seed mixes or agricultural crops, as appropriate, based on the use of adjacent lands.

Facility access roads would be removed in a four-step process: (1) gravel removal; (2) grading; (3) topsoil application; and (4) seeding. The restored areas would be reclaimed to restore surface grade, soil and vegetation to a condition supportive of either agriculture or wildlife habitat, as appropriate, based on the use of adjacent lands. Some roads on private property could be left in place, depending on the landowner's preference.

Demolition waste material would be transported for disposal at authorized sites. Turbines, turbine towers, and nacelles are expected to have carbon steel scrap value that would offset the estimated cost of demolition and site restoration.

Biglow would not have underground storage tanks or other on-site bulk storage of hazardous materials. Small quantities of lubricants, vehicle fuel and herbicides could be transported over the site during operation, and leaks, spills or improper handling of these materials could occur. Given the small amounts of such materials used on the site, soil contamination is unlikely.

The Council finds that the actions necessary to demolish the facility are feasible and that restoration of the site to a useful, non-hazardous condition is achievable.

B. Estimated Cost of Site Restoration

OAR 345-022-0050(2) addresses the possibility that the certificate holder may be unable or unwilling to restore the site to a useful, non-hazardous condition upon permanent cessation of construction or operation of the facility at any time during the life of the facility. The requirement that the certificate holder post a bond or letter of credit in an amount sufficient to cover the cost of restoring the site to a useful, non-hazardous condition, naming the State of Oregon as beneficiary, provides a financial assurance to protect the State of Oregon and its citizens if the certificate holder fails to fulfill its site restoration obligation under any circumstances.

Orion seeks a site certificate that would allow for the construction and operation of a facility that, at full build-out, could assume one of four possible configurations: (1) 225 GE 1.5-MW turbines with a 7-mile transmission line interconnecting the facility with the BPA John Day Substation (the "225-turbine John Day Alternative"); (2) 225 GE 1.5-MW turbines with a 3-mile transmission line interconnecting the facility with the Klondike Schoolhouse Substation (the "225-turbine Klondike Schoolhouse Alternative"); (3) 150 GE 3.0-MW turbines with a 7-mile transmission line interconnecting the facility with the BPA John Day Substation (the "150-turbine John Day Alternative"); and (4) 150 GE 3.0-MW turbines with a 3-mile transmission line interconnecting the facility with the Klondike Schoolhouse Substation (the "150-turbine Klondike Schoolhouse Alternative"). In addition, Orion seeks a site certificate that would allow for substitution of other turbine types and sizes in the event the GE turbines proved to be unavailable at the time of construction. Regardless of the facility's final configuration, Orion also seeks a site certificate that would allow for construction of the facility in one or more phases, backed by a reduced financial assurance requirement adequate to cover only the phase or phases then in operation or under construction. To provide a fund that is adequate for the State of Oregon to bear the cost of site restoration if the certificate holder fails to fulfill its obligations, the Council assumes circumstances under which the restoration cost would be greatest.

Orion estimated the net cost of site restoration at full build-out under each of the four possible configurations, as depicted in Table 1.

Table 1

Orion's Facility Retirement Cost Estimates

Proposed Facility Configuration	Gross Retirement Cost Estimate	Carbon Steel Scrap Value	Net Retirement Cost Estimate
225-turbine John Day Alternative	$11,748,453	$7,170,000	$4,578,453
225-turbine Klondike Schoolhouse Alternative	$11,524,453	$7,170,000	$4,354,453
150-turbine John Day Alternative	$11,018,899	$9,210,150	$1,808,749
150-turbine Klondike Schoolhouse Alternative	$10,794,899	$9,210,150	$1,584,749

The Department obtained independent cost estimates, based on the estimating procedure outlined in the "Facility Retirement Cost Estimating Guide." The Department also

obtained an independent estimate of the current value of carbon steel scrap.[4] By application of the Facility Retirement Cost Estimating Guide and the independent estimate of carbon steel scrap value, the Department estimated the net cost of site restoration at full build-out under each of the four possible configurations, as depicted in Table 2.

Table 2

Independent Facility Retirement Cost Estimates

Proposed Facility Configuration	Gross Retirement Cost Estimate	Carbon Steel Scrap Value	Net Retirement Cost Estimate
225-turbine John Day Alternative	$11,051,830	$6,503,850	$4,547,980
225-turbine Klondike Schoolhouse Alternative	$10,995,346	$6,503,850	$4,491,496
150-turbine John Day Alternative	$13,254,259	$8,515,350	$4,738,909
150-turbine Klondike Schoolhouse Alternative	$13,197,775	$8,515,350	$4,682,425

In order to allow Orion some flexibility in determining the final configuration of the proposed facility, the Council finds that the net cost of site restoration for the fully constructed facility would be the amount applicable to the 150-turbine John Day Alternative, or $4,738,909 (in 2005 dollars), including an offset for the value of carbon steel scrap. The Council adds to the net cost of site restoration a one-percent performance bond, representing a cost to be borne by the demolition contractor, and the customary ten-percent administration and project management assessment to cover the Department's costs if it must oversee the demolition and site restoration effort and the customary twenty-percent future developments contingency to address unforeseen developments over the course of 30 years. The Council finds that the financial assurance amount applicable to the 150-turbine John Day Alternative would be $6,208,000. Details in support of the independent facility retirement cost estimates are included in Tables 3 and 4.

Table 3

Cost Estimates for Site Restoration – BPA John Day Substation Alternatives*

			225-Turbine John Day Alternative		150-Turbine John Day Alternative	
		Unit Cost	Quantity	Extension	Quantity	Extension
Turbines						
Disconnect electrical, remove turbines, towers and nacelles (per tower)	1.5-MW	$18,101	225	$4,072,725		
	3.0-MW	$29,920			150	$4,488,000
Foundation removal, restoration and reseeding (per turbine)	1.5-MW	$7,211	225	$1,622,475		
	3.0-MW	$25,419			150	$3,813,000
Remove and load pad transformers (per transformer)		$2,119	225	$476,775	150	$317,850
Met Towers						
Dismantle and dispose of met towers per tower)		$8,113	10	$81,130	10	$81,130
Substation						
Dismantle and dispose of substation		$208,972	1	$208,972	1	$208,972
O&M Facility						
		$100,589	1	$100,589	1	$100,589

[4] The Department's estimates were developed by Pacific Energy Systems, Inc., which engaged Pinnell-Busch, Inc., in the preparation of the Facility Retirement Cost Estimating Guide and in the investigation of current local carbon steel scrap values.

Dismantle and dispose of O&M Facility						
Transmission Lines						
Remove aboveground 34.5-kV collector system (per mile)		$3,739	15	$56,085	15	$56,085
Remove 230-kV transmission line (per mile)		$14,121	7	$98,847	7	$98,847
Remove junction boxes to 3' below grade (per junction box)		$1,246	25	$31,150	25	$31,150
Access Roads						
Roadway Obliteration (per mile)		$9,008	40.5	$364,824	40.5	$364,824
Roadway Regrading (per acre)		$12,728	137.45	$1,749,464	137.45	$1,749,464
Roadway Reseeding (per acre)		$2,617	137.45	$359,707	137.45	$359,707
Turnarounds and Access Road Intersections Obliteration, regrading and reseeding (per acre)		$18,003	12.23	$220,177	12.23	$220,177
Temporary Laydown Areas						
Regrading and reseeding areas disturbed during restoration work (per acre)		$15,345	77.78	$1,193,534	61.85	$949,088
General Costs		$415,377	1	$415,377	1	$415,377
Gross Cost				$11,051,830		$13,254,259
Less Carbon Steel Scrap Value (per net ton)		-$149	43650	-$6,503,850	57150	-$8,515,350
Subtotal				$4,547,980		$4,738,909
Performance Bond			1%	$45,480	1%	$47,389
Administration and Project Management			10%	$454,798	10%	$473,891
Future Developments Contingency			20%	$909,596	20%	$947,782
Total Site Restoration Cost (rounded to nearest $1,000)				**$5,958,000**		**$6,208,000**

* Assumes full build-out with 225 GE 1.5-MW GE Turbines or 150 GE 3.0-MW GE Turbines and 7-mile transmission line interconnecting with BPA John Day Substation

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Table 4

Cost Estimates for Site Restoration – Klondike Schoolhouse Alternatives*

			225-Turbine Klondike Schoolhouse Alternative		150-Turbine Klondike Schoolhouse Alternative	
		Unit Cost	**Quantity**	**Extension**	**Quantity**	**Extension**
Turbines						
Disconnect electrical, remove turbines, towers and nacelles (per tower)	1.5-MW	$18,101	225	$4,072,725		
	3.0-MW	$29,920			150	$4,488,000
Foundation removal, restoration and reseeding (per turbine)	1.5-MW	$7,211	225	$1,622,475		
	3.0-MW	$25,420			150	$3,813,000
Remove and load pad transformers (per transformer)		$2,119	225	$476,775	150	$317,850
Met Towers						
Dismantle and dispose of met towers per tower)		$8,113	10	$81,130	10	$81,130
Substation						
Dismantle and dispose of substation		$208,972	1	$208,972	1	$208,972
O&M Facility						
Dismantle and dispose of O&M Facility		$100,589	1	$100,589	1	$100,589
Transmission Lines						
Remove aboveground 34.5-kV collector system (per mile)		$3,739	15	$56,085	15	$56,085
Remove 230-kV transmission line (per mile)		$14,121	3	$42,363	3	$42,363
Remove junction boxes to 3' below grade (per junction box)		$1,246	25	$31,150	25	$31,150
Access Roads						
Roadway Obliteration (per mile)		$9,008	40.5	$364,824	40.5	$364,824
Roadway Regrading (per acre)		$12,728	137.45	$1,749,464	137.45	$1,749,464
Roadway Reseeding (per acre)		$2,617	137.45	$359,707	137.45	$359,707
Turnarounds and Access Road Intersections Obliteration, regrading and reseeding (per acre)		$18,003	12.23	$220,177	12.23	$220,177

Temporary Laydown Areas Regrading and reseeding areas disturbed during restoration work (per acre)	$15,345	77.78	$1,193,534	61.85	$949,088
General Costs	$415,377	1	$415,377	1	$415,377
Gross Cost			$10,995,346		$13,197,775
Less Carbon Steel Scrap Value (per net ton)	-$149	43650	-$6,503,850	57150	-$8,515,350
Subtotal			$4,491,496		$4,682,425
Performance Bond		1%	$44,915	1%	$46,824
Administration and Project Management		10%	$449,150	10%	$468,243
Future Developments Contingency		20%	$898,299	20%	$936,485
Total Site Restoration Cost (rounded to nearest $1,000)			**$5,884,000**		**$6,134,000**

* Assumes full build-out with 225 GE 1.5-MW Turbines or 150 GE 3.0-MW Turbines and 3-mile transmission line interconnecting with Klondike Schoolhouse Substation

Because Orion seeks flexibility that would allow for development of the facility in one or more phases to address market demand and equipment availability, the Department has designed a procedure that would allow for assignment of the financial assurance requirement applicable to a given phase of facility development. That procedure assigns unit costs to the retirement tasks. It then calls for extending those unit costs based on the quantity of units applicable to the proposed phase and any previous phases of development. Unit costs are defined in Table 5.

Table 5

Unit Costs Applicable to Phased Development of Biglow Canyon Wind Farm as Derived by Application of the Facility Retirement Cost Estimating Guide

Facility Component and Retirement Tasks	Unit	Unit Cost
GE 3.0-MW Turbines		
Disconnect electrical, remove turbines, turbine towers and nacelles	Turbine Tower	$29,920
Foundation removal, restoration and reseeding	Turbine Tower	$25,420
Carbon Steel Scrap Value (381 net tons per turbine tower)	Turbine Tower	($56,769)
GE 1.5-MW Turbines		
Disconnect electrical, remove turbines, turbine towers and nacelles	Turbine Tower	$18,101
Foundation removal, restoration and reseeding	Turbine Tower	$7,211
Carbon Steel Scrap Value (194 net tons per turbine tower)	Turbine Tower	($28,906)
Facility Components for GE 3.0-MW or GE 1.5-MW Turbines		
Transformers – Remove, load and haul	Transformer	$2,119
Meteorological Towers – Dismantle, load and haul	Met Tower	$8,113
Substation – Dismantle, load and haul	Substation	$208,972
O&M Facility – Dismantle, load and haul	O&M Facility	$100,589
230-kV or 500-kV Transmission Line – Dismantle, load and haul	Mile	$14,121
34.5-kV Aboveground Collector System – Dismantle, load and haul	Mile	$3,739
Junction Boxes – Remove to 3' below grade	Junction Box	$1,246
Access Roads – Obliterate	Mile	$9,008
Access Roads – Apply topsoil and grade	Acre	$12,728
Access Roads – Reseed	Acre	$2,617
Turnarounds and Access Road Intersections – Obliterate, apply topsoil, grade and reseed	Acre	$18,003
Temporary Laydown Areas – Apply topsoil, grade and reseed*	Acre	$15,345
General Costs – Permits, mobilization, engineering, overhead, utility disconnects, etc.	First Phase	$415,377

* Site restoration temporary laydown areas are presumed to measure one-half the size of temporary laydown areas required during construction of the facility.

In the event Orion elected to develop the facility in one or more phases using either the GE 1.5-MW turbines or the GE 3.0-MW turbines or a combination of these two GE turbines, as proposed in the site certificate application, before beginning construction of the facility, Orion would be required to submit to the Department its final site design, including documentation in support of the quantity of the units that would apply to retirement of each

phase of the facility. The Department would apply the appropriate unit costs from Table 5 to each of those quantities and add to the resulting subtotal the one-percent performance bond amount, the ten-percent administration and project management assessment and the twenty-percent future developments contingency to arrive at the financial assurance amount applicable to each phase of development. The General Costs, i.e., permits, mobilization, engineering overhead, and utility disconnects, would apply only to the first phase of development. Before beginning construction of the first phase of development, Orion would be required to submit to the State of Oregon through the Council a letter of credit in the designated amount. Before beginning construction of any subsequent phase of development, Orion would be required to increase the amount of the letter of credit by the amount applicable to that phase of development.

To find that Orion can comply with OAR 345-022-0050(2), the Council adopts the following conditions in the site certificate:

(5) If the certificate holder elects to build the facility in a single phase using only GE 1.5-MW turbines, GE 3.0-MW turbines or a combination of these two GE turbines, before beginning construction of the facility and after considering all micrositing factors, the certificate holder shall provide to the Department a detailed map of the proposed facility showing the final locations where facility components are proposed to be built within the 500-foot-wide corridors shown on Revised Figures C-2 and C-2A of the ASC Supplement.

(6) If the certificate holder proposes to build the facility in more than one phase using only GE 1.5-MW turbines, GE 3.0-MW turbines or a combination of these two GE turbines, before beginning construction of any phase of the facility and after considering all micrositing factors, the certificate holder shall provide to the Department a detailed map of that phase of the facility showing the final locations where facility components are proposed to be built within the 500-foot-wide corridors shown on Revised Figures C-2 and C-2A of the ASC Supplement, shall identify on this map the facilities that would constitute that phase of construction, and shall provide documentation defining the quantities of each of the following components that would constitute that phase of construction: GE 1.5-MW turbines, GE 3.0-MW turbines, pad transformers, meteorological towers, substation, O&M facility, miles of 230-kV or 500-kV transmission line, miles of aboveground 34.5-kV collector system, miles of access road, acres of turnarounds and access road intersections, and acres of temporary laydown area.

(7) If the certificate holder elects to build the facility in a single phase using any turbines other than the GE 1.5-MW turbines or GE 3.0-MW turbines, before beginning construction of the facility and after considering all micrositing factors, the certificate holder shall provide to the Department a detailed map of the proposed facility showing the final locations where

facility components are proposed to be built within the 500-foot-wide corridors shown on Revised Figures C-2 and C-2A of the ASC Supplement. The certificate holder shall include with this map documentation defining quantities of each of the following components that would constitute the complete facility: turbines, pad transformers, meteorological towers, substation, O&M facility, miles of 230-kV or 500-kV transmission line, miles of aboveground 34.5-kV collector system, miles of access road, acres of turnarounds and access road intersections, and acres of temporary laydown area. For each turbine, the certificate shall define the turbine manufacturer, turbine capacity, weight of steel, height of tower, sweep of blade, and size of concrete foundation.

(8) If the certificate holder elects to build the facility in more than one phase using any turbines other than the GE 1.5-MW turbines or GE 3.0-MW turbines, before beginning construction of any phase of the facility and after considering all micrositing factors, the certificate holder shall provide to the Department a detailed map of that phase of the facility showing the final locations where facility components are proposed to be built within the 500-foot-wide corridors shown on Revised Figures C-2 and C-2A of the ASC Supplement, shall identify on this map the facilities that would constitute that phase of construction, and shall provide documentation defining the quantities of each of the following components that would constitute that phase of construction: turbines, pad transformers, meteorological towers, substation, O&M facility, miles of 230-kV or 500-kV transmission line, miles of aboveground 34.5-kV collector system, miles of access road, acres of turnarounds and access road intersections, and acres of temporary laydown area. For each turbine, the certificate shall define the turbine manufacturer, turbine capacity, weight of steel, height of tower, sweep of blade, and size of concrete foundation.

(9) If the certificate holder elects to build the facility in a single phase using only GE 1.5-MW turbines, GE 3.0-MW turbines or a combination of these two GE turbines, before beginning construction of the facility the certificate holder shall submit to the State of Oregon through the Council a bond or letter of credit in the amount of $6.208 million (in 2005 dollars) naming the State of Oregon, acting by and through the Council as beneficiary or payee. If the certificate holder elects to build the facility in a single phase using any turbines other than the GE 1.5-MW or GE 3.0-MW turbines or if the certificate holder elects to build the facility in more than one phase using any combination of turbines, before beginning construction of any phase of the facility, the certificate holder shall submit to the State of Oregon through the Council a bond or letter of credit naming the State of Oregon, acting by and through the Council, as beneficiary or payee in the amount (in 2005 dollars) determined by the Department as the gross cost of demolition and site restoration minus the

carbon steel scrap value plus the one-percent performance bond amount, ten-percent administration and project management costs and twenty-percent future developments contingency applicable to the proposed phase of construction, together with any previous phases of construction. If the certificate holder elects to build the facility in more than one phase using only GE 1.5-MW turbines, GE 3.0-MW turbines or a combination of the two GE turbines, the Department will establish the amount of the bond or letter of credit by applying the unit costs described in Table 5 of the Council's final order on the site certificate application (incorporated herein by this reference) to the number of units identified by the certificate holder and verified by the Department as applicable to the proposed phase and any previous phases of construction and adding to that subtotal the one-percent performance bond amount, ten-percent administration and project management costs and twenty-percent future developments contingency. If the certificate holder elects to build the facility using any turbines other than the GE 1.5-MW turbines or GE 3.0-MW turbines, for each phase of construction the Department will establish the amount of the bond or letter of credit by using its Facility Retirement Cost Estimating Guide to estimate the gross cost of demolition and site restoration minus the carbon steel scrap value plus the one-percent performance bond amount, ten-percent administration and project management costs and twenty-percent future developments contingency.

(a) The certificate holder shall adjust the amount of the bond or letter of credit annually, using the following calculation:

(i) Adjust the gross cost (in 2005 dollars) to present value, using the U.S. Gross Domestic Product Implicit Price Deflator, Chain-Weight, as published in the Oregon Department of Administrative Services' *Oregon Economic and Revenue Forecast* or by any successor agency (the "Index"). If at any time the Index is no longer published, the Council shall select a comparable calculation to adjust 2005 dollars to present value.

(ii) Adjust the estimated carbon steel scrap value by an index factor derived from the Producer Price Index values, not seasonally adjusted, reported by the U.S. Department of Labor, Bureau of Labor Statistics, "Commodities: Metals and Metal Products: Carbon Steel Scrap" (Series ID: WPU101211). Using the average monthly index value for the 12 months ending with December of the year preceding the year in which the adjustment is made as the numerator and the average monthly index value for the 12 months ending with December 2005 (277.2) as the demoninator,

multiply the estimated scrap value of $149 per net ton (in 2005 dollars) by the resulting factor. If at any time the Producer Price Index Values are no longer published, the Council shall select a comparable calculation to adjust the estimated scrap value.

(iii) Multiply the adjusted carbon steel scrap value (ii) per net ton by the number of tons of carbon steel scrap applicable to the phase or phases of construction to which the letter of credit applies and subtract the resulting value from the adjusted gross cost (i).

(iv) Add 1 percent of the subtotal (iii) for the adjusted performance bond amount, 10 percent of the subtotal (iii) for the adjusted administration and project management costs, and 20 percent of the subtotal (iii) for the adjusted future developments contingency.

(v) Add the subtotal (iii) to the sum of the percentages (iv) and round the resulting total to the nearest $1,000 to determine the adjusted financial assurance amount for the reporting year.

(b) The certificate holder shall use a form of bond or letter of credit approved by the Council.

(c) The certificate holder shall use an issuer of the bond or letter of credit approved by the Council.

(d) The certificate holder shall describe the status of the bond or letter of credit in the annual report submitted to the Council under Condition (122).

(e) The bond or letter of credit shall not be subject to revocation or reduction before retirement of the facility.

(10) If the certificate holder elects to use a bond to meet the requirements of Condition (9), the certificate holder shall ensure that the surety is obligated to comply with the requirements of applicable statutes, Council rules and this site certificate when the surety exercises any legal or contractual right it may have to assume construction, operation or retirement of the facility. The certificate holder shall also ensure that the surety is obligated to notify the Council that it is exercising such rights and to obtain any Council approvals required by applicable statutes, Council rules and this site certificate before the surety commences any activity to complete construction, operate or retire the facility.

C. Ability of the Applicant to Obtain a Bond or Letter of Credit

The Council finds that the value of the financial assurance bond or letter of credit for restoring the site of the proposed Biglow facility could be in the amount of up to $6.208 million (in 2005 dollars) adjusted annually as described in Condition (9)(a). Condition (108) requires that the certificate holder provide the applicable bond or letter of credit before beginning construction, in accordance with OAR 345-027-0020(8). The bond or letter of credit would remain in force until the certificate holder has fully restored the site. In its ASC Supplement, Orion requested that construction be allowed to begin at any time within three years after issuance of the site certificate, with construction of all phases to be complete within seven years after issuance of the site certificate. The Council requires construction to begin within three years after the effective date of the site certificate and to be completed within five years after the effective date of the site certificate.

OAR 345-022-0050(2) requires the Council to decide whether the applicant has a reasonable likelihood of obtaining a bond or letter of credit in a form and amount satisfactory to the Council to restore the site to a useful, non-hazardous condition. Orion provided information about its financial capability in Exhibits D and M of the ASC. Orion proposes to provide a financial assurance letter of credit in a form approved by the Council before beginning construction of the facility and to maintain that performance letter of credit in effect until the facility is retired and the site has been restored.

Orion has provided a letter from Wells Fargo Bank stating that it has "a long standing Business Banking Relationship with Orion Energy. They have been, and continue to be, in good standing at Wells Fargo Bank." The letter goes on to state: "Based upon the current dollars on deposit at Wells Fargo Bank and subject to acceptable pricing, terms and requisite approvals, Wells Fargo would be willing to arrange a standby letter of credit in an amount up to $6.5 million for the purpose of ensuring that the site of the proposed Biglow Canyon Wind Farm can be restored to a useful non-hazardous condition." Though this letter does not constitute a firm commitment from Wells Fargo Bank to issue the letter of credit for $6.208 million, the Council accepts the letter as credible evidence that Orion could obtain the necessary letter of credit.

To find that Orion can comply with OAR 345-022-0050(2), the Council adopts the following conditions in the site certificate:

(11) The certificate holder shall begin construction of the facility within three years after the effective date of the site certificate. Under OAR 345-015-0085(9), a site certificate is effective upon execution by the Council Chair and the applicant. The Council may grant an extension of the deadline to begin construction in accordance with OAR 345-027-0030 or any successor rule in effect at the time the request for extension is submitted.

(12) The certificate holder shall complete construction of the facility within five years after the effective date of the site certificate. Construction is

complete when: (1) the facility is substantially complete as defined by the certificate holder's construction contract documents; (2) acceptance testing has been satisfactorily completed; and (3) the energy facility is ready to begin continuous operation consistent with the site certificate. The certificate holder shall promptly notify the Department of the date of completion of construction. The Council may grant an extension of the deadline for completing construction in accordance with OAR 345-027-0030 or any successor rule in effect at the time the request for extension is submitted.

(13) The certificate holder shall construct a facility substantially as described in the site certificate.

(14) Notwithstanding OAR 345-027-0050(2), an amendment of the site certificate is required if the proposed change would increase the electrical generation capacity of the facility and would increase the number of wind turbines or the dimensions of existing wind turbines.

(15) The certificate holder shall obtain all necessary state and local permits or approvals required for construction, operation and retirement of the facility or ensure that its contractors obtain necessary state and local permits or approvals.

(16) Before beginning construction, the certificate holder shall notify the Department in advance of any work on the site that does not meet the definition of "construction" in OAR 345-001-0010 or ORS 469.300 and shall provide to the Department a description of the work and evidence that its value is less than $250,000.

Conclusions of Law

The Council concludes that the proposed facility site, taking into account mitigation, can be restored adequately to a useful, non-hazardous condition following permanent cessation of construction or operation of the facility. The Council further concludes that $6.208 million (in 2005 dollars) adjusted annually, as described in Condition (9), is a reasonable estimate of the cost to restore the site to a useful, non-hazardous condition in the event the certificate holder completes the facility as proposed and that the Department has proposed a suitable procedure for estimating the cost to restore the site to a useful, non-hazardous condition in the event the certificate holder elects to develop the facility in phases. The Council concludes that the applicant, subject to the conditions stated in this order, has demonstrated a reasonable likelihood of obtaining a letter of credit, satisfactory to the Council, in an amount adequate to restore the site to a useful, non-hazardous condition. The Council adopts Conditions (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15) and (16) in the site certificate. Based on these findings and conditions, the Council concludes that the applicant has met the Retirement and Financial Assurance Standard for the proposed facility.

3. Standards About the Impacts of Construction and Operation

(a) Land Use

OAR 345-022-0030

(1) To issue a site certificate, the Council must find that the proposed facility complies with the statewide planning goals adopted by the Land Conservation and Development Commission.

(2) The Council shall find that a proposed facility complies with section (1) if:

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(b) The applicant elects to obtain a Council determination under ORS 469.504(1)(b) and the Council determines that:

(A) The proposed facility complies with applicable substantive criteria as described in section (3) and the facility complies with any Land Conservation and Development Commission administrative rules and goals and any land use statutes directly applicable to the facility under ORS 197.646(3);

(B) For a proposed facility that does not comply with one or more of the applicable substantive criteria as described in section (3), the facility otherwise complies with the statewide planning goals or an exception to any applicable statewide planning goal is justified under section (4); or

(C) For a proposed facility that the Council decides, under sections (3) or (6), to evaluate against the statewide planning goals, the proposed facility complies with the applicable statewide planning goals or that an exception to any applicable statewide planning goal is justified under section (4).

(3) As used in this rule, the "applicable substantive criteria" are criteria from the affected local government's acknowledged comprehensive plan and land use ordinances that are required by the statewide planning goals and that are in effect on the date the applicant submits the application. If the special advisory group recommends applicable substantive criteria, as described under OAR 345-021-0050, the Council shall apply them. If the special advisory group does not recommend applicable substantive criteria, the Council shall decide either to make its own determination of the applicable substantive criteria and apply them or to evaluate the proposed facility against the statewide planning goals.

(4) The Council may find goal compliance for a proposed facility that does not otherwise comply with one or more statewide planning goals by taking an exception to the applicable goal. Notwithstanding the requirements of ORS 197.732, the statewide planning goal pertaining to the exception process or any rules of the Land Conservation and Development Commission pertaining to the

exception process, the Council may take an exception to a goal if the Council finds:

(a) The land subject to the exception is physically developed to the extent that the land is no longer available for uses allowed by the applicable goal;

(b) The land subject to the exception is irrevocably committed as described by the rules of the Land Conservation and Development Commission to uses not allowed by the applicable goal because existing adjacent uses and other relevant factors make uses allowed by the applicable goal impracticable; or

(c) The following standards are met:

(A) Reasons justify why the state policy embodied in the applicable goal should not apply;

(B) The significant environmental, economic, social and energy consequences anticipated as a result of the proposed facility have been identified and adverse impacts will be mitigated in accordance with rules of the Council applicable to the siting of the proposed facility; and

(C) The proposed facility is compatible with other adjacent uses or will be made compatible through measures designed to reduce adverse impacts.
** * **

Findings of Fact

Orion provided information about compliance with the Council's Land Use Standard in Exhibit K of the application and elected to have the Council make the land use determination under OAR 345-022-0030(2)(b)(quoted above). The analysis area for the Land Use Standard is the area within the site boundary and one-half mile from the site boundary.

The land use analysis begins with identification of the "applicable substantive criteria" to be recommended by the Special Advisory Group. On August 19, 2005, the Council appointed the Sherman County Board of Commissioners the Special Advisory Group for this application. The Department requested that the Sherman County Commissioners identify the applicable substantive criteria in effect on the date Orion submitted the application (October 12, 2005).[5] The Sherman County Commissioners did not identify any applicable substantive criteria. OAR 345-022-0030(3) provides that if the Special Advisory Group does not recommend applicable substantive criteria, "the Council shall decide either to make its own determination of the applicable substantive criteria and apply them or to evaluate the proposed facility against the statewide standards."

[5] Request for Comments on Completeness of the Application, dated October 13, 2005.

The Council finds that Article 5 of the Sherman County Zoning Ordinance (SCZO) contains the applicable substantive criteria for the proposed project.[6] The Sherman County Commissioners recommended SCZO Article 5 as the applicable substantive criteria for a wind facility site certificate application filed a few months prior to the Biglow application.[7] In addition, Article 5 satisfies the other requirements of "applicable substantive criteria" provided in OAR 345-022-0030(3): Article 5 provides criteria from Sherman County's acknowledged comprehensive plan and land use ordinances that are required by the statewide planning goals and in effect on the date the applicant submitted the application.

The Council's Land Use Standard (OAR 345-022-0030) must be applied in conformance with the requirements of ORS 469.504. The Oregon Supreme Court recently held that "under ORS 469.504(1)(b) and (5), the council may choose to determine compliance with statewide planning goals by evaluating a facility under paragraph (A) or (B) or (C), but … it may not combine elements or methods from more than one paragraph, except to the extent that the chosen paragraph itself permits." *Save Our Rural Oregon et al. v. Energy Facility Siting Council*, 339 Or 353, 367 (2005).

The Council may find compliance with statewide planning goals under ORS 469.504(1)(b)(A) if the Council finds that the proposed facility "complies with applicable substantive criteria from the affected local government's acknowledged comprehensive plan and land use regulations that are required by the statewide planning goals and in effect on the date the application is submitted." For the reasons discussed below, the Council finds that the proposed facility does not comply with all of the applicable substantive criteria.

If the Council finds that the proposed facility does not comply with one or more of the applicable substantive criteria, then the Council must proceed under ORS 469.504(1)(b)(B) and must determine whether the proposed facility "otherwise [complies] with the applicable statewide planning goals."[8] The Court held in *Save Our Rural Oregon* that "paragraph (B) necessarily requires an evaluation of the same applicable substantive criteria as paragraph (A) and, to the extent those criteria are not met, directs the council to consider statewide planning goals." The Council finds that the applicable statewide planning goal is Goal 3 and that an exception to Goal 3 is justified, for the reasons discussed below.

The substantive criteria contained in Article 5 of the SCZO are in Sections 5.2 and 5.8 of the ordinance. The other sections of the article are procedural. The Council makes findings regarding these criteria as discussed below.

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[6] Compatibility with the Sherman County Comprehensive Plan (SCCP) is required by SCZO Section 5.2.1.
[7] *See* Draft Proposed Order, In the Matter of the Application for a Site Certificate for the Klondike III Wind Project, at 21.
[8] Where the special advisory group does not recommend applicable substantive criteria within the stated time, the Council may elect, under ORS 469.504(1)(b)(C), (5), to evaluate a proposed facility solely against applicable statewide planning goals. However, for the reasons stated above, the Council finds that SCZO Article 5 provides the applicable substantive criteria. Therefore, ORS 469.504(1)(b)(C) does not apply.

A. Applicable Substantive Criteria

SCZO Section 5.2: General Criteria

In determining whether or not a Conditional Use proposal shall be approved or denied, it shall be determined that the following criteria are either met or can be met through compliance with specific conditions of approval.

1. The proposal is compatible with the County Comprehensive Plan and applicable Policies.

2. The proposal is in compliance with the requirements set forth by the applicable primary Zone, by any applicable combining zone, and other provisions of this Ordinance that are determined applicable to the subject use.

3. That, for a proposal requiring approvals or permits from other local, state and/or federal agencies, evidence of such approval or permit compliance is established or can be assured prior to final approval.

4. The proposal is in compliance with specific standards, conditions and limitations set forth for the subject use in this Article and other specific relative standards required by this or other County Ordinance.

5. That no approval be granted for any use which is or expected to be found to exceed resource or public facility carrying capacities, or for any use which is found to not be in compliance with air, water, land, and solid waste or noise pollution standards.

6. That no approval be granted for any use violation of this Ordinance.

SCZO Section 5.2.1: Compatibility with the Comprehensive Plan

SCZO Section 5.2.1 requires that the proposal (construction and operation of the facility) be compatible with the SCCP and applicable policies. SCCP Sections I through X contain an introduction, definitions and procedural directives to the county commissioners. These sections do not contain applicable substantive criteria. Sections XI through XVI articulate the County's substantive land use goals. In addition, Section XVIII provides requirements for certain land designations. Each Section contains findings and goals, and policies designed to further the goals. Several goals address specific resources within the County that would not be affected in any way by the proposed facility: Goal VII (aggregate resources), Goal IX (BLM lands), Goal XII (use of resources within the Deschutes and John

Day Oregon State Scenic Waterways) and Goal XVI (affordable housing).[9] Additionally, Goal VIII calls for an investigation of ground water resources. The proposed use would not conflict with an investigation of ground water resources, and, for the reasons discussed in the Public Services Standard section of the order, the facility would not have a significant adverse impact on ground water. The proposed facility is compatible with the remaining goals and applicable policies for the reasons discussed in the sections that follow.

(a) Goal V: Quality of the Physical Environment

Goal V: Improve or maintain the existing quality of the physical environment within the County. [SCCP Section XI]

Biglow would maintain the existing quality of the physical environment within the County. The two policies under SCCP Goal V are not applicable to Biglow. Policy I "recognizes…recommendations for a state-wide non-point source pollution control program." Neither construction nor operation of the facility will create a pollution source. Policy II requires that erosion control provisions be incorporated into the subdivision ordinance, which is not applicable to the facility.

Nonetheless, as discussed in the Soil Protection Standard section of the order, the site certificate holder would implement measures to decrease soil exposure during the construction of the facility. The site certificate holder would open the smallest necessary sections of trench during each day of construction, and would backfill the trenches as soon as is practical after the power lines have been set in the trenches. Construction would also take place during the time of year when rainfall is lowest, minimizing erosion from precipitation. Straw bales or similar containment features will be used to protect stockpiles of soil from erosion. Water trucks would be used as needed to keep wind-borne erosion to a minimum. After construction, the staging locations would be brought back to their original contours, covered in topsoil, and revegetated or prepared for planting of wheat or barley or use as range land. Finally, the facility would be constructed pursuant to an NPDES General Construction Stormwater (1200-C) Permit issued by the DEQ. The NPDES permit would require the use of best management practices to minimize the potential for erosion.

(b) Goal VI: Natural Hazards

Goal VI: To protect life and property from natural disasters and hazards. [SCCP Section XI]

The proposed facility would meet the requirements of Goal VI. Policy I under Goal VI requires the evaluation of lands designated as potential natural hazard areas before construction of any permanent structure. The facility site contains no lands designated as potential natural hazard areas. Nonetheless, as discussed in the Structural Standard section of the order, the certificate holder would conduct appropriate site-specific geotechnical

[9] The project's effects on the scenic quality of the State Scenic Waterways is addressed in relation to SCCP Goal X (Landscape) and in relation to the discussion of the Scenic and Aesthetic Values Standard it the order. The project's effects on housing availability are discussed in relation to the Public Services Standard in the order.

evaluation prior to construction to identify and avoid geological hazards.[10] Policy II under Goal VI is not applicable because it addresses construction within flood-prone areas, and the facility site is not within a flood-prone area.

(c) Goal X: Landscape

Goal X: Preserve the integrity of the Sherman County Landscape. [SCCP Section XI]

The features of the Sherman County landscape are addressed in SCCP Section XI, Finding XI, which identifies rock outcroppings, trees, the John Day River Canyon and the Deschutes River Canyon as the "all-important features of the County's landscape." The Finding also notes certain segments of I-80, US 97, OR 206 and OR 216 were designated as "scenic highways." The facility would preserve the integrity of these landscape features. It would not be located in the John Day River Canyon or the Deschutes River Canyon, and would not be located adjacent to I-80, US 97, OR 206, or OR 216. The facility site contains few significant rock outcrops, and neither construction, nor operation, nor retirement of the facility is anticipated to result in the alteration of significant rock outcroppings.[11] As discussed in the Scenic and Aesthetic Values Standard section of the order, the facility will not have any significant effect on the scenic qualities of any of these resources. The single policy under Goal X calls for retaining trees when practical. The proposed facility would not require the removal of significant numbers of trees, if any.[12]

(d) Goal XI: Fish and Wildlife

Goal XI: To maintain all species of fish and wildlife at optimum levels and prevent the serious depletion of any indigenous species. [SCCP Section XI]

Biglow is compatible with the goal of maintaining fish and wildlife populations. Policy I calls for implementation of fish and wildlife management policies. Construction and operation of the facility would be consistent with the Oregon Department of Fish and Wildlife (ODFW) habitat mitigation goals and standards, and would not cause any significant adverse impact to protected or sensitive plant or animal species, as discussed in the Fish and Wildlife Habitat Standard and the Threatened and Endangered Species Standard sections of the order. About 93 percent of the land permanently affected and 95 percent of the land temporarily affected by the proposed facility is either cultivated agricultural land or developed land, and designated as Habitat Category 6 (habitat that has low potential for becoming essential or important habitat for fish and wildlife).

Policy II under Goal XI does not apply to the proposed facility because it addresses range management programs. Policy III calls for consideration of retention of fence rows, ditch banks and brush patches for wildlife use. Biglow would not remove any of these habitats. Policy IV does not apply because it addresses maintenance by ODFW of "existing

[10] App, Ex. H, page H-3.
[11] App, Ex. R, page R-9.
[12] App, pages K-13, R-9.

habitat plantings and water developments constructed for wildlife use." Policy V addresses the use of pesticides that have "low toxicity to wildlife, fish and people." Pesticides would not be used during construction and operation of the proposed facility. Herbicides might be used for weed control, and, as addressed in the Siting Standards for Wind Facilities section of the order, a weed management plan would be implemented in consultation with the Sherman County Weed Control District and the Department. Policy VI does not apply because it addresses habitat quality on Rufus Bar and Maryhill Islands. Biglow would not affect these areas.

(e) Goal XIII: Plant and Animal Diversity

Goal XIII: Attempt to maintain the diversity of plan [sic] *and animal species within the County. [SCCP Section XI]*

The two policies under Goal XIII encourage preservation of sites or areas considered "critical habitat." Goal XIII and its accompanying policies are phrased in aspirational rather than mandatory language. Nevertheless, the proposed facility is compatible with Goal XIII based on findings in the Fish and Wildlife Habitat Standard and Threatened and Endangered Species Standard sections of the order.

(f) Goal XIV: Social Services and Public Facilities

Goal XIV: To improve or maintain the current level of social services available with the County and to assure the provision of public facilities consistent with the intensity of land use. [SCCP Section XII]

There are twenty specific policies under Goal XIV, but many of these policies are inapplicable to the proposed facility. Polices that are applicable to the proposed facility are discussed below. The facility would meet the requirements of each applicable policy. In addition, the overall concern of Goal XIV is the adequacy of public services in Sherman County. We address the effect of the proposed facility on the delivery of public services in the analysis area in the Public Services Standard section in the order. Based on the findings in that discussion and the discussion here, the proposed facility is compatible with Goal XIV.

Policies X, XII, and XX address the adequacy of roads and transportation services in the County and are applicable to the facility. In relevant part, Policy X provides that "the County road system shall be maintained and improved consistent with the needs of the Sherman County citizenry." The conditions below for road maintenance and improvement would improve the quality of the roads and have a beneficial impact on traffic safety. To find that Orion satisfies the requirements of Policy X, the Council adopts the following conditions in the site certificate:

(17) The certificate holder shall construct the public road improvements described in the site certificate application to meet or exceed road standards for the road classifications in the County's Transportation System Plan and Zoning Ordinance because roads will require a more

substantial section to bear the weight of the vehicles and turbine components than would usually be constructed by the County.

(18) The certificate holder shall ensure that no equipment or machinery is parked or stored on any county road except while in use.

Policy XII provides that the "construction of new public roads and highways shall be located whenever possible to avoid dividing existing farm units." Orion will not build any new public roads or highways as part of the facility. However, Orion stated in the ASC that it would design and construct new private access roads to minimize dividing existing farm units.[13] The Council adopts the statement as the following condition in the site certificate:

(19) The site certificate holder shall design and construct private access roads to minimize the division of existing farm units.

Finally, the proposed facility would be compatible with Policy XX, which contains the County's transportation planning policies.[14] Subsection A.1 does not apply because the facility is not a public road or highway project, and A.2 does not apply because no new public roads would be built for the proposed facility. Subsection A.3, provides that "maintenance, repair and preservation of existing transportation facilities shall be allowed without land use review, except where specifically regulated." As noted above, Orion would improve segments of existing County roads to meet or exceed County standards because certain roads will require a more substantial section to bear the weight of the vehicles and turbine components than would usually be constructed by the County. Subsections A.4 and A.5 do not apply to the facility, because the improvements are not designated in the Transportation Service Plan, and the facility does not require an Environmental Impact Study or Environmental Assessment. Section B, concerning local-state coordination policies, is not applicable to the facility. Subsection B.2. requires the County to provide notice to the Oregon Department of Transportation (ODOT) of land-use applications for properties that have direct frontage or direct access onto a state highway. The facility will not have direct frontage or access onto any state highway or road. Section C concerns protection of transportation facilities, and requires the County to protect the function of existing and planned roads and consider a proposal's impact on existing or planned transportation facilities. As described above, the project is consistent with the Policy X requirement to maintain and improve the County road system consistent with the needs of the Sherman County citizenry. In addition, traffic impacts would not be significant. Some minor local traffic delays might occur during the construction period, but the roads near the facility site are not heavily used and alternative routes are available for local traffic.

Policy XV, also related to transportation, requires that the Wasco State Airport be protected from incompatible land uses. As discussed in the Siting Standards for Wind Energy

[13] App. Page K-17

[14] The county's "transportation system plan" is incorporated in SCZO Sections 3.1.3(f) and 4.14. *See* Draft Proposed Order, In the Matter of the Application for a Site Certificate for the Klondike III Wind Project, at 25 n.33 (referencing personal communication with Georgia Macnab, Sherman County Planning Director).

Facilities section of the order, the certificate holder would install and maintain aviation warning lights on the turbine strings as required by Federal Aviation Administration (FAA) safety regulations. The proposed facility is also subject to review by the FAA for a determination of whether the facility would interfere with flight paths. As discussed in the Public Health and Safety Standards for Wind Energy Facilities section in this order, the certificate holder would submit a Notice of Proposed Construction or Alteration to the Federal Aviation Administration identifying the proposed final locations of the turbines and related or supporting facilities.

Other applicable policies include IV, VI, and VIII, which deal with the adequacy of hospital, school, and sanitary landfill services, respectively. As discussed in both the Public Services Standard and the Waste Minimization Standard sections of the order, the facility would not have any adverse impacts on the availability of these services.

Finally, Goal XIV contains two applicable economic development policies, I and IX. Policy I encourages business growth consistent with population growth and the other policies of the SCCP. Policy XIX encourages increased economic diversity and creation of long-term employment opportunities, although not to the detriment of existing residential structures. The facility would require about 15 to 20 permanent employees once operational, in addition to an estimated 250 workers at peak construction periods during the construction process. The facility would also increase economic diversity in the County by providing jobs outside the agricultural sector. The facility would not affect existing residential structures. As discussed herein, Biglow would be consistent with the other policies of the SCCP. The project is thus consistent with Policies I and XIX.

(g) Goal XV: Cultural Resources

Goal XV: To protect historical, cultural and archeological [sic] resources from encroachment by incompatible land uses and vandalism. [SCCP Section XII]

As discussed in the Historic, Cultural and Archaeological Resources Standard section of the order, historic, cultural and archaeological resources would be protected during construction and operation of the proposed facility. Policy I identifies specific areas and structures considered historically, archaeologically or culturally significant, and Policy II calls for protection of these areas. The proposed facility is consistent with the County policies because it would not affect any of these significant areas or structures. The Oregon Trail is shown to pass through the southern portion of the facility area and is intersected by several existing roads: Emigrant Springs Road, Oehman Road, and Medler Lane, and six turbine strings (shown on Figure 1, attached to Supp. Exhibit S). In addition, the trail would be intersected by a proposed overhead transmission line between Beacon Road and Oehman Road.

The facility area has long been under intensive cultivation and each of the areas mentioned above is currently in wheat production. Each turbine string was examined for evidence of archaeological and historical cultural resources, including the trail, and no physical evidence of the trail was observed, likely due to farming of the area. If intact

segments of the trail were discovered at a later date, the certificate holder would avoid any adverse impacts to the trail.

(h) Goal XVII: Economic Base and Viability of Agriculture

Goal XVII: Diversify the economic base of the County and maintain the viability of the agricultural sector. [SCCP Section XIV]

The five policies under Goal XVII are not directly applicable to the proposed facility. Policy II, which calls for the adoption of zoning and other necessary ordinances "to assure conservation and retention of agricultural lands in agricultural uses," applies indirectly through the provisions of the SCZO that address protection of agricultural uses (see discussion of SCZO Section 5.8.16 below). The project is consistent with the language of the goal itself. It would diversify the economic base of the County by providing non-agricultural sector jobs and investment. The project would also help to maintain the viability of the agricultural sector by being compatible with surrounding farm uses and providing a stable source of revenue, through wind facility lease payments, to farm operators.

(i) Goal XVIII: Energy Resources

Goal XVIII: Conserve energy resources. [SCCP Section XV]

Policy I under Goal XVIII calls for cooperation in the use and development of renewable resources. The proposed facility is a renewable resource energy project. Policy II concerns "pumped storage" and is inapplicable to the proposed facility. Policy III requires "new high voltage electrical transmission lines with nominal voltage in excess of 230 kV" to be constructed within or adjacent to existing electrical transmission line right-of-way. The applicant proposes two transmission-line alternatives for the project. Either line would be 230-kV to 500-kV and, to comply with Policy III, must therefore be "within or adjacent to" an existing transmission line right-of-way. The Applicant has not demonstrated that either line would be within or adjacent to such a right-of-way. Accordingly, the Council finds that the proposed transmission lines do not comply with SCCP Goal XVIII, Policy III and as a result do not comply with SCZO Section 5.2.1. However, the Council finds that the transmission lines are in compliance with applicable statewide planning goals, as required by ORS 469.504(1)(b)(B) and discussed below. Policy IV is inapplicable to Biglow because it concerns integration of transportation services at Biggs Junction.

(j) Goal XIX: Orderly Use of Lands

Goal XIX: To provide an orderly and efficient use of the lands within Sherman County. [SCCP Section XVI]

With the exception of Policy IV, the five policies under Goal XIX are not applicable to the proposed project. Policy IV states that "commercial businesses, except those related to agricultural uses, should be located within incorporated cities." The proposed facility is a "commercial utility facility," which is a use specifically conditionally allowable in Sherman County's Exclusive Farm Use Zone.

SCZO Section 5.2.2: Compliance with Zoning Requirements

The proposal is in compliance with the requirements set forth by the applicable primary Zone, by any applicable combining zone, and other provisions of this Ordinance that are determined applicable to the subject use.

(a) Applicable Primary Zone and Applicable Combining Zone

Under SCZO Section 5.2.2, the proposed facility must comply with the requirements of the applicable primary zone and any applicable combining zone. The proposed facility would be located entirely within an Exclusive Farm Use zone, which is designated "F-1" under SCZO Section 3.1. There is no applicable combining zone.

Section 3.1.2 lists uses permitted outright in the F-1 zone, and subsection (g) allows "reconstruction or modification of public roads." The proposed facility would include improvement of certain segments of public roads to support the weight of vehicles and turbine components.[15]

Section 3.1.3 lists uses "and their accessory uses" conditionally permitted in the F-1 zone. Subsection 3.1.3(e)(17) conditionally allows "operations conducted for" "commercial utility facilities." SCZO Section 1.4.136 defines a "utility facility" to include "any major structure owned or operated by a…private…electric…company for the generation, transmission, distribution or processing of its products…but excluding local…power distribution lines, and similar minor facilities."[16] SCZO Section 1.4.6 defines "[a]ccessory use or structure" as "[a] use or structure, or a portion of a structure, the use of which is incidental and subordinate to the main use of the property or structure and located on the same premises as the main or primary use and/or structure." The proposed wind turbines and meteorological towers, power collection system, aboveground transmission line, substation, site control and

[15] Section 3.1.2, which lists permitted uses in the F-1 zone is not entirely consistent with ORS 215.283(1). ORS 215.283(1) lists uses that are permitted under state law and includes "utility facilities necessary for public service" (ORS 215.283(1)(d)) and "reconstruction * * * of public roads, *including the placement of utility facilities overhead and in the subsurface of public roads and highways along the public right of way* * * *" (ORS 215.283(1)(L)(emphasis added)). While SCZO Section 3.1.2(g) contains the introductory language for 215.283(1)(L) permitting "reconstruction or modification of public roads," it does not contain the additional language permitting placement of utilities "along the right-of-way." However, the county cannot narrow the application of uses permitted under ORS 215.283(1). *Brentmar v. Jackson County*, 321 Ore. 481; 900 P.2d 1030; 1995 Ore. LEXIS 93 (1995). Furthermore, ORS 758.010 grants to any person or corporation the right to place utility service lines along public roads. Thus, under ORS 215.283(1)(L), utility facilities such as transmission lines and junction boxes may be placed in the public right-of-way as a matter of right.

[16] SCZO Section 3.1.3(e)(17) appears to be modeled on ORS 215.283(2)(g), which conditionally allows "commercial utility facilities for the purpose of generating power for public use by sale." However, the definition of "utility facility" in SCZO Section 1.4.136 is overbroad and includes some utility facilities, such as transmission lines, that are permitted outright under ORS 215.283(1)(d), subject to compliance with ORS 215.275. Thus, under SCZO Section 3.1.3, some uses that are allowed outright under applicable state law are improperly subjected to additional conditions under SCZO Section 3.1.3. *Brentmar v. Jackson County*, 321 Ore. 481; 900 P.2d 1030; 1995 Ore. LEXIS 93 (1995).

data acquisition system, and the O&M building are structures that meet the definition of a "utility facility."[17]

The proposed access roads are "transportation improvements" that are separately allowed as a conditional use under SCZO Section 3.1.3(f).[18] "Transportation improvements" are subject to four requirements (in addition to the other applicable requirements of Article 5). The proposed access roads comply with these four requirements. Subsection (A) requires that the project be designed to be compatible with existing land use and social patterns, including noise generation, safety, and zoning. The access roads will be compatible with existing land

[17] The proposed meteorological towers and O&M building may alternatively be allowed as "accessory uses" rather than being considered parts of the "utility facility." The power collection system and the substations might also be considered "accessory uses," but we believe that these structures fit more directly within the definition of utility facility structures for "transmission, distribution or processing" of electricity.

The applicant proposes treating the power collection system, the aboveground transmission line, the substation, the meteorological towers, and the O&M building as uses permitted as of right in an F-1 zone by characterizing them as "Non-Commercial utility facilities necessary for private service or public service," pursuant to SCZO Section 3.1.2(m). App. Page K-6. At Page K-23 of the application, the applicant also suggests that the access roads are governed by 3.1.2(m), although at Page K-6 the applicant treats them as "transportation improvements" subject to SCZO Section 3.1.3(f)(1). The Council rejects this interpretation of SCZO Section 3.1.2(m), and instead treats these elements of the proposed facility as components of a "commercial utility facility," a conditional use in an F-1 zone pursuant to SCZO Section 3.1.3(e)(17).

The applicant argues that "commercial utility facility" is an implementation of ORS 215.283(2)(g), which concerns "commercial utility facilities for the purpose of generating power for public use by sale" and that "non-commercial utility facilities necessary for private service or public service" is an implementation of ORS 215.283(1)(d), which concerns "utility facilities necessary for public service." The applicant thus separates the power-generating component of the facility (the turbines) from the other components of the facility necessary to make the power available. However, the SCZO makes a distinction between "commercial" and "non-commercial" utility facilities, rather than between facility components for power generation and those necessary to make the power available. The primary purpose of the proposed facility, to sell the power generated by connection to the energy grid, is consistent with the plaint meaning of "commercial." It would therefore be contrary to the plain language of the SCZO to treat any component of the facility necessary to sell the power through the grid as a "non-commercial utility facility." Additionally, while the SCZO does not specifically define "commercial," it treats at least some operations accessory to the growing of crops and livestock and used in their distribution and sale, such as processing, packaging, and reshipment facilities, as "*commercial* activities in conjunction with farm use." Finally, the Department's recommended interpretation is supported by the Sherman County Planning Director, and all similar previously permitted wind facilities have had components such as the collection system and O&M buildings reviewed as "commercial utility facilities." *See* Letter from Georgia L. Macnab, Sherman County Planning Director, April 20, 2006.

[18] The proposed access roads may also be considered an "accessory use," which is defined at SCZO Section 1.3.6 as "a use or structure, or a portion of a structure, the use of which is incidental and subordinate to the main use of the property or structure and located on the same premises as the main or primary use and/or structure." In addition to being a use "incidental and subordinate" to the main use of the property, and located within the same lease area, the access roads are necessary to the construction and operation of the facility. However, the Council need not decide in this instance whether characterizing the access roads as an "accessory use" would be more appropriate than characterizing them as "transportation improvements." Treating the access roads as "transportation improvements" subjects them to all the same requirements as would treating them as an "accessory use," in addition to the requirements that are specific to "transportation improvements," and the Council finds that the access roads comply with the requirements that are specific to "transportation improvements."

use patterns. As discussed below, in reference to SCZO 5.8.16, the proposed facility, including the access roads, will be compatible with farm uses (the primary land use in the vicinity). In addition, the roads will provide improved access by land managers and farmers to their fields. Trips on the roads generated by the 15 to 20 operational staff of the facility will not cause a perceptible increase in traffic in the vicinity. Finally, as discussed in the Noise Control Regulations section of the order, the access roads would meet DEQ noise standards.

Subsection (B) requires that the project be designed to minimize unavoidable environmental impacts to identified wetlands, wildlife habitat, air and water quality, cultural resources, and scenic qualities. The new access roads will minimize unavoidable environmental impacts to these resources as discussed in the Removal-Fill Law, Public Services, Fish and Wildlife Habitat, Threatened and Endangered Species, Scenic and Aesthetic Values, Historic, Cultural, and Archaeological Resources, and Recreation sections of the order.

Additionally, the construction and use of the access roads will not create substantial adverse air quality impacts. Construction of the roads may create dust, but, as discussed in the Soil Protection Standard section of the order, the applicant would use standard best management practices to control dust and wind erosion, such as sprinkling the site with water periodically. Subsection (C) requires that the project "preserves or improves the safety and function of the facility through access management, traffic calming, or other design features." General usage of the public roads intersecting the proposed access roads is low, and the trips on the access roads generated by the 15-to-20 operational staff will not have a significant impact on traffic. Therefore, the Council finds that the access roads preserve the safety and function of intersecting public roads without the need for access management, traffic calming, or other design features.

Subsection (D) requires that the project "includes provision for bicycle and pedestrian circulation as consistent with the comprehensive plan and other requirements of this ordinance." As discussed below, SCZO Section 4.15, which relates to pedestrian and bicycle facilities, is not applicable to the proposed facility. There are no other provisions of the SCCP or SCZO that would require bicycle and pedestrian facilities for the proposed facility.

The conditional uses listed in SCZO Section 3.1.3 and their "accessory uses" are permitted in an F-1 zone "when authorized in accordance with the requirements of Article 5 of this Ordinance and this Section." In context, "this Section" includes the dimensional standards of Section 3.1.4. The wind turbines, O&M building, substations, and meteorological towers are "buildings" under the definition in SCZO Section 1.4.20 and are therefore subject to applicable setback requirements. In the ASC, the Applicant provided a site plan for the proposed facility showing the location of these structures and stating that all of the turbines and above-ground elements of the proposed facility would be located at least 50 feet from any property line.[19] However, the applicant later found that the 50-foot setback requirement would apply to residential structures and that the setback requirement applicable to non-residential structures is 30 feet from the property line. The applicant requested that it

[19] App p. K-8 and Appendix C-2.

be held to the setback requirement applicable to non-residential structures, not to include aboveground transmission and collector lines and junction boxes. Article 4 of the SCZO contains "Supplementary Provisions," and Sections 4.2 and 4.9 are applicable to the proposed use. Section 4.2 prohibits projections from buildings by more than 2 feet into a required setback, and the proposed facility would not have such projections.

In Condition (20) of the draft proposed order, the Department recommended a 50-foot setback for all aboveground facility structures, based on the applicant's statement in the application. In its comments during the public hearing process, the applicant asked that aboveground power collection and transmission lines and junction boxes be excluded from the 50-foot setback condition so as not to interfere with farm operations. SCZO Section 3.1.4 requires a setback of 30 feet from the property line, "except that the front yard setback requirement from the right-of-way line of an arterial or major collector road or street shall be 50 feet unless approved otherwise by the Planning Commission." For most of the aboveground structures, the ordinance requires a 30-foot setback. There are no arterials or major collector roads in the project area, so SCZO 3.1.4 does not require a 50-foot setback for any of the facility structures.[20] The Department recommended revising Condition (20) to make it consistent with SCZO Section 3.1.4. However, exclusion of the aboveground power collection and transmission lines and junction boxes from the setback requirements, as requested by the applicant, would conflict with SCZO Section 3.1.4. The Council finds that the facility does not meet SCZO Section 3.1.4 if the site certificate condition removes the aboveground power collection and transmission lines and junction boxes from the setback requirements.

Under ORS 469.504(1)(b)(B), if a facility does not meet the applicable substantive criteria recommended by the special advisory group pursuant to ORS 469.504(5), the Council may nevertheless approve the facility if it complies with applicable statewide planning goals. The applicable statewide planning goal is Goal 3, which is the state's Agricultural Lands goal. The facility's compliance with Goal 3 is discussed below. Goal 3 requires that non-farm uses within exclusive farm use zones not have significant adverse effects on accepted farm or forest practices. The applicant noted that the permanent occupation of farmland by facility structures could cause some small-scale changes in agricultural practices, including changes in harvest patterns.[21] To avoid these impacts as a result of placement of aboveground collection and transmission lines and junction boxes, the Council finds that the proposed aboveground collection and transmission lines and junction boxes should be located along property lines and rights-of-way where practicable. The Council modifies Condition (20) by removing aboveground power collection and transmission lines and junction boxes from the setback requirements and modifies Condition (21) to require placement of transmission lines and junction boxes along road rights-of-way or property lines to the extent practicable.

The Council adopts the following condition in the site certificate:

[20] Letter from Georgia MacNab, Sherman County Planning Director, dated June 1, 2006.
[21] App. Page K-5.

(20) The certificate holder shall not locate any aboveground facility structure (including wind turbines, O&M building, substations, and meteorological towers, but not including aboveground transmission and collector lines and junction boxes) within 30 feet from any property line or within 50 feet from the right-of-way of any arterial or major collector road or street and shall not allow any architectural feature, as described in Sherman County Zoning Ordinance Section 4.2, to project into these required setbacks by more than 2 feet.

(b) Other Applicable Provisions

In addition to consideration of the requirements of the primary zone and any combining zone, Section 5.2.2 requires consideration of other provisions of the SCZO that are determined "applicable to the subject use." Many provisions of the SCZO are clearly not applicable to the proposed facility, and are not discussed here. SCZO Articles 4 (Supplementary Provisions) and 11 (Design and Improvement Standard Requirements) are at least potentially applicable to the proposed project, and are considered below.

Sections 4.9 and 4.13 are applicable to the proposed facility. Section 4.9 provides: "Approval of any use or development proposal pursuant to the provisions of this Ordinance shall require compliance with and consideration of all applicable State and Federal agency rules and regulations." This provision is similar to language in the Council's General Standard of Review, which requires a finding that "except for those statutes and rules for which the decision on compliance has been delegated by the federal government to a state agency other than the Council, the facility complies with all other Oregon statutes and administrative rules identified in the project order." ORS 469.503(3). The project order for the proposed facility identifies all applicable state agency permits, rules and regulations. The Department's recommendations regarding the General Standard of Review are discussed above.

Exhibit E of the application identifies the applicable federal agency rules and regulations. Federal agencies having regulations that are potentially applicable are the FAA, the U.S. Army Corps of Engineers (USACOE), the Bonneville Power Administration (BPA), and the United States Fish and Wildlife Service (USFWS).

As discussed in the Public Health and Safety Standards for Wind Energy Facilities section of the order, the certificate holder will file the required Notice of Proposed Construction or Alteration with the FAA and will notify the Department as soon as the FAA's response has been received. The USACOE administers the Section 404 permit program under the Clean Water Act, which addresses fill activities in of waters of the United States including wetlands. The applicant states that the facility is covered by USACOE Nationwide Permit Number 12, which covers construction, maintenance, and repair of utility lines and associated facilities in waters of the United States, provided the discharge from the facility does not cause the loss of more than one-half of an acre of waters of the United States and the length of fill does not exceed 50 linear feet. This permit is self-executing, so no further permission or permitting action from the USACOE is required for the project. The BPA will lead review of the facility's interconnection to BPA's transmission system under the National Environmental Policy Act (NEPA). The NEPA review (in the form of an Environmental Impact Statement)

will include review under the Endangered Species Act, the National Historical Preservation Act, and related cultural resources protection statutes. No formal consultation with the USFWS is needed, because no federal license, permit, or authorization is required for the project under the Endangered Species Act. The Council finds that the proposed facility complies with SCZO Section 4.9.

Section 4.13 contains conditions that the County "may require…for development proposals." The section is a list of discretionary conditions rather than substantive standards. In issuing a Conditional Use Permit for the proposed facility, the County would be bound by the conditions listed in the site certificate.[22] The Department has consulted with the Sherman County Planning Department regarding proposed site certificate conditions.

The other sections in Article 4 are not applicable. Sections 4.1 and 4.3 do not apply in an F-1 zone. Section 4.2, governing projections from buildings, applies in an F-1 zone; however, each of the structures proposed for the facility will meet setback requirements even when any "projections" from the structures are taken into account. None of the structures need rely upon the 2-foot allowance for "projection" into the setback zone. Sections 4.4, 4.5, 4.6, 4.7, 4.8, 4.11 and 4.12 apply to residential uses, and therefore these sections do not apply to Biglow. Section 4.10 applies to "divisions of land within the F-1 zone." The proposed use does not require a division of land, and therefore Section 4.10 is not applicable.

Section 4.14 contains the county's access management policies. Section 1.4.5 defines "access management" as "the process of providing and managing access to land development while preserving the flow of traffic in terms of safety, capacity and speed." Section 1.4.62 defines "land development" as "any subdivision or partition of land, or any other division of land provided for in this Document." Because the proposed facility does not involve a division of land, Section 4.14 is not applicable. Section 4.15 is intended to provide for "safe and convenient pedestrian, bicycle and vehicular circulation consistent with access management standards and the function of affected streets." As noted, the access management standards do not apply to the proposed facility. In addition, the specific standards under Section 4.15 are directed at "developments," and the proposed project does not involve a division of land. Section 4.15 is not applicable.[23]

According to Section 11.1, the requirements of SCZO Article 11 apply to "any land division or development and the improvements required, whether by subdivision, partitioning, creation of a street or other right-of-way, zoning approval, or other land development requiring approval pursuant to the provisions of this Ordinance." SCZO Section 1.4.62 defines "land development" as "any subdivision or partition of land, or any other division of land provided for in this Document." The proposed facility would not require any land division or land development. For that reason, the Council finds that Article 11 of the SCZO does not apply to the proposed facility.

[22] ORS 469.401(3).

[23] The Department confirmed this interpretation of the SCZO with Sherman County Planning Director Georgia Macnab in a personal communication on October 3, 2005. *See* Draft Proposed Order, In the Matter of the Application for a Site Certificate for the Klondike III Wind Project, at 27 n.37.

SCZO Section 5.2.3: Other Local, State and Federal Permits

Section 5.2.3 addresses any required approvals or permits from "other local, state and/or federal agencies" and requires evidence of approval or permit compliance. In context, "other" local agencies means local agencies other than the Sherman County Planning Commission. As discussed in the Retirement and Financial Assurance Standard and Waste Minimization Standard sections of the order, the certificate holder will obtain a building permit and a local on-site sewage permit that would be required prior to construction. These are construction-related permits that are not subject to Council approval.[24] Orion applied to the Oregon Department of Environmental Quality (DEQ) for an NPDES 1200-C General Construction Storm Water permit, and DEQ has issued a permit for the facility.[25] Orion also has applied to DEQ for a Wastewater General Permit 1700 in the event it needs to wash turbine blades. As discussed in the Waste Minimization Standard section of the order, the certificate holder will provide the Department with a copy of the permit once it is issued by DEQ. The project order for the proposed project identifies all applicable state agency permits and approvals. The Department's recommended findings regarding applicable state agency permits, rules and regulations are summarized below. Compliance with federal permitting requirements is discussed in reference to SCZO 5.2.2, above.

SCZO Section 5.2.4: Compliance with Specific Standards, Conditions and Limitations

Section 5.2.4 requires compliance with "specific standards, conditions and limitations set forth for the subject use" in Article 5 and "other specific relative standards required by this or other County Ordinance." Applicable substantive criteria contained in other Articles of the SCZO are discussed in Section 5.2.2. The substantive criteria contained in Article 5 of the SCZO are in Sections 5.2 and 5.8 of the ordinance. We discuss Sections 5.2.1, 5.2.2 and 5.2.3 above, and we discuss Sections 5.2.5 and 5.2.6 below. Section 5.8 provides standards specific to various conditionally permitted uses, including the uses at issue here, and we discuss these standards below. The Council finds that the application, as conditioned, will comply with all provisions in Article 5 and other standards required by the SCZO.

SCZO Section 5.2.5: Resource Carrying Capacity and Pollution Standards

Section 5.2.5 prohibits land use approval if the use exceeds "resource or public facility carrying capacities" or does not comply with "air, water, land, and solid waste or noise pollution standards."

As discussed in the Public Services Standard and the Waste Minimization Standard sections of the order, the facility would not have any adverse impact or otherwise exceed the "carrying capacity" of public facilities. Neither would the project exceed resource carrying

[24] ORS 469.401(4). The Facility does not require a Water Pollution Control Facility (WPCF) for the on-site septic system because it would have a design capacity of less than 2,500 gallons-per-day and not produce effluent greater than residential strength wastewater. OAR 340-071-0130; *see also* Draft Proposed Order, In the Matter of the Application for a Site Certificate for the Klondike III Wind Project, at 29 n.39.

[25] App. Supp. Page E-1.

capacities. The construction and operation of the facility would not injure existing water rights or exceed the amount of water available for beneficial use within the watershed. As discussed below, the facility would occupy a minimal percentage of the both the County's and the surrounding area's farmland.

The proposed facility would comply with all air, water, land and solid waste or noise pollution standards. It would have no emissions that would result in an adverse impact to air quality. Water used for construction-related purposes would evaporate or infiltrate into the ground on-site.[26] As discussed in the Waste Minimization Standard section of the order, wastewater contained in portable toilets would be pumped and disposed of by a licensed contractor. Water would not be discharged to wetlands, lakes, rivers or streams, and there would be no adverse impact on water quality.[27] Water used during operation at the O&M building would be disposed of in an approved on-site septic system and would not result in an adverse impact on water quality or affect any public sewer facilities. The amount of water used during operation would be insignificant. As discussed in the Public Services Standard section of the order, the facility would obtain water for use during operation from an on-site well, and thus there would be no demand on public facilities to supply water during operation. As discussed in the Soil Protection Standard section of the order, to avoid or reduce soil erosion, the certificate holder would comply with the requirements of the NPDES 1200-C storm water permit and an Erosion and Sediment Control Plan and would implement erosion control measures during construction and operation

Measures to reduce and properly dispose of solid waste are discussed in the Waste Minimization Standard section of the order. The facility would comply with applicable noise control regulations, which we discuss in the Noise Control Regulations section of the order.

SCZO Section 5.2.6: Use Violation

Section 5.2.6 prohibits land use approval for "any use violation of this Ordinance." The proposed facility would not involve any use violations. The proposed principal use is a commercial utility facility, which is a conditional use allowed in an EFU zone under SCZO Section 3.1.3(e)(17). The access roads are transportation improvements, which is a conditional use allowed in an EFU zone under SCZO Section 3.1.3(f). The proposed improvement of public roads within the site boundary is allowed outright in an EFU zone under Section 3.1.2(g).

SCZO Section 5.8: Standards Governing Specific Conditional Uses

Three subsections of SCZO Section 5.8 are applicable to the proposed project. Section 5.8.10 contains standards for "Radio or Television Transmission Tower, Utility Station or Substation." Section 5.8.14 contains standards for "Public Facilities and Services." Section 5.8.16 contains standards for "Non-farm Uses in an F-1 Zone." The other subsections of SCZO 5.8 are not applicable to the proposed facility.

[26] App. Page 0-2.
[27] *Id.*

SCZO Section 5.8.10: Radio or Television Transmission Tower, Utility Station or Substation

When authorized as a Conditional Use, the following standards and limitations apply:

(a) In a residential zone or area, all equipment storage on the site shall be enclosed within a building.

(b) The use may be required to be fenced and provided with landscaping

(c) Coloring of structures, buildings and other permanent installations shall be of neutral colors or as otherwise required by the Commission or reviewing authority.

The proposed facility would include one new substation, in one of two proposed alternative locations. "Substation" is not specifically listed as a conditional use in an F-1 zone, but SCZO Section 3.1.3 authorizes the listed conditional uses "and their accessory uses." As noted in the discussion of SCZO Section 5.2.2, above, the Council finds that the proposed substations are authorized as conditional uses in the F-1 zone because they are "accessory uses" related to a "utility facility" (the wind energy facility).

Subsection (a) of SCZO 5.8.10 does not apply because the substations would not be located in a "residential zone or area." Subsection (b) provides that fencing and landscaping of the proposed use "may be required." As described in the Public Health and Safety Standards for Wind Facilities section of the order, the substation would be fenced. As described in the Siting Standards for Wind Energy Facilities section of the order, the proposed substation building would comply with subsection (c) because it would be painted a neutral color, and substation equipment would incorporate a low-reflectivity finish to minimize visual impact.

SCZO Section 5.8.14: Public Facilities and Services

(a) Public facilities including, but not limited to, utility substations, sewage treatment plants, storm water and water lines, water storage tanks, radio and television transmitters, electrical generation and transmission devices, fire stations and other public facilities shall be located so as to best serve the County or area with a minimum impact on neighborhoods, and with consideration for natural or aesthetic values.

(b) Structures shall be designed to be as unobtrusive as possible. Wherever feasible, all utility components shall be placed underground.

(c) Public facilities and services proposed within a wetland or riparian area shall provide findings that: Such a location is required and a public need exists; and Dredge, fill and adverse impacts are avoided or minimized.

Section 5.8.14 applies to "public facilities," including utility substations and electrical generation and transmission devices. The applicability of Section 5.8.14 is "not limited to" the facilities listed in subsection (a). The Council finds that Section 5.8.14 applies to the proposed facility substation, wind turbines (as "electrical generation devices") and transmission lines (as "electrical transmission devices").

Subsection (a) requires the location of public facilities to "best serve" the County or area, to have "minimum impact" on neighborhoods and to consider "natural and aesthetic values." The wind turbines and associated power collection lines ("electrical generation and transmission devices") would be located to take optimal advantage of the wind resource for power generation. To best serve their intended purpose, the substations and transmission lines that would be part of the proposed facility must be located within the general area of the wind turbines and close to the point of interconnection with the BPA system. The location of these facilities would "best serve" the County or the area because they would use a small fraction of agricultural land (about 0.75 percent of the actively farmed acres adjacent to these facilities) to generate significant new tax revenues for the County and income for the landowners of the property leased to the facility. The facilities would have a "minimum impact on neighborhoods" because they would be located on rural land and not within neighborhoods. The location of the facilities would not have a significant adverse impact on, and would comply with the Council's standards concerning, "natural and aesthetic values," as is discussed in the Threatened and Endangered Species Standard, Fish and Wildlife Habitat Standard, Scenic and Aesthetic Resources Standard, Historical, Cultural and Archeological Resources Standard, Recreation Standard, and Protected Areas Standard sections of the order.

Subsection (b) requires that public facilities be designed to be as "unobtrusive as possible" and requires utility components to be placed underground wherever feasible. However, wind turbines must be mounted on tall tower structures. Likewise, meteorological towers associated with operation of the facility must be aboveground. As discussed in the Siting Standards for Wind Facilities section of the order, the certificate holder would make these facilities as unobtrusive as possible by the use of uniform design and neutral colors. As discussed in the Scenic and Aesthetic Values Standard section of the order, the facility would not have an adverse impact on significant or important scenic resources.

Subsection (c) applies to public facilities proposed "within a wetland or riparian area." No part of the substation, transmission lines, or wind turbines would be located within a wetland or riparian area. We discuss the analysis of area wetlands and other waters of the state in the Removal-Fill Law section in this order.

SCZO Section 5.8.16: Non-farm Uses in an F-1 Zone

> *Non-farm uses, excluding farm related, farm accessory uses or uses conducted in conjunction with a farm as a secondary use thereof, may be approved upon a findings* [sic] *that each such use:*
>
> *(a) Is compatible with farm uses described in ORS 215.203(2);*

(b) Does not interfere seriously with accepted farming practices on adjacent lands devoted to farm use;

(c) Does not materially alter the overall land use pattern of the area;

(d) Is situated upon generally unsuitable land for the production of farm crops and livestock, considering the terrain, adverse soil or land conditions, drainage and flooding, vegetation, location and size of the tract, and the availability of necessary support resources for agriculture;

(e) Complies with other applicable significant resource provisions; and

(f) Complies with such other conditions as deemed necessary.

Although the SCZO allows commercial utility facilities to be located in an F-1 zone, "non-farm uses" must meet the standards contained in SCZO Section 5.8.16. Subsection (a) requires a finding that the proposed use is compatible with farm uses.

The placement of the proposed facility would take very little area out of farm use.[28] The area occupied by the facility is a small fraction of the adjacent farmed area. The permanent footprint of the project would have an impact on about 157 acres of agricultural land within the 25,000 acres of adjacent land under wind energy easement. Construction would have a temporary impact on about 363 acres of agricultural land. Countywide, in 1997 approximately 80 percent of the land was in farmland. Assuming that about 80 percent of the 25,000 acres of land under easement is farmland (about 20,000 acres), then the impact of the permanent facility to the surrounding area would be about 0.80 percent. Even during construction less than 2 percent of the area would be affected.

Farming activities could continue on cropland within the site boundary adjacent to facility structures, especially if facility components are strategically placed to be as compatible as possible with farming.[29] Local farmers would be able to maneuver around the turbine strings and across gravel access roads, with some minor alterations to sowing and harvesting patterns in the immediate vicinity of the turbine springs. As discussed in the Fish and Wildlife Habitat Standard section of the order, the certificate holder would implement a weed control plan to mitigate the spread of weeds to cropland. Landowners would be able to use the new turbine access roads for movement of farm equipment between cultivated fields.

To find that the proposed facility is compatible with the farm uses of the wind easement property, the Council adopts the following conditions in the site certificate:

(21) The certificate holder shall locate access roads and temporary construction laydown and staging areas to minimize disturbance with

[28] **Orion figures:** In 1997, 80 percent of the land in Sherman County was farmland, with 30 percent in harvested cropland. The approximate total acreage is 526, 853 acres. Approximately 157 acres of agricultural land would be disturbed by the completed facility.
[29] App. Ex. K, Attachment K-1 (statements by farmers).

farming practices and, wherever feasible, shall place turbines and transmission interconnection lines along the margins of cultivated areas to reduce the potential for conflict with farm operations. The certificate holder shall place aboveground transmission and collector lines and junction boxes along property lines and public road rights-of-way to the extent practicable.

(22) During operation of the facility, the certificate holder, in cooperation with landowners, shall avoid impact on cultivated land to the extent reasonably possible when performing facility repair and maintenance activities.

Subsection (b) requires that the proposed use "not interfere seriously with accepted farming practices on adjacent lands." "Accepted farming practices" is defined at ORS 215.203(2)(c) as "a mode of operation that is common to farms of a similar nature, necessary for the operation of such farms to obtain a profit in money, and customarily utilized in conjunction with farm use."

Farming on adjacent land consists predominantly of dry land wheat and barley.[30] No cattle grazing is expected to occur in the facility area.[31] Accepted farm practices include soil preparation in the spring and fall, sowing, fertilizing, pest and weed management, and harvesting.[32] Aerial crop dusting is used in some areas.[33]

The Council finds that Biglow would not seriously interfere with accepted farming practices. Construction activities would cause the temporary displacement of crops, and construction traffic could cause temporary delays for farm equipment and trucks. However, the certificate holder will reseed temporarily disturbed areas, and, when construction is complete, farm operators would be able to cultivate the land around the turbine pads. Some minor changes to plowing and harvesting patterns will be required, but none that will seriously interfere with accepted farm practices. Maneuvering large farm equipment around the tight radius of a wind turbine could result in corners or edges that cannot be easily be cultivated, increasing the opportunity for weeds to grow in those spots. Farmers cite weed control in general as a major concern. As described in the Siting Standards for Wind Energy Facilities section of this order, the certificate holder would practice weed control measures during construction and operation of the facility to minimize the spread of weeds. According to Orion, neither local crop dusters nor lease-holding landowners expressed concern about the impact of facility components on the effectiveness of aerial spraying.

To find that the proposed facility can comply with Subsection (b), the Council adopts the following condition in the site certificate:

(23) Where necessary and feasible, the certificate holder shall provide access across construction trenches to fields within the facility site and otherwise

[30] App Page K-4.
[31] App. Page K-25.
[32] App. Page K-4.
[33] App. Page K-25.

provide adequate and timely access to properties during critical periods in the farming cycle, such as harvest.

Subsection (c) requires a finding that the non-farm use would not materially alter the overall land use pattern of the area. The Council finds that approval of Biglow would not materially alter the overall land use pattern of the area. The area within one-half mile of the proposed facility (the "analysis area") consists of wheat or barley crops with some rangeland where the soil is poor or too steep to cultivate. Beyond the analysis area, except for incorporated towns and rural nodes, wheat farming is the main use. In 1997, 80 percent of the land in Sherman County was in farm land, with 30 percent in harvested cropland. Agricultural areas enrolled in the Conservation Reserve Program (CRP) are found throughout the analysis area, occurring as narrow strips in previously plowed drainage ways and as large blocks in other areas. CRP areas have been planted with a mix of native and non-native bunchgrasses with the primary intent of increasing wildlife habitat in the area.[34]

As noted above, the facility would permanently impact only 0.75 percent of the estimated 20,000 acres of the wind lease lands in farmland. The facility would have a similarly minor impact on individual parcels within the facility footprint. The applicant conducted a comparison of the maximum footprint of the facility's permanent infrastructure to the total acreage within the top five landowner parcels (in terms of preliminary siting layout). The percentage of land within each parcel affected by the permanent footprint ranges from between 0.55 percent and 1.66 percent, with an average percentage of 0.98 percent. The footprint of the facility as a percentage of total parcel size is substantially similar or smaller throughout the land area that would be potentially occupied by the facility.

Given evidence that the facility will not have serious impacts on the generally accepted farming practices in the area, it is unlikely that the facility will cause any given parcel in the surrounding area to go out of farm use. Finally, land leases for the placement and operation of the facility provide an additional source of income for the parcel owners, helping to stabilize the inherent volatility of farm income and therefore minimizing the potential for changes in the overall land use pattern of the area.

Subsection (d) requires a finding that the proposed use is "situated upon generally unsuitable land for the production of farm crops and livestock." Orion argues that the land that would be occupied by the proposed facility is unsuitable for the production of farm crops and livestock because the soils "do not support a diversity of crops, nor crops that are high value" and because the soils "also do not generally support livestock in the county." Orion further argues that "there is increasing evidence that maintaining production of wheat and barley on such lands is becoming uneconomic."[35]

The Natural Resources Conservation Service (NRCS) soil survey for Sherman County identifies the soil types within the proposed facility site and classifies soil types into "capability" classes. This classification system shows, in a general way, the suitability of soils

[34] App. Page K-25.
[35] App. Page K-26.

for growing field crops, and subclasses identify limitations or hazards affecting suitability for crop production. The land on which permanent facility structures would be located is not of uniform suitability. Instead, the land is characterized by a mosaic of soil types, predominantly ranging from Class IV (soils that have very severe limitations that restrict the choice of plants or require very careful management, or both.) to Class IIc (soils that have moderate limitations "that reduce the choice of plants or that require moderate conservation practices"; the subclass "c" designation indicates soils that are limited by being very cold or very dry). Nevertheless, Biglow would occupy approximately 157 acres of land that is now used for non-irrigated crop production.[36] The fact of such use demonstrates the "general suitability" for the use. Accordingly, the Council finds that Biglow would be located on land "generally suitable" for crop production and does not comply with SCZO Section 5.8.16(d).

Subsection (e) of SCZO Section 5.8.16 requires that the proposed non-farm use comply with "other applicable significant resource provisions." The Council finds that the proposed facility would comply with the other SCZO provisions applicable to the EFU zone, for the reasons discussed above. Subsection (f) requires compliance with "such other conditions as deemed necessary." The facility would be subject to the conditions of the site certificate.

B. Applicable Statewide Planning Goals

For the reasons discussed above, the proposed facility does not comply with Policy III under SCCP Goal XVIII, and therefore does not comply with SCZO Section 5.2.1, which requires that the proposed facility is compatible with the SCCP and applicable policies. In addition, the proposed facility does not comply with SCZO Sections 3.1.4 and 5.8.16(d). Therefore, the proposed facility does not comply with all of the applicable substantive criteria. Under ORS 469.504(1)(b)(B), the Council must determine whether the proposed facility "otherwise [complies] with the applicable statewide planning goals."

The "applicable statewide planning goal" in this case is Goal 3, the state's Agricultural Lands goal. SCZO Section 5.8.16(d) relates to "non-farm uses in an F-1 zone." SCCP Goal XVIII relates to conservation of energy resources, which does not necessarily invoke Goal 3. However, Policy III concerns the siting of high-voltage transmission lines, and Finding V under Section XV of the SCCP (the Energy section) is that such transmission lines have impacts on farm operations in the County. Because the County's intent in promulgating Policy III is to regulate impacts on farm operations, Goal 3 is an applicable statewide planning goal. No other statewide planning goals are applicable.

As expressed in *Oregon's Statewide Planning Goals and Guidelines*, Goal 3 is:

> ***To preserve and maintain agricultural lands.***
> *Agricultural lands shall be preserved and maintained for farm use, consistent with existing and future needs for agricultural products, forest and open space and with the state's agricultural land use policy expressed in ORS 215.243 and 215.700.*

[36] App. Supp. Page P-6.

Consistent with Goal 3, Sherman County has identified the "F-1" zone as an "exclusive farm use" zone. Under Goal 3, non-farm uses are permitted within a farm use zone as provided under ORS 215.283.

To find compliance with ORS 215.283, the Council must determine whether the proposed energy facility and its related or supporting facilities are uses that fit within the scope of the uses permitted in exclusive farm use zones as described in ORS 215.283(1), (2) or (3). The Biglow project would consist of the energy facility (the wind turbines) and the following related or supporting facilities: the underground and aboveground power collection lines, one substation, up to ten meteorological towers, an O&M building, the control system and access roads.[37]

In the Final Order on Amendment #2 for the Stateline Wind Project, the Council found that a wind energy facility (the "principal use") was a "commercial utility facility for the purpose of generating power for public use by sale" and allowable under ORS 215.283(2)(g). The Council found that the power collector system and meteorological towers were part of the principal use. The Council found that the Stateline substation and the aboveground transmission line connecting the substation with the main power grid were "utility facilities necessary for public service" allowed under ORS 215.283(1)(d). The Council, further, found that the Stateline access roads had "independent utility" and were not part of the principal use. The Council found that the access roads were allowable under ORS 215.283(3).

The Council follows its own precedent in the Stateline decision and finds that the wind turbines constitute a "commercial utility facility for the purpose of generating power for public use by sale" and that the power collection system and meteorological towers are part of that principal use. In addition, the Council finds that the Biglow control system and O&M building are part of the principal use.

The Council finds that the proposed substation and transmission line are a "utility facility necessary for public service" allowed under ORS 215.283(1)(d). The applicant proposes a new substation at one of two potential locations. The first location would be in the southern section of the facility site, and might involve the construction of an overhead high-voltage (230-kV to 500-kV) transmission line about three miles long. The second location would be located near the center of the facility site, and might involve the construction of an overhead high-voltage transmission line about seven miles long. Regardless of the selected location, the substation would function to step up the power to accommodate interconnection with the BPA system, and the overhead transmission line would be used to interconnect with the BPA system.

[37] Under ORS 469.300, the "energy facility" is "an electric power generating plant." Some facility components, such as the control system, might be considered intrinsic to the "electric power generating plant" and therefore part of the "energy facility" rather than separate, related or supporting facilities. The "related or supporting facilities" listed in the text are treated separately in this discussion, without implying any finding that any given component is separate from the energy facility.

Either of these substations and transmission lines would be similar in function to the substation and transmission line at Stateline, which was proposed to step up the power for transmission over a 115-kV or 230-kV line that would interconnect the Stateline facility with the regional power grid in Washington. Because one of the two proposed locations for the substation and transmission line is necessary to make the power from Biglow available to the public through the BPA system, the "utility facility necessary for public service" provision is applicable.

Finally, consistent with precedent in the Stateline decision, the Council finds that the access roads are allowable under ORS 215.283(3).

Having concluded that each of the facility components falls within the definitions of non-farm uses permitted within a farm use zone as provided under ORS 215.283, we now apply the standards for determining whether each use is allowable in the case of the proposed facility.

The Principal Use and Access Roads

While the principal use and the access roads are allowable subject to two different subsections of ORS 215.283, the substantive standards that both uses must meet for a finding of compliance with Goal 3 are identical; therefore, the following discussion addresses both the principal use and the access roads.

In this case, the principal use is a "commercial utility facility." ORS 215.283(2)(g) authorizes "commercial utility facilities for the purpose of generating power for public use by sale" on agricultural land, subject to ORS 215.296. OAR Chapter 660, Division 33, contains the Land Conservation and Development Commission (LCDC) administrative rules for implementing the requirements for agricultural land as defined by Goal 3. OAR 660-033-0120 (Table 1) lists the "commercial utility facility" use as a type "R" use ("use may be approved, after required review") and references the standards found in OAR 660-033-0130(5) and (22) for such a facility if it is proposed to be located on non-high-value farmland, and (5) and (17) if it is proposed to be located on high-value farmland.[38]

The proposed access roads are allowable on EFU land under ORS 215.283(3). ORS 215.283(3) allows "roads, highways and other transportation facilities and improvements" that are not otherwise allowed under paragraphs (1) and (2) of ORS 215.283 to be established in an EFU zone, subject to:

> *(a) Adoption of an exception to the goal related to agricultural lands and to any other applicable goal with which the facility or improvement does not comply; or*

[38] OAR 660-033-0020(8) defines "high value farmland." Non-irrigated farmland is "high value" if the tract is composed predominantly of soils that are classified prime, unique, Class I or II by the NRCS. The soils in the area affected by the principal use are not classified as "prime farmland" by the NRCS, and the soil capability classifications in the area range from Class VIII to Class IIc (a subclass indicating limitation due to soil being very cold or very dry).

(b) ORS 215.296 for those uses identified by rule of the Land Conservation and Development Commission as provided in section 3, chapter 529, Oregon Laws 1993.

The subparagraphs are conjoined by "or" and so either (a) or (b) applies. In this case, subparagraph (b) applies because the facility access roads are a use that has been identified by the LCDC. OAR 660-033-0120 identifies uses authorized on agricultural lands. OAR 660-033-0120 (Table 1) lists "transportation improvements on rural lands allowed by OAR 660-012-0065" as a type "R" use ("use may be approved, after required review"). OAR 660-033-0120 does not make reference to any criteria in OAR 660-033-0130 for this use.

OAR 660-012-0065 applies to transportation improvements on rural lands. The proposed facility access roads fall within the definition of "accessory transportation improvements" in OAR 660-012-0065(2)(d) because they are "transportation improvements that are incidental to a land use to provide safe and efficient access to the use."[39]

Under OAR 660-012-0065(3)(a), "accessory transportation improvements for a use that is allowed or conditionally allowed by ORS…215.283" are consistent with Goal 3, "subject to the requirements of this rule." The proposed access roads are accessory transportation improvements for a "commercial utility facility for the purpose of generating power for public use by sale," which is a use conditionally allowed by ORS 215.283(2)(g). Accordingly, the access roads are consistent with Goal 3, subject to any applicable requirements of OAR 660-012-0065.

The requirements of OAR 660-012-0065(4) are applicable:

Accessory transportation improvements required as a condition of development listed in subsection (3)(a) of this rule shall be subject to the same procedures, standards and requirements applicable to the use to which they are accessory.

The rule language applies specifically to accessory transportation improvements "required as a condition of development." Because the facility access roads are necessary for the operation and maintenance of the wind energy facility, they are a necessary condition of the development of the commercial utility facility. Accordingly, the access roads are subject to the standards and requirements applicable to the principal use. As discussed above, the applicable standards and requirements are contained in OAR 660-033-0130(5) and (22) for non-high-value farmland and (5) and (17) for high-value farmland.

The facility would preclude from agricultural use about 157 acres of farmland, the majority of which are high-value farmlands.

OAR 660-033-0130(5) provides:

[39] OAR 660-12-0065(2)(a) defines "access roads" as "low volume public roads that principally provide access to property or as specified in an acknowledged comprehensive plan." The proposed Facility turbine string access roads are not "access roads" under this definition because they are not public roads.

Approval requires review by the governing body or its designate under ORS 215.296. Uses may be approved only where such uses:

(a) will not force a significant change in accepted farm or forest practices on surrounding lands devoted to farm or forest use; or

(b) will not significantly increase the cost of accepted farm or forest practices on lands devoted to farm or forest use.[40]

The Council finds that the principal use and the access roads for the facility would not force a significant change in accepted farm practices on surrounding farm land and would not significantly increase the cost of accepted farm practices. There would be no significant change in accepted farming practices as a result of the proposed facility for the reasons discussed above with respect to SCZO Sections 3.1.4 and 5.8.16(a), (b) and (c). In summary, accepted farming activities could continue on the farm parcels where the facility structures would be located. The facility would occupy less than 1 percent of the actively farmed land adjacent to the facility. Construction and operation of the proposed facility would be compatible with farm uses and would not seriously interfere with accepted farming practices.

The cost of farming practices in the area could be affected because of changes in patterns of harvesting and other mechanical operations on the fields, increased need for weed control, and temporary delays to movement of farm equipment and trucks due to construction or construction traffic. The location of the turbines and access roads could require farmers to change their previous patterns of harvesting and other mechanical operations on the fields, but there would be no significant impact on the time needed to perform these farming operations and no significant increase in cost. Construction or construction traffic could cause temporary delays in the movement of farm equipment and trucks or access to fields during the construction period, but these delays, although inconvenient, would not result in a significant increase in the cost of farm practices. As discussed in reference to SCZO Section 5.8.16(b), above, where necessary and feasible, the certificate holder will provide access across construction trenches to fields within the facility area. While some increased weed control may be necessary, it would not significantly increase costs.[41]. As noted earlier, the certificate holder would implement a weed control plan to mitigate the spread of weeds to cropland both during construction and operation. In addition, farm income could be affected by the acreage taken out of crop production by placement of permanent facilities and temporary displacement of crops by construction activities. The acreage that would become unavailable for crop production due to the principal use and the access roads amounts to 0.80 percent of

[40] OAR 660-033-0130(5) reiterates the standards set forth in OAR 215.296(1).
[41] App. Ex. K, Attachment K-1.

the actively farmed area adjacent to the proposed facility.[42] Assuming that all of this area is now used for crop production, the loss of this area would result in at most a 0.80 percent reduction in farm income. During the construction period, about 363 acres of agricultural land would be temporarily unavailable for crop production. This amounts to approximately 1.6 percent of the actively farmed area adjacent to the proposed facility, and consequently not more than about 1.6 percent of farm income for one year. These income losses will be defrayed by wind project lease revenue, which is expected to be significantly greater than the expected farm revenues from the acreage occupied by the facility.[43]

For the reasons discussed above, the Council finds that the principal use and access roads would comply with the standards of ORS 215.296 and OAR 660-033-0130(5). On non-high-value farmland, the principal use and access roads are also subject to OAR 660-033-0130(22), which provides:

> *(22) A power generation facility shall not preclude more than 20 acres from use as a commercial agricultural enterprise unless an exception is taken pursuant to ORS 197.732 and OAR chapter 660, division 004.*

On high-value farmland, the principal use and access roads are subject to OAR 660-033-0130(17), which provides:

> *(17) A power generation facility shall not preclude more than 12 acres from use as a commercial agricultural enterprise unless an exception is taken pursuant to OAR chapter 660, division 004.*[44]

In this case, the "power generation facility" consists of the principal use and the turbine string access roads. The area occupied by the power generation facility is shown in Table 6.

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[42] The total area permanently affected by the proposed facility is estimated to be about 177 acres. Excluding 6 acres occupied by the proposed substation, the principal use and access roads would occupy 171 acres. Not all 171 acres are currently used for crop production (the 171 acres includes CRP land, shrub-steppe and grassland not in production, as well as some previously developed acreage). Nevertheless, assuming all 171 acres is potentially available for crop production, this area is only 0.80 percent of the actively-farmed area adjacent to the proposed facility.

[43] App. Ex. K, Attachment K-1.

[44] The Applicant correctly points out that the requirements of OAR 660-033-0130(17), (22) would be directly applicable to the proposed facility even if ORS 469.504(1)(b)(B) did not, as a result of the proposed facility's noncompliance with certain SCZO provisions, require the Department to apply OAR 660-033-0130(17), (22). ORS 197.646(3) provides:

> When a local government does not adopt comprehensive plan or land use regulation amendments as required by subsection (1) of this section, the new or amended goal, rule or statute shall be directly applicable to the local government's land use decisions.

The SCZO has not incorporated OAR 660-033-0130(17), (22) as required by ORS 197.646(3), so these regulations are directly applicable to the proposed facility.

Table 6 Area Occupied By the Power Generation Facility	
Structure	**Acres**
Principal use	
Turbine towers	14.39
Meteorological towers	0.19
O&M building site	5.00
Subtotal	**19.58**
Access roads	151.15
Total	**170.73**

In total, the facility would occupy about 177 acres. As shown above, the principal use and access roads would occupy about 170.73 acres within the EFU zone, the majority of which is high-value farmland. (The remaining 6 acres would be occupied by the substation, which is analyzed for land use purposes in a separate section of the order.) These numbers exceed the allowances of OAR 660-0333-0130(17) and (22), respectively; therefore, the Council finds that the principal use and access roads would not comply with OAR 660-033-0130(17) and (22) and Goal 3. We discuss an exception to Goal 3 below.

Substations

The Council finds that the proposed substation and aboveground transmission line, regardless of the location chosen, would be "utility facilities necessary for public service" allowed on EFU land under ORS 215.283(1)(d), subject to the provisions of ORS 215.275. Such a finding is consistent with the Council's finding that the Stateline substation and the aboveground transmission line connecting the substation with the main power grid were "utility facilities necessary for public service." Like the substation and transmission line at Stateline, the proposed substation and transmission line would function to step up the power to accommodate interconnection with the BPA system. Because the proposed substation and transmission line is necessary to make the power from the facility available to the public through the BPA system, a finding that they are "utility facilities necessary for public service" is appropriate.

ORS 215.275 lists factors for deciding whether a utility facility is "necessary for public service." The statute provides:

> *(1) A utility facility established under ORS 215.213 (1)(d) or 215.283 (1)(d) is necessary for public service if the facility must be sited in an exclusive farm use zone in order to provide the service.*
>
> *(2) To demonstrate that a utility facility is necessary, an applicant for approval under ORS 215.213 (1)(d) or 215.283 (1)(d) must show that reasonable alternatives have been considered and that the facility must be sited in an exclusive farm use zone due to one or more of the following factors:*

(a) Technical and engineering feasibility;

(b) The proposed facility is locationally dependent. A utility facility is locationally dependent if it must cross land in one or more areas zoned for exclusive farm use in order to achieve a reasonably direct route or to meet unique geographical needs that cannot be satisfied on other lands;

(c) Lack of available urban and nonresource lands;

(d) Availability of existing rights of way;

(e) Public health and safety; and

(f) Other requirements of state or federal agencies.

The proposed substation must be located in an EFU zone because there is no non-EFU land in the vicinity of the facility. There are no reasonable alternatives. At least three of the factors listed in ORS 215.275(2) apply. First, "technical and engineering feasibility" requires that there be a substation to accommodate interconnection with the BPA system. It is not feasible or technically possible to interconnect with the main transmission grid without a substation. Second, the proposed substation is "locationally dependent." The substation must be located in proximity to the proposed wind turbines, because that is where the power would be generated. It must also be located near the point of interconnection with the BPA system so that the power can be transmitted to customers. Third, there are no urban or non-resource lands available to locate the substation where it could serve its purpose. For these reasons, location of the substation on EFU land is "necessary for public service." The Council finds that the substation is allowable under ORS 215.283(1)(d).

ORS 215.275 imposes two requirements on "utility facilities necessary for public service" allowed under ORS 215.283(1)(d). ORS 215.275(4) requires that the owner of the utility facility be responsible for restoring agricultural land and associated improvements to their former condition if they are damaged or disturbed by the siting, maintenance, repair or reconstruction of the facility. The proposed substation would be located on a six-acre parcel of land that would be part of the permanent Biglow "footprint." Construction of the substation would not affect agricultural land or associated improvements outside of the six-acre parcel. Nevertheless, as discussed in the Council Conditions Required By Rule and the Fish and Wildlife Habitat Standard sections of this order and in the Revegetation Plan (Attachment B), the certificate holder would be responsible for restoring all areas temporarily disturbed during construction of the facility upon completion of construction**.**

ORS 215.275(5) requires the imposition of "clear and objective conditions" on siting a utility facility under 215.283(1)(d) "to mitigate and minimize the impacts of the proposed facility, if any, on surrounding lands devoted to farm use in order to prevent a significant change in accepted farm practices or a significant increase in the cost of farm practices on the surrounding farmlands." Construction of the proposed substation as part of Biglow would not

substantially increase the impacts of the principal use and access roads, which would occupy a much larger area of agricultural land than the substation. For the reasons discussed above, the principal use and access roads would not result in a significant change in accepted farm practices or significantly increase the cost of those practices. The Council finds that the proposed substation and transmission line would not cause a significant change in accepted farm practices or significantly increase the cost of those practices. As discussed throughout the Land Use section of this order, the Council imposes certain conditions on the site certificate holder to "mitigate and minimize" the impacts of the proposed facility on surrounding lands devoted to farm use.

C. Goal 3 Exception

The proposed principal use and access roads would occupy more than 20 acres of non-high-value farmland and more than 12 acres of high-value farmland in the EFU zone and therefore would not comply with OAR 660-033-0130(17), (22) and Goal 3. Therefore, to find compliance under ORS 469.504(1)(b)(B), the Council must find "that an exception to any applicable statewide planning goal is justified under subsection (2)" of ORS 469.504. Accordingly, the Council must determine whether an exception to Goal 3 is justified.

ORS 469.504(2)(c) sets out the requirements that must be met for the Council to take an exception to a land use planning goal, as follows:

> *(2) The council may find goal compliance for a facility that does not otherwise comply with one or more statewide planning goals by taking an exception to the applicable goal. Notwithstanding the requirements of ORS 197.732, the statewide planning goal pertaining to the exception process or any rules of the Land Conservation and Development Commission pertaining to an exception process goal, the council may take an exception to a goal if the council finds:*
> * * *
>
> *(c) The following standards are met:*
>
> *(A) Reasons justify why the state policy embodied in the applicable goal should not apply;*
>
> *(B) The significant environmental, economic, social and energy consequences anticipated as a result of the proposed facility have been identified and adverse impacts will be mitigated in accordance with rules of the council applicable to the siting of the proposed facility; and*
>
> *(C) The proposed facility is compatible with other adjacent uses or will be made compatible through measures designed to reduce adverse impacts.*

The Council makes the findings discussed below and concludes that the standards for an exception to Goal 3 under ORS 469.504(2)(c) are met.

Reasons Supporting an Exception

The state policy embodied in Goal 3 is the preservation and maintenance of agricultural land for farm use. Several reasons support an exception to Goal 3.

First, although the proposed facility would occupy more than 20 acres of non-high-value farmland and more than 12 acres of high-value farmland, it would occupy less than one percent of the actively farmed land adjacent to the facility. The land that would be occupied by the wind facility would not be in a single, contiguous area within which no farming activities could occur. Rather, the spacing of turbines and turbine strings would preserve most of the land upon which the facility lies for farm use. The total amount of land occupied by wind turbines would be about 14 acres; the majority of the area occupied by the facility would be occupied by the access roads (about 151 acres). The access roads would be available for use by the landowner in farm operations.

Second, for the reasons discussed above in reference to SCZO 5.8.16, the facility is compatible with farm use, would not seriously interfere with accepted farm practices on adjacent land and would not materially alter the overall land use pattern of the area.

Third, approval of the proposed facility furthers the state policy embodied in Goal 13 (Energy Conservation). The Guidelines for implementing Goal 13 expressly direct land use planning to utilize renewable energy sources, including wind, "whenever possible." State policy supporting development of renewable energy is also found in the State's Renewable Energy Action Plan (ODOE, 2005), which calls for significant, additional development of renewable resources, including wind energy.

Fourth, it is not feasible to locate a renewable wind energy facility in the County without affecting agricultural land because the best wind resources are all located on agricultural land.[45] The only non-EFU land in the area is located in the cities of Moro, Wasco, Rufus, and Biggs Junction. None of these locations has the necessary wind resource, adequate parcels of land, or proximate transmission system necessary to build the facility.

Fifth, the farmers who own the land where the facility would be located are willing to enter into land leases to allow the project to be built. In return, the landowners would receive annual lease payments. Lease payments would provide a stable, supplemental income source that would help maintain the land in farm use by increasing the economic viability of the landowners' farm operations.

Sixth, the project would boost the local economy by creating jobs and contributions to the local tax base. The applicant estimates the number of construction jobs would range from

[45] We note that *Save Our Rural Oregon* held that "the legislature did not intend to require the council to perform an alternatives analysis in making a determination under ORS 469.504(2)(c) that an exception could be taken to a land use planning goal." *Save Our Rural Oregon et al. v. Energy Facility Siting Council*, 339 Or 353, 372 (2005). While an alternatives analysis is not required, the lack of feasible alternatives to the proposed facility site nonetheless is a valid reason justifying an exception to Goal 3.

50 to 250 during the construction period. Operation of the facility would require 15 to 20 full-time employees.[46] The facility is expected to provide substantial tax revenues to the County over the life of the project, with insubstantial countervailing public service demands.[47]

Significant environmental, economic, social and energy consequences

The facility would be in compliance with all rules of the Council applicable to the siting of the proposed facility. As demonstrated in other sections of this order, the facility, including proposed mitigation measures will not cause significant adverse environmental, social, or economic consequences. In addition, the facility will create jobs and contribute significant income to the County. Finally, the energy consequences of the facility will be positive.

Compatibility with adjacent uses

For the reasons discussed above in reference to SCZO 5.8.16 (see page 49), the facility is compatible with farm use, would not seriously interfere with accepted farm practices on adjacent land and would not materially alter the overall land use pattern of the area.

Conclusion

For the reasons set forth above, the Council concludes that the standards for an exception to Goal 3 under ORS 469.504(2)(c) are met.

D. Additional Land Use Conditions

In addition to the conditions set forth above, to find that Orion can comply with OAR 345-022-0030, the Council adopts the following conditions in the site certificate:

(24) Before beginning construction of the facility, the certificate holder shall record a Farm Management Easement covering the properties on which the certificate holder locates wind power generation facilities. The certificate holder shall record the easement in the real property records of Sherman County and shall file a copy of the recorded easement with the Sherman County Planning Director.

(25) The certificate holder shall remove from Special Farm Assessment the portions of parcels on which facilities are located and shall pay all property taxes due and payable after the Special Farm Assessment is removed from such properties.

The Council interprets the removal of properties from Special Farm Assessment to apply only to the portion of the properties on which the facilities are located in accordance with ORS 308A.113(1)(a).

[46] App. Page U-1.
[47] App pp. U-8, K-15.

Conclusions of Law

Based on the foregoing findings of fact, reasoning, proposed conditions and conclusions, the Council concludes that the proposed facility does not comply with three applicable substantive criteria. The proposed facility does not comply with SCZO Sections 3.1.4 and 5.8.16(d), and does not comply with Policy III under SCCP Goal XVIII, which in turn means that the proposed facility does not comply with SCZO Section 5.2.1, which requires that the proposed facility is compatible with the SCCP and applicable policies.

Accordingly, the Council must proceed with its land use analysis under ORS 469.504(1)(b)(B). The Council finds that the proposed facility does not comply with OAR 660-033-0130(17) and (22) and therefore does not comply with the applicable statewide planning goal (Goal 3). The Council concludes that an exception to Goal 3 is justified under ORS 469.504(2)(c). The Council adopts Conditions (17), (18), (19), (20), (21), (22), (23), (24) and (25) in the site certificate. Based on these findings and recommended conditions, the Council concludes that the proposed facility complies with the Land Use Standard.

(b) Soil Protection

OAR 345-022-0022
To issue a site certificate, the Council must find that the design, construction, operation and retirement of the facility, taking into account mitigation, are not likely to result in a significant adverse impact to soils including, but not limited to, erosion and chemical factors such as salt deposition from cooling towers, land application of liquid effluent, and chemical spills.

Findings of Fact

Biglow provided evidence regarding soil impacts in Exhibit I of the application. The analysis area for the Soil Protection standard is the area within the site boundary.

Adverse impacts to soils can affect crop production on adjacent agricultural lands, native vegetation, fish and wildlife habitat, and water quality. Construction and operation of the facility could have soil impacts such as erosion, compaction, and chemical spills. Because a wind facility does not have a cooling tower or liquid effluent, there is no potential for salt deposition.

Biglow identified the near surface soils in the analysis area using the U.S. Department of Agriculture Natural Resources Conservation Service soil survey of Sherman County, Oregon. Soil types are depicted in Figure I-1 of the application. Soil erosion potential at the proposed Biglow site is moderate to high. Much of the land surrounding the project site is cropland, which is subject to erosion from agricultural activities.

A. Impacts During Construction

Wind and water erosion is of concern on both the facility site and within temporarily disturbed areas. Construction of the energy facility would include removal of surface vegetation, grading and leveling operations, and the use of large cranes and other heavy equipment that could temporarily increase the potential for soil erosion. Installation of underground communications and power collection systems would require trenching that could expose the affected areas to increased erosion risk.

Heavy equipment movement, car and truck traffic, and component laydown during construction could cause soil compaction. Soil compaction in relation to this standard is a concern where it could reduce agricultural productivity or interfere with revegetation. During construction of the facility, about 74 to 100 acres could be temporarily disturbed for laydown and staging areas, turbine-string turnaround areas, parking and other construction-related uses.

There is a risk of chemical spills during construction from fuels, oils and grease associated with operation of construction equipment. Federal law (40 CFR 112) requires the operators of facilities that store quantities of oil and engage in refueling operations onsite to develop and implement a Spill Prevention, Control, and Countermeasure Plan during construction and operation.

B. Impacts During Operation

Operation of the facility would have little impact on soils. Precipitation could result in surface water collecting on structures and on concrete or gravel surfaces. Drainage from those areas could erode nearby soils. In addition, repair or maintenance of underground communications or power collection lines could expose soils to increased erosion. Small amounts of chemicals, such as lubricating oils and cleaners for the turbines and herbicides for weed control, would be used at the facility site and present a risk to soils from accidental spills.

C. Impacts During Retirement

Retirement would cause soil disturbance similar to construction. Use of trucks and heavy equipment could compact soils and temporarily increase the potential for soil erosion during removal of equipment, dismantling turbines, demolishing foundations, and grading. Disturbance or removal of vegetation would expose soils to greater risk of wind and water erosion. Site restoration would be carried out subject to the terms of a final retirement plan approved by the Council, which would include measures for protection of the environment during the retirement process.

D. Control and Impact Mitigation Measures

During construction of the facility, Biglow would be subject to the requirements of the NPDES Storm Water Discharge General Permit #1200-C and the associated Erosion and Sediment Control Plan. The Erosion and Sediment Control Plan would describe best management practices for erosion and sediment control and would be subject to DEQ approval. Construction truck traffic would be limited to existing and improved road surfaces

to avoid soil compaction. Gravel or other non-erosive covering would be spread on turbine pad areas immediately after soil exposure during construction. All areas of temporary disturbance would be restored upon completion of construction. During operation, facility staff would regularly inspect all project areas for signs of erosion or sedimentation and, as necessary, maintain or repair erosion control measures. Measures would be taken to avoid accidental spills of hazardous materials and to remedy any spills that occur, as discussed under the Waste Minimization Standard section of the order.

To find that Orion can comply with OAR 345-022-0022, the Council adopts the following conditions in the site certificate:

(26) The certificate holder shall conduct all construction work in compliance with an Erosion and Sediment Control Plan (ESCP) satisfactory to the Oregon Department of Environmental Quality and as required under the National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge General Permit #1200-C. The certificate holder shall include in the ESCP any procedures necessary to meet local erosion and sediment control requirements and storm water management requirements.

(27) During construction of the facility, the certificate holder shall limit truck traffic to designated existing and improved road surfaces to avoid soil compaction, to the extent possible.

(28) The certificate holder shall cover turbine pad areas with gravel or other non-erosive material immediately following exposure during construction and shall maintain the pad area covering during operation of the facility.

(29) During construction of the facility, the certificate holder shall restore areas that are temporarily disturbed in accordance with the methods, monitoring procedures and success criteria described in the Revegetation Plan that is incorporated in this order as Attachment B and as that Revegetation Plan may be amended from time to time. During operation of the facility, the certificate holder shall restore areas that are temporarily disturbed during facility maintenance or repairs according to the same methods and monitoring procedures.

(30) During operation of the facility, the certificate holder shall routinely inspect and maintain all roads, pads and trenched areas and, as necessary, maintain or repair erosion control measures.

(31) During construction of the underground collector system, the certificate holder shall open the smallest necessary sections of trench during each day of construction and backfill the trenches as soon as is practical after power lines have been set in the trenches.

(32) During construction of the facility, the certificate holder shall strip and stockpile soil from laydown areas only during the time of year when rainfall is lowest, minimizing erosion from precipitation.

(33) During construction of the facility, the certificate holder shall use straw bales or similar containment features to protect soil stockpiles from erosion, as needed.

(34) During construction of the facility, the certificate holder shall keep wind-borne erosion to a minimum by using water trucks for dust suppression, as necessary.

(35) During construction of the facility, the certificate holder shall restore staging locations by bringing them back to their original contours, covering them with topsoil, and revegetating or preparing them for planting of wheat or barley or use as range land.

Conclusions of Law

The Council concludes that the design, construction, operation and retirement of the proposed facility, taking into account mitigation and subject to the conditions stated in this order, are not likely to result in a significant adverse impact to soils. The Council adopts Conditions (26), (27), (28), (29), (30), (31), (32), (33), (34) and (35) in the site certificate. Based on these findings and recommended conditions, the Council concludes that the proposed facility complies with the Soil Protection Standard.

(c) Protected Areas

OAR 345-022-0040

(1) Except as provided in sections (2) and (3), the Council shall not issue a site certificate for a proposed facility located in the areas listed below. To issue a site certificate for a proposed facility located outside the areas listed below, the Council must find that, taking into account mitigation, the design, construction and operation of the facility are not likely to result in significant adverse impact to the areas listed below. Cross-references in this rule to federal or state statutes or regulations are to the version of the statutes or regulations in effect as of August 28, 2003:

(a) National parks, including but not limited to Crater Lake National Park and Fort Clatsop National Memorial;

(b) National monuments, including but not limited to John Day Fossil Bed National Monument, Newberry National Volcanic Monument and Oregon Caves National Monument;

(c) Wilderness areas established pursuant to The Wilderness Act, 16 U.S.C. 1131 et seq. and areas recommended for designation as wilderness areas pursuant to 43 U.S.C. 1782;

(d) National and state wildlife refuges, including but not limited to Ankeny, Bandon Marsh, Baskett Slough, Bear Valley, Cape Meares, Cold Springs, Deer Flat, Hart Mountain, Julia Butler Hansen, Klamath Forest, Lewis and Clark, Lower Klamath, Malheur, McKay Creek, Oregon Islands, Sheldon, Three Arch Rocks, Umatilla, Upper Klamath, and William L. Finley;

(e) National coordination areas, including but not limited to Government Island, Ochoco and Summer Lake;

(f) National and state fish hatcheries, including but not limited to Eagle Creek and Warm Springs;

(g) National recreation and scenic areas, including but not limited to Oregon Dunes National Recreation Area, Hell's Canyon National Recreation Area, and the Oregon Cascades Recreation Area, and Columbia River Gorge National Scenic Area;

(h) State parks and waysides as listed by the Oregon Department of Parks and Recreation and the Willamette River Greenway;

(i) State natural heritage areas listed in the Oregon Register of Natural Heritage Areas pursuant to ORS 273.581;

(j) State estuarine sanctuaries, including but not limited to South Slough Estuarine Sanctuary, OAR Chapter 142;

(k) Scenic waterways designated pursuant to ORS 390.826, wild or scenic rivers designated pursuant to 16 U.S.C. 1271 et seq., and those waterways and rivers listed as potentials for designation;

(L) Experimental areas established by the Rangeland Resources Program, College of Agriculture, Oregon State University: the Prineville site, the Burns (Squaw Butte) site, the Starkey site and the Union site;

(m) Agricultural experimental stations established by the College of Agriculture, Oregon State University, including but not limited to:
Coastal Oregon Marine Experiment Station, Astoria
Mid-Columbia Agriculture Research and Extension Center, Hood River
Agriculture Research and Extension Center, Hermiston
Columbia Basin Agriculture Research Center, Pendleton
Columbia Basin Agriculture Research Center, Moro
North Willamette Research and Extension Center, Aurora

East Oregon Agriculture Research Center, Union
Malheur Experiment Station, Ontario
Eastern Oregon Agriculture Research Center, Burns
Eastern Oregon Agriculture Research Center, Squaw Butte
Central Oregon Experiment Station, Madras
Central Oregon Experiment Station, Powell Butte
Central Oregon Experiment Station, Redmond
Central Station, Corvallis
Coastal Oregon Marine Experiment Station, Newport
Southern Oregon Experiment Station, Medford
Klamath Experiment Station, Klamath Falls;

(n) Research forests established by the College of Forestry, Oregon State University, including but not limited to McDonald Forest, Paul M. Dunn Forest, the Blodgett Tract in Columbia County, the Spaulding Tract in the Mary's Peak area and the Marchel Tract;

(o) Bureau of Land Management areas of critical environmental concern, outstanding natural areas and research natural areas;

(p) State wildlife areas and management areas identified in OAR chapter 635, Division 8.

Findings of Fact

Orion provided evidence about potential impacts to protected areas in Exhibit L of the application. The analysis area for the Protected Areas Standard is the area within the site boundary and 20 miles from the site boundary, including areas outside the state.

The proposed facility would not be located within any protected area designated under OAR 345-022-0040(1). In Table L-1 of the application, Orion identified 11 federal and state management areas within 20 miles of the proposed facility site. In three instances, Orion listed two protected areas under a single heading. The DPO separates the following combined areas of concern into distinct areas: The Deschutes River State Recreation Area and Heritage Landing, the Deschutes Federal Wild and Scenic River/State Scenic Waterway, and the John Day Federal Wild and Scenic River/State Scenic Waterway. Orion listed the "J.S. Burres State Park" in Oregon, which is a state-owned property managed by the BLM and not subject to the Protected Areas standard. In addition, Orion listed three state parks in Washington not subject to the Protected Areas standard. The following table shows 10 protected areas, a reference to the applicable subparagraph of OAR 345-022-0040(1), the approximate distance and direction of each protected area from the proposed facility site, and the state in which the area is located:

Table 7
Protected Areas within 20 Miles of the Proposed Facility Site

Protected Area	Rule Reference	Distance (Miles)	Direction from Biglow	State
Columbia River Gorge National Scenic Area	(g)	10	NW	Oregon Washington
Deschutes River State Recreation Area	(h)	11	W	Oregon
Heritage Landing Day Use Area	(h)	11	W	Oregon
Deschutes Federal Wild and Scenic River	(k)	15	SW	Oregon
Deschutes State Scenic Waterway (Pelton Dam to Columbia River)	(k)	15	SW	Oregon
Lower Deschutes Wildlife Area	(p)	11	W	Oregon
John Day Wildlife Refuge	(d)	1	E	Oregon
John Day Federal Wild and Scenic River	(k)	1	E	Oregon
John Day State Scenic Waterway (Parrish Creek to Tumwater Falls)	(k)	1	E	Oregon
Columbia Basin Agriculture Research Center (Moro)	(m)	9	SW	Oregon

A. Noise

Construction activities are likely to produce short-duration noise levels in the range of 84 to 90 dBA at a distance of 50 feet from the noise source. At the closest point, construction noise sources would be about 1 mile from the boundary of the John Day Wildlife Refuge and the John Day Federal Wild and Scenic River reach. At this distance, Orion states that the loudest construction activity would produce noise levels of no more than 45 dBA, the L_{50} nighttime noise limit under Oregon law for designated "quiet areas" such as refuges. Biglow would produce less noise during operation. The Council finds that noise during construction and operation of the proposed facility would not result in a significant adverse impact on any protected area.

B. Traffic

The primary transportation route for facility construction vehicles would begin from either eastbound or westbound I-84 and continue south on US 97 from Biggs Junction to Wasco. Construction traffic might also approach the facility site from the south on US 97. From US 97, construction-related vehicles would follow OR 206 to reach Wasco and would use local Sherman County roads to reach the site. For any facility phase, construction is anticipated to take up to 10 months and employ an estimated maximum of 250 workers at peak construction periods. In addition to travel by construction workers, construction traffic would include deliveries of heavy equipment, building materials and turbine components. Orion anticipates that construction traffic could cause short-term traffic delays on US 97 and local roads that might adversely affect access on these routes to the protected areas along the John Day River corridor (John Day Wildlife Refuge, John Day Federal Wild and Scenic River and John Day State Scenic Waterway) and to the Columbia Basin Agriculture Research

Center in Moro. Access to other protected areas would not be affected by construction traffic. The Council finds that traffic delays affecting access to protected areas along the John Day River would not result in a significant adverse impact on those areas and that access to other protected areas would be unaffected by construction-related traffic.

During operation of the facility, Orion estimates that Biglow would employ 15 to 20 people. Road use by employees, combined with road use for deliveries and other facility-related purposes, is not likely to have a significant impact on local road traffic. The Council finds that local facility-related road use during operation of the proposed facility would not result in a significant adverse impact on any protected area.

C. Water Use and Wastewater Disposal

Construction and operation of the proposed facility would not result in a significant adverse impact on water quantity or water quality within any protected area. During construction, water would be used primarily for dust suppression, road compaction and concrete mixing. An estimated 12 million gallons of water would be used during construction. The water would be acquired by a contractor and trucked in from an off-site source that would not require a new or transferred water right. The source of construction water is expected to be the City of Wasco, which has agreed to provide a source of construction water at the rate of up to 125,000 gallons per day, provided such deliveries would not jeopardize its ability to satisfy demands within the City. All water used during construction would be lost on or very near the site, primarily through evaporation. No water used on the site would be discharged into wetlands, lakes, rivers or streams. There would be no impact on any protected area.

During the operations phase, water would be used for sanitary purposes at the O&M facility. Water for these purposes would be supplied from an on-site well and would be discharged to an on-site septic system. Turbine blade washing may occur, but water use would be only occasional and not substantial. Water for blade-washing activities would be obtained from the on-site well or permitted off-site sources. There would be no impact on any protected area.

The Council finds that water use and disposal during construction and operation of the proposed facility would not result in a significant adverse impact on water quantity or water quality within any protected area.

D. Visual Impacts

Wind energy facilities have no emissions to affect air quality or visibility. Visual impacts would result from the visibility of wind turbine structures from locations within a protected area that might adversely affect a visual resource for which the area is designated as protected. In evaluating the visual impact of wind turbines on protected areas near the Stateline Wind Project, the Council found that the view of the turbines would not be significant at distances of five miles or more from the site (Final Order for the Stateline Wind Project, p. 48). Although the turbine towers for Biglow are taller than those in operation at

Stateline (about 85 meters at hub height compared to 50 meters for the Stateline turbines), the difference would not be significant when viewed from a distance of five miles or more.

Of the 10 protected areas identified in Table 7, only three are within five miles of the site: the John Day Wildlife Refuge, the John Day Federal Wild and Scenic River, and the John Day State Scenic Waterway (Parrish Creek to Tumwater Falls). While portions of the John Day Wildlife Refuge are within five miles of the proposed facility, the wildlife refuge area is protected because it provides wildlife habitat, and it is not managed primarily for its scenic views. The John Day Federal Wild and Scenic River and the John Day State Scenic Waterway are managed, in part, for outstanding scenic quality. Orion used computer modeling to determine what parts of Biglow would be visible from the John Day River and performed additional modeling at the request of the Bureau of Land Management. The Oregon Department of Parks and Recreation also expressed concern about the visibility of turbines along the John Day River.

Orion found that the turbines would not be visible from about 80 percent of the river's length in the reach between the Klondike-John Day Road and Tumwater Falls. In the limited areas along the river corridor from which the turbines might be visible, few would be visible from any one point, and only the blades are likely to be visible in many instances. More of the project would be visible from higher locations on the river canyon walls, where access is limited.

The Council finds that, although parts of Biglow might be visible from some locations within protected areas along the John Day River, the visual impact of the facility would not result in a significant adverse impact to these protected areas. In addition, the Council finds that the visual impact of the proposed facility, if it were visible at all, would be insignificant in protected areas located five miles or more from the facility.

To find that Orion can comply with OAR 345-022-0040, the Council adopts the following condition in the site certificate:

(36) Without Department approval, the certificate holder shall not move any turbines within its micrositing corridors such that a worst-case visual impact beyond that stated in the ASC and ASC Supplement would occur for the John Day Wildlife Refuge, the John Day Federal Wild and Scenic River, or the John Day State Scenic Waterway (Parrish Creek to Tumwater Falls).

Conclusions of Law

The Council concludes that the proposed facility is not located in a protected area as listed in OAR 345-022-0040 and that the design, construction and operation of the proposed facility, taking into account mitigation and subject to the conditions stated in this order, are not likely to result in significant adverse impact to any protected area. The Council adopts Condition (36) in the site certificate. Based on these findings and recommended condition, the Council concludes that the proposed facility complies with the Protected Areas Standard.

(d) Scenic and Aesthetic Values

OAR 345-022-0080

(1) Except for facilities described in section (2), to issue a site certificate, the Council must find that the design, construction, operation and retirement of the facility, taking into account mitigation, are not likely to result in significant adverse impact to scenic and aesthetic values identified as significant or important in applicable federal land management plans or in local land use plans in the analysis area described in the project order.

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Findings of Fact

Orion provided evidence about potential impacts to scenic and aesthetic values in Exhibit R of the ASC and ASC Supplement. The analysis area for the Scenic and Aesthetic Values Standard is the area within the site boundary and 30 miles from the site boundary, including areas outside the state. In applying this standard, the Council focuses on the effects of facility structures on "scenic and aesthetic values identified as significant or important in applicable federal land management plans or in local land use plans in the analysis area."

The tallest structures that would be part of Biglow are the turbine towers, and these structures, therefore, are the visual elements of the facility most likely to be visible from a distance. In evaluating the visual impact of wind turbines on protected areas near the Stateline Wind Project, the Council found that the view of the turbines would not be significant at distances of five miles or more from the site (Final Order for the Stateline Wind Project, p. 48). Although the turbine towers for the Biglow are taller than those in operation at Stateline (about 85 meters at hub height compared to 50 meters for the Stateline turbines), the difference would not be significant when viewed from a distance of five miles or more.

A. Visual Features of the Site and the Proposed Facility

The proposed Biglow site occupies an overall area of about 25,000 acres under easement, or about 360 square miles. Within that area, up to 225 wind turbine towers and tower pad areas, about 40.5 miles of new access roads, an O&M building, a substation and up to 22 miles of aboveground collector or transmission lines would be constructed on about 177 acres of land. Turbines would be arrayed in "strings" spaced about one-half to one mile apart. Under the Maximum Turbine Layout (150 3.0-MW turbines), the turbine towers were assumed to be 85 meters (279 feet) tall at the turbine hub, and the rotors were assumed to be 100 meters (328 feet) in diameter, resulting in an overall height of the towers and blades of 135 meters (443 feet). Under the Minimum Turbine Layout (225 1.5-MW turbines), the turbine towers were assumed to be 80 meters (262 feet) tall, and the rotors were assumed to be 82 meters (269 feet) in diameter, resulting in an overall height of the towers and blades of 121 meters (397 feet). The towers would be smooth, tubular steel structures with low-reflectivity neutral gray, white, off-white or earth-tone finishes to minimize contrast with the sky backdrop and to minimize the reflections that can call attention to structures in the

landscape. Exterior lighting on the turbine towers would be limited to the aviation warning lights required by the FAA and would be kept to the minimum required number and intensity to meet FAA standards. In addition, up to 10 meteorological towers would be built. The meteorological towers would be either guyed or un-guyed steel towers, about 85 meters (279 feet) tall.

Orion would install one of two alternative overhead 230-kV or 500-kV transmission lines. One alternative would be a 3-mile transmission line interconnecting a substation located in the southern portion of the facility with the Klondike Schoolhouse Substation south of the facility site. The other alternative would be a 7-mile transmission line interconnecting a substation near the center of the facility site with the BPA John Day Substation northwest of the facility site. Under both alternatives, the transmission line would be mounted on wood or steel poles or towers about 60 to 90 feet tall. The O&M building would occupy about 5,000 square feet on a 5-acre parcel. The substation would occupy a 6-acre parcel.

B. Effect on Identified Scenic Values

Orion considered the following managed areas within the analysis area for potential scenic values:

Table 8
Land Management Areas

Area	Management	Location
Columbia River Gorge National Scenic Area	Federal	Oregon Washington
Lower Klickitat Wild and Scenic River	Federal/State	Washington
Deschutes River	Federal/State	Oregon
John Day River	Federal/State	Oregon
Oregon Trail	Federal	Oregon
Sherman County	County	Oregon
Gilliam County	County	Oregon
Wasco County	County	Oregon
Morrow County	County	Oregon
Klickitat County	County	Washington
Yakima County	County	Washington
The Dalles	City	Oregon
Goldendale	City	Washington

Columbia River Gorge National Scenic Area

The Columbia River Gorge National Scenic Area (CRGNSA) consists of the 80-mile corridor extending along the Columbia River from Troutdale to the Deschutes River. The

Biglow facility site would lie outside and about 10 miles east of the Scenic Area's eastern boundary.

The Columbia River Gorge was the first and is still the only National Scenic Area (NSA) in the United States. The federal legislation that established the NSA in 1986 included among its purposes:

- Protect and provide for the enhancement of the scenic, cultural, recreational, and natural resources of the Columbia River Gorge

- Protect and support the economy of the Gorge area by encouraging growth to occur in existing urban areas and by allowing future economic development in a manner that is consistent with protection of the resources

The Scenic Area Management Plan, adopted by the Columbia River Gorge Commission in 1991 establishes policies and guidelines for resource protection that are implemented by the National Scenic Area Ordinance adopted by the local jurisdictions within the NSA boundaries. Among other things, the Management Plan designates key viewing areas that are considered to be the most important vantage points within the scenic area from which the public views the scenic area landscapes. Orion sound that four of these key viewing areas would be located within 30 miles of the proposed Biglow facility: (1) the Columbia River; (2) the Historic Columbia River Highway; (3) Interstate Highway I-84; and (4) Washington State Route 14 (SR-14). Based on its analysis, Orion found that from all four areas the facility might be visible as a feature in the far distance.

The applicant's visibility analysis indicated that facility turbines might be visible from the CRGNSA but that because they would be at least ten miles from the nearest key viewing area, the facility's effects on scenic values would be less than significant. The Council finds that the proposed facility is not likely to result in a significant adverse impact to the important scenic values of the CRGNSA.

Lower Klickitat Wild and Scenic River

The lower ten miles of the Klickitat River is a Federal Wild and Scenic River. Biglow would not be visible from any part of the designated area. The area lies entirely in the State of Washington about 30 miles from the Biglow facility site. The Council finds that the Biglow facility is not likely to result in significant adverse impact to the scenic values associated with the Lower Klickitat Wild and Scenic River.

Deschutes River

The Deschutes River is a federal Wild and Scenic River and an Oregon State Scenic Waterway. Orion found that the proposed Biglow facility would not be visible from the areas in the Deschutes River canyon along the Deschutes Wild and Scenic River and would be visible only from a small area of the BLM lands within and adjacent to the canyon. Orion found that because none of the BLM or private lands that lie within the canyon would be directly affected by the facility, and because the facility would not be visible from the interior

of the canyon, the facility would be consistent with the BLM Two Rivers Plan and with the provisions of the Wasco County and Sherman County comprehensive plans that identify the Deschutes River as an important land feature. The Council finds that the proposed Biglow facility would not have any significant impact on visual resources along the designated Deschutes River resource areas.

John Day River

The Bureau of Land Management (BLM) manages the John Day River Canyon as an "area of high visual quality" and has designated the area as a Visual Resource Management Class II resource, a management classification that permits management activities resulting in changes to the existing character of the landscape, provided that they do not attract the attention of the casual observer. BLM's management plans do not apply directly to lands, such as the proposed facility site, that are located outside the jurisdictional boundaries of BLM's plans.

The same stretch of the John Day River is also a designated State Scenic Waterway. Under the State Scenic Waterways Act, the river segments in the analysis area have been classified as a Scenic River Area. Scenic River Areas are administered to preserve their undeveloped character and maintain or enhance their high scenic quality, recreation, fish, and wildlife values while allowing continued agricultural use. Like the BLM management plan, administration of the State Scenic Waterways Act is not directly applicable to the proposed Biglow facility because it lies outside of the area regulated by the plan.

Orion described the potential visual impact of the proposed facility on the John Day River area using computer modeling and visibility analyses, field investigation, interviews with local, state and federal agency staff and visual simulations. Portions of the proposed facility would be visible to some degree in scattered locations along the northern reach of the John Day River, up to about mile 17. Regarding protection of visual resources of the John Day and Deschutes river canyons, the BLM prioritizes areas "normally seen from these rivers." Portions of the facility would be visible from many vantage points at higher elevation along the canyon walls, but these areas have limited access. The Oregon Parks and Recreation Department administers the state's Scenic Waterways Act, and its regulations are aimed at maintaining the scenic qualities as seen from the river.

Orion's modeling showed that in limited areas along the river corridor from which the facility's turbines might be visible, few turbines would be visible from any one point, and only the blades would be visible from many locations, rather than the turbines or turbine towers. In the places where they are visible, the turbines would appear as elements on the ridgelines in the landscape's background and would have no direct effect on the appearance of the canyon walls or canyon floor. Although the turbines could be noticeable in some of the views, because of their small numbers, their location in the background, and the viewing distance (which would range from 1 to 3.5 miles), they would be unlikely to be dominant elements in the scene. The Council finds that construction and operation of the facility would not result in significant adverse impact to the significant or important scenic and aesthetic values within the John Day River area.

Oregon National Historic Trail

The Oregon National Historic Trail received federal designation to commemorate the historic travel route and to promote its preservation, interpretation and public use and appreciation. The Trail passes through six states and covers 2,130 miles. Within the analysis area are five "high potential" sites: Fourmile Canyon, John Day River Crossing, Biggs Junction, Deschutes River Crossing and The Dalles Complex. The management plan does not identify specific scenic or aesthetic values beyond these five sites. "High potential" sites are sites that have potential to interpret the Trail's historical significance, that afford a high-quality recreational experience and greater than average scenic values.

Orion found that all of these "high potential" sites lie outside the areas from which the proposed facility's turbines might be visible. The Council finds that the Biglow facility is not likely to result in significant adverse impact to the scenic values associated with the Oregon National Historic Trail.

Sherman County

Section XI of the Sherman County Comprehensive Plan identifies important landscape features within the County, including rock outcroppings, trees, the John Day River Canyon and the Deschutes River Canyon. The related goal is SCCP Goal X: "Preserve the integrity of the Sherman County Landscape." The single policy under this goal is: "Trees should be considered an important feature of the landscape and therefore the County Court shall encourage the retention of this resource when practical." The proposed Biglow facility would not require the removal of any trees. The Council finds that the proposed Biglow facility would not result in a significant adverse impact to the scenic resources identified in the local Sherman County land use plan.

The segment of US Highway 97 extending from Biggs in Sherman County to Baker City in Baker County has been designated by the Oregon Department of Transportation as the Journey Through Time Scenic Byway. Although the Biglow facility would be visible from locations along US 97, there are no scenic overlooks or vista points along the segment of the highway in the vicinity of the proposed facility. The Council finds that the proposed Biglow facility would not result in a significant adverse impact to the Journey Through Time Scenic Byway.

Gilliam County

The applicant states that the Gilliam County Comprehensive Plan, Part 5, identifies "rock outcroppings marking the rim and walls of steep canyon slopes" as important scenic resources. The Council finds that the proposed Biglow facility is not likely to have a significant impact on viewing rock outcroppings and scenic canyons in Gilliam County. In addition, the Plan identifies the John Day River corridor as a scenic resource, but Gilliam County defers to the Oregon State Scenic Waterways Act to govern this resource and deems additional regulation unnecessary. The visual impact of the proposed facility on the John Day River Canyon has been described above.

Wasco County

The applicant states that the Wasco County Comprehensive plan identifies the Deschutes and John Day Scenic Waterways, the White River canyon, and the Columbia River Gorge as important scenic resources. The visual impacts of the proposed facility on the Columbia River Gorge and on the Deschutes and John Day River canyons have been described above. White River Canyon lies outside the 30-mile analysis area. The nearest parts of Wasco County are eight miles or more from the proposed Biglow facility. The Council finds that the proposed facility would not have a significant adverse effect on important scenic resources in Wasco County.

Morrow County

The nearest parts of Morrow County are at least 20 miles from the proposed Biglow facility site, and the facility would not be visible from any part of Morrow County. The Council finds that the proposed facility would not have a significant effect on important scenic resources in Morrow County.

Klickitat County

Klickitat County, Washington, lies north of Sherman County on the north side of the Columbia River. The nearest parts of Klickitat County are at least nine miles from the proposed Biglow facility site. While some facility turbines may be visible from Klickitat County, the facility is unlikely to have a significant effect on visual qualities due to the distance from the site and intervening topography. The Council finds that the proposed facility would not have a significant effect on important scenic resources in Klickitat County.

Yakima County

Orion found that Biglow facility turbines might be visible in a very small area at the southern edge of Yakima County. This area falls within the boundaries of the Yakama Indian Reservation. Because this small area is about 29 miles from the closest turbine, the turbines have a low probability of being detectable under most atmospheric and lighting conditions. Consequently, the turbines are unlikely to have any impact on views from Yakima County. The Council finds that the proposed facility would not have a significant effect on important scenic resources in Yakima County.

The Dalles

Orion found that the proposed facility would not be visible from The Dalles. The Council finds that the proposed facility would not have a significant effect on important scenic resources in The Dalles.

Goldendale

Orion found that the proposed facility would not be visible from Goldendale, Washington. The Council finds that the proposed facility would not have a significant effect on important scenic resources in Goldendale.

The Council finds that no conditions other than those addressed in the Siting Standards for Wind Energy Facilities section in the order are required for Orion to comply with OAR 345-022-0080.

Conclusions of Law

The Council concludes that the design, construction, operation and retirement of the facility, taking into account mitigation, are not likely to result in significant adverse impact to scenic and aesthetic values identified as significant or important in applicable federal land management plans or in local land use plans in the analysis area. Based on these findings and recommended conditions, the Council concludes that the proposed facility complies with the Scenic and Aesthetic Values Standard.

(e) Recreation

OAR 345-022-0100

(1) Except for facilities described in section (2), to issue a site certificate, the Council must find that the design, construction and operation of a facility, taking into account mitigation, are not likely to result in a significant adverse impact to important recreational opportunities in the analysis area as described in the project order. The Council shall consider the following factors in judging the importance of a recreational opportunity:

(a) Any special designation or management of the location;

(b) The degree of demand;

(c) Outstanding or unusual qualities;

(d) Availability or rareness;

(e) Irreplaceability or irretrievability of the opportunity.

* * *

Findings of Fact

A. Recreational Opportunities in the Analysis Area

Orion provided information about compliance with the Council's Recreation Standard in Exhibit T of the ASC. The analysis area for the Recreation is the area within the site boundary and five miles from the site boundary.

In general, recreational activities in the vicinity of the proposed facility include camping, hiking, upland bird and big game hunting, rafting, boating, fishing, sightseeing, nature and wildlife photography, and bicycling. Based on the criteria outlined in the Council's Recreation Standard, Orion found there were no important recreational facilities or opportunities within the site boundary. However, Orion did identify three potentially important opportunities in the analysis area: (1) the John Day River; (2) the Journey Through Time Scenic Byway; and (3) the Historic Oregon Trail alignment, including the Barlow Road Cutoff Trail alignment.

John Day River

The main stem of the John Day River, between river miles 0 and 20, runs through the analysis area. This segment of the river, a designated federal Wild and Scenic River, is classified as Recreational. The primary recreational uses on the segment of river within the analysis area include fishing, boating, and bird hunting. Outstanding remarkable values include scenery, recreation, fish, wildlife, geology, paleontology, and archaeology. Botanical and ecological values are also deemed significant. The segment is also designated as a State Scenic Waterway pursuant to the Oregon State Scenic Waterways Act administered by the Oregon Parks and Recreation Department. The Oregon Department of Fish and Wildlife administers the John Day Wildlife Refuge located upstream of the confluence of the John Day and Columbia Rivers (located within the analysis area). The primary purpose of the refuge is to protect wintering and nesting waterfowl. In addition, the US Army Corps of Engineers administers the John Day Arm of the Columbia Reservoir and Le Page Park, located from river mile 10 downstream to the Columbia River. The Council finds that this segment of the John Day River is an important recreational opportunity.

Journey Through Time Scenic Byway

The Journey Through Time Byway is a designated Oregon State Scenic Byway. The byway runs south out of Biggs along US 97 through the analysis area to Shaniko, where it turns east, and eventually travels to Baker City. Primary recreational uses include sightseeing and road touring. There are no developed scenic overlooks or waysides along the byway in the analysis area. The Council finds that the Journey Through Time Byway is an important recreational opportunity.

Historic Oregon Trail and Barlow Road Cutoff Trail Alignments

The Oregon Trail and the Barlow Road Cutoff Trail run through the analysis area, including portions within the site boundary. Agricultural practices and other development activities have destroyed nearly all evidence of the trails in the analysis area. Orion was unable to identify intact segments within the site boundary. The only accessible, intact segment within the analysis area that has been identified occurs near the McDonald Crossing, which is southeast of the analysis area.

Trail crossings at county and state roads are somewhat well signed within the analysis area, but many signs are dilapidated or missing. Furthermore, the surrounding landscape is

primarily private land cultivated for wheat, so the recreational opportunity is limited to visiting and viewing the approximate historic alignments from county roads.

The Council finds that the Historic Oregon Trail and Barlow Road Cutoff Road Alignments are important recreational opportunities.

B. Potential Impact on Important Recreational Opportunities

The Council finds that important recreational opportunities exist within the analysis area associated with the following features: the John Day River, the Journey Through Time Scenic Byway, and Historic Oregon Trail and Barlow Road Cutoff Road Alignments. Design, construction and operation of the proposed facility would have no direct effect on any recreational opportunities in the analysis area. The only recreation-related feature within the site boundary is some segments of the historic trail alignments, but because there are no visible signs of the trails within the site boundary, the proposed facility would have no adverse impact on any physical remnant of the trails. Wind turbines might be visible from some locations within the John Day River corridor and along the Scenic Byway. Construction noise and wind turbine noise may be audible at some locations on segments of the historic trail alignments and within the John Day River corridor. Short-term traffic delays may occur on parts of the Scenic Byway due to construction traffic, but traffic impact during operation of the proposed facility would be insignificant. These impacts are not likely to interfere significantly with the recreational opportunities for hunting, rafting, boating, fishing, sightseeing, nature and wildlife photography, bicycling, horseback riding, hiking or camping within the analysis area.

Conclusions of Law

The Council concludes that the design, construction and operation of the proposed facility, taking into account mitigation and subject to conditions stated in this order, are not likely to result in significant adverse impact to important recreational opportunities in the analysis area. The Council concludes that the proposed facility complies with the Recreation Standard. There are no conditions specifically related to this finding, but conditions recommended in the Scenic and Aesthetic Values Standard, Historic, Cultural and Archaeological Resources Standard, and Noise Control Regulations sections may serve to mitigate the impact of the facility on the enjoyment of recreational opportunities.

(f) Public Health and Safety Standards for Wind Energy Facilities

OAR 345-024-0010

* * *

(2) To issue a site certificate for a proposed wind energy facility, the Council must find that the applicant:

(a) Can design, construct and operate the facility to exclude members of the public from close proximity to the turbine blades and electrical equipment;

(b) Can design, construct and operate the facility to preclude structural failure of the tower or blades that could endanger the public safety and to have adequate safety devices and testing procedures designed to warn of impending failure and to minimize the consequences of such failure.

Findings of Fact

Because Biglow would be located on private property, public access to the facility would be limited. Turbine towers would be located at least 450 feet from any residence or public road to ensure that in the unlikely event a turbine tower became dislodged from its foundation it would not fall upon a house or roadway. Turbine blade tips would be approximately 132 feet above ground at the closest point of rotation. Towers would be smooth steel structures with no exterior ladders or access to the turbine blades. Tower entry doors would be locked. There would be no access to the nacelles or turbine tower interiors or to the electrical equipment contained within the nacelles or turbine tower interiors. Step-up transformers would be located within locked cabinets at the base of each tower.

Towers and tower foundations, as well as aboveground transmission line support structures, would be designed according to applicable building codes to avoid failure or collapse. During construction of the facility, the certificate holder would follow the manufacturers' recommended handling instructions and procedures to prevent damage to towers or blades that could lead to failure.

During operation of the facility, the certificate holder would have an operational safety-monitoring program and would inspect turbine blades on a regular basis for signs of wear. All turbines would have self-monitoring devices linked to sensors at the O&M facility to alert operators to potentially dangerous conditions.

Electric transformers and other equipment associated with the proposed substation would be enclosed by a fence with a locked gate and otherwise be made inaccessible to the public. Warning signs would be posted as required by law for the safety of the public.

To find that Orion can comply with OAR 345-024-0010, the Council adopts the following conditions in the site certificate:

(37) During construction, operation or retirement of the facility, the certificate holder shall notify the Department within 72 hours of any accidents that may result in public health and safety concerns, including mechanical failures on the site associated with construction or operation of the facility.

(38) Before beginning construction of any phase of the facility, the certificate holder shall submit a Notice of Proposed Construction or Alteration to the Federal Aviation Administration (FAA) identifying the proposed final locations of the turbines and related or supporting facilities for that phase of the facility. The certificate

holder shall notify the Department of the FAA's response as soon as it has been received.

(39) The certificate holder shall enclose the facility substation with appropriate fencing and locked gates to protect the public from electrical hazards.

(40) The certificate holder shall not locate turbine towers within 450 feet of any residence. The certificate holder shall not locate turbine towers within 450 feet of any public road, unless the certificate holder demonstrates to the Department's satisfaction that a lesser setback is consistent with the protection of public health and safety.

(41) The certificate holder shall construct turbine towers that are smooth steel structures with no exterior ladders or access to the turbine blades and shall install locked access doors accessible only to authorized personnel.

(42) During construction of the facility, the certificate holder shall follow manufacturers' recommended handling instructions and procedures to prevent damage to towers or blades that could lead to failure.

(43) During operation of the facility, the certificate holder shall have an operational safety-monitoring program and shall inspect turbine blades on a regular basis for signs of wear. The certificate holder shall repair turbine blades as necessary to protect public safety.

(44) During operation of the facility, the certificate holder shall install and maintain self-monitoring devices on each turbine, connected to a fault annunciation panel or supervisory control and data acquisition (SCADA) system at the O&M facility, to alert operators to potential dangerous conditions, and the certificate holder shall remedy any dangerous conditions immediately.

(45) During construction of the facility, the certificate holder shall install generator step-up transformers at the base of each turbine tower in locked cabinets designed to protect the public from electrical hazards and to avoid creation of artificial habitat for raptor prey.

(46) During construction of the facility, the certificate holder shall require that all on-site construction contractors develop and implement a site health and safety plan that informs on-site workers and others what to do in case of an emergency and that

includes the locations of fire extinguishers and nearby hospitals, important telephone numbers, and first aid techniques.

(47) During operation of the facility, the certificate holder shall develop and implement a site health and safety plan that informs on-site employees and others what to do in case of an emergency and that includes the locations of fire extinguishers and nearby hospitals, important telephone numbers, and first aid techniques.

Conclusions of Law

The Council concludes that the certificate holder can design, construct and operate the facility to exclude members of the public from close proximity to the turbine blades and electrical equipment. The Council further concludes that the certificate holder can design, construct and operate the facility to preclude structural failure of the turbine towers or blades that could endanger the public safety and to have adequate safety devices and testing procedures designed to warn of impending failure and to minimize the consequences of such failure. The Council adopts Conditions (37). (38), (39), (40), (41), (42), (43), (44), (45), (46) and (47) in the site certificate. Based on these findings and conditions, the Council concludes that the proposed facility complies with the Public Health and Safety Standards for Wind Energy Facilities.

(g) Siting Standards for Wind Energy Facilities

OAR 345-024-0015
To issue a site certificate for a proposed wind energy facility, the Council must find that the applicant:

(1) Can design and construct the facility to reduce visual impact by methods including, but not limited to:

(a) Not using the facility for placement of advertising, except that advertising does not include the manufacturer's label or signs required by law;

(b) Using the minimum lighting necessary for safety and security purposes and using techniques to prevent casting glare from the site, except as otherwise required by the Federal Aviation Administration or the Oregon Department of Transportation, Transportation Development Branch, Aeronautics Section; and

(c) Using only those signs necessary for facility operation and safety and signs required by law;

(2) Can design and construct the facility to restrict public access by the following methods:

(a) For a horizontal-axis wind energy facility with tubular towers, using locked access sufficient to prevent unauthorized entry to the interior of the tower;

(b) For a horizontal-axis wind energy facility with lattice-type towers:

(A) Removal of wind facility tower climbing fixtures to 12 feet from the ground;

(B) Installation of a locking, anti-climb device on the wind facility tower; or

(C) Installation of a protective fence at least 6 feet high with a locking gate; or

(c) For a vertical-axis wind energy facility, installation of a protective fence at least 6 feet high with a locking gate;

(3) Can design and construct facility to reduce cumulative adverse environmental impacts in the vicinity to the extent practicable by measures including, but not limited to, the following, where applicable:

(a) Using existing roads to provide access to the facility site, or if new roads are needed, minimizing the amount of land used for new roads and locating them to reduce adverse environmental impacts;

(b) Combining transmission lines and points of connection to local distribution lines;

(c) Connecting the facility to existing substations, or if new substations are needed, minimizing the number of new substations; and

(d) Avoiding, to the extent practicable, the creation of artificial habitat for raptors or raptor prey. Artificial habitat may include, but is not limited to:

(A) Above-ground portions of foundations surrounded by soil where weeds can accumulate;

(B) Electrical equipment boxes on or near the ground that can provide shelter and warmth; and

(C) Horizontal perching opportunities on the towers or related structures.

Findings of Fact

A. Visual Impact

In constructing Biglow, Orion would use turbine towers, nacelles and rotors that are locally uniform and that conform to high standards of industrial design to present a trim,

uncluttered, aesthetic appearance. Orion would paint the turbine towers, nacelles and rotors with a low-reflectivity, neutral gray, white, off-white or earth tone finish to control contrast with the sky backdrop and to control the reflections that can call attention to structures in the landscape. Orion would use neutral gray, white, off-white or earth tone finishes for the small cabinets containing pad-mounted equipment that may be located at the base of each turbine to help the cabinets blend into the surrounding background.

Orion would restrict exterior lighting on the turbines to the aviation warning lights required by the Federal Aviation Administration (FAA). Orion would use the minimum number of lowest intensity lights required to meet the FAA standards.

Orion would apply a low-reflectivity finish to the exterior of the O&M building and substation equipment to control their visual integration into the surrounding background. Outdoor lighting at the O&M building and substation would be restricted to the minimum lighting required for safety and security. Sensors and switches would be used to keep the lighting turned off when not required, and all lights would be hooded and directed to control backscatter and off-site light trespass. Orion would use low-reflectivity insulators and fencing with a dull finish at the substation to reduce contrast with the surroundings.

Orion would not allow advertising on any part of the facility site. Signs would be limited to those required by law or for safety and convenience, including signs posting the maximum traffic speed, stop signs at intersections of access roads, and warning signs on or near electrical equipment. Turbine nacelles would be printed with the turbine manufacturer's logo.

B. Restriction of Public Access

Because Biglow would be located on private property, public access to the facility would be limited. The facility would use horizontal-axis wind turbines on tubular towers. Tower entry doors would be locked. There would be no access to the nacelles or turbine tower interiors or to the electrical equipment contained within the nacelles or turbine tower interiors. Step-up transformers would be located within locked cabinets at the base of each tower.

C. Cumulative Environmental Effects

At maximum build-out, Biglow would consist of up to 225 turbines. In addition, the proposed Klondike III Wind Project (with up to 165 turbines) and the existing Klondike I and Klondike II Wind Projects (with a total of 66 turbines) would lie south of the Biglow site. If the maximum number of proposed turbines are approved and built, there would be a cumulative total of 456 wind turbines in the immediate area.

Access Roads

Orion proposes to use existing roads for access to the facility site to the maximum extent feasible. However, in order to reach ridges where no roads currently exist, Orion would build about 40.49 miles of new access roads. All new access roads would be limited to

locations within the site boundary. Road construction and improvement would not significantly affect wetlands, other waters of the state, or fish and wildlife habitat.

Transmission Lines and Substations

Electrical lines for the facility would consist primarily of underground 34.5-kV collector cables that would follow road rights-of-way wherever possible. To address geotechnical, environmental or agricultural constraints, up to 15 miles of the 88.6-mile collector system could be mounted on aboveground single wood poles. Collector cable routes would be combined where cables could run close to one another, such as on approach to the substation.

Orion proposes to build one of two alternative substations and high-voltage transmission lines. Under one alternative, Orion would construct a substation near the center of the facility site and install a 7-mile-long overhead transmission line to interconnect with the BPA John Day Substation northwest of the facility site. Under the other alternative, Orion would construct a substation in the southern section of the facility site and install a 3-mile-long transmission line to interconnect with the Klondike Schoolhouse Substation south of the facility site.

Raptor Protection

Orion would design the facility to avoid creating artificial habitat for raptors or raptor prey. All aboveground portions of the turbine pads would be graveled to reduce the potential for weed infestation and raptor use. Orion would implement an ongoing weed control plan. The turbine towers and pad-mounted transformers would be enclosed and would provide no opportunities for shelter or warmth for wildlife. Orion would ensure that the turbine towers and meteorological towers provided no perching opportunities by using tubular steel structures rather than lattice towers. The overhead transmission structures would be equipped with anti-perching devices.

To find that the certificate holder can comply with OAR 345-024-0015, the Council adopts the following conditions in the site certificate:

(48) The certificate holder shall construct turbines on concrete foundations and shall cover the ground within a minimum 10-foot radius with non-flammable material. The certificate holder shall maintain the non-flammable pad area covering throughout operation of the facility.

(49) During construction and operation of the facility, the certificate holder shall implement a plan to control the introduction and spread of noxious weeds. The certificate holder shall develop the weed control plan in consultation with the Sherman County Weed Control District and the Department.

(50) During construction of the facility, to reduce the visual impact of the facility, the certificate holder shall:

(a) Paint turbine towers, nacelles, rotors, meteorological towers, and cabinets containing pad-mounted equipment with a low-reflectivity, neutral gray, white, off-white or earth tone finish to reduce contrast with the surrounding background.

(b) Apply a low-reflectivity finish to the exterior of the O&M building and substation equipment to control their visual integration into the surrounding background.

(c) With the exception of the turbine manufacturer's logo that may appear on turbine nacelles, not allow any advertising to be used on any part of the facility or on any signs posted at the facility.

(d) Use only those signs required by law or for facility safety or security, except that the certificate holder may erect a sign near the O&M facility or substation to identify the wind energy facility.

(51) The certificate holder shall design and construct the O&M building to be generally consistent with the character of similar buildings used by commercial farmers or ranchers in the area and shall paint the building in a neutral color to blend with the surrounding background.

(52) The certificate holder shall not use exterior nighttime lighting except:

(a) The minimum turbine tower lighting required by the Federal Aviation Administration.

(b) Security lighting at the O&M building and substation, provided that such lighting is shielded or directed downward to reduce glare.

(c) Minimum lighting necessary for repairs or emergencies.

Conclusions of Law

The Council concludes that, subject to the conditions stated in this order, the proposed design and construction of Biglow would reduce visual impact, restrict public access and reduce cumulative adverse environmental impacts in accordance with the requirements of OAR 345-024-0015. The Council adopts Conditions (48), (49), (50), (51) and (52) in the site certificate. Based on these findings and conditions, the Council concludes that the proposed facility complies with the Council's Siting Standards for Wind Energy Facilities.

(h) Siting Standards for Transmission Lines

OAR 345-024-0090

To issue a site certificate for a facility that includes any high voltage transmission line under Council jurisdiction, the Council must find that the applicant:

(1) Can design, construct and operate the proposed transmission line so that alternating current electric fields do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public;

(2) Can design, construct and operate the proposed transmission line so that induced currents resulting from the transmission line and related or supporting facilities will be as low as reasonably achievable.

Findings of Fact

Orion proposes to build one or the other of two alternative overhead high-voltage transmission lines, each with two optional routings, to connect the wind energy facility to the BPA system. One alternative would be a transmission line about 3 miles long connecting a new substation in the southern portion of the facility site to the Klondike Schoolhouse Substation. Under the first option, this transmission line would interconnect with the Klondike Schoolhouse substation by passing diagonally across agricultural land from the intersection of North Klondike Road and Hilderbrand Lane to interconnect with the substation. Under the second option, this transmission line would avoid crossing agricultural land by paralleling the route of existing roads. The other alternative would be a transmission line about 7 miles long connecting a new substation near the center of the facility site to the BPA John Day Substation. Under the first option, this transmission line would interconnect with the BPA John Day Substation by paralleling the route of Herin Lane. Under the second option, this transmission line would generally follow the same route but by means of straight lines across agricultural lands rather than paralleling the route of Herin Lane. The transmission lines would be either one 3-phase, 230-kV circuit, with two conductors per phase, or one 3-phase, 500-kV circuit, with three conductors per phase.

In addition to the overhead high-voltage transmission line, Orion proposes to install a 34.5-kV collector system to interconnect the wind turbines with the substation. This collector system would consist of about 233,333 feet of 3-wire electric cable, most of which would be installed underground, and some of which would be bundled in a single trench where the cables follow the same alignment, *e.g.*, on approach to the substation. To span terrain, including canyons, grasslands, wetlands, intermittent streams, and cultivated areas, Orion expects to install some portion (about 15 miles) of the collector system above ground on pole or tower structures.

Electric Fields. Strong electric fields can induce electric voltages in nearby objects, such as fences. If proper precautions are not taken, these induced currents might result in electric shocks.

The Council has adopted a limit for electric fields from transmission lines of 9 kV per meter at one meter above the ground surface in areas that are accessible to the public. OAR 345-024-0090(1). The BPA guidelines for its transmission lines limit electric fields to a maximum of 9 kV per meter within the ROW, 5 kV per meter at the edge of the ROW, and 5 kV per meter at highway crossings. (BPA Red Book, 1993)

For the overhead transmission lines, Orion calculated electric fields one meter above grade at mid-span where the conductor is positioned at its lowest point between structures (the estimated maximum sag point) using the program called, "Corona and Field Effect Program (Version 3) developed by the Bonneville Power Administration.0

The calculations showed that the maximum electric field strengths in the right-of-way would be about 3.8 kV per meter for the 230-kV transmission line, about 8.2 kV per meter for the 500-kV transmission line, about 0.25 kV per meter for the overhead segments of the single-circuit 34.5-kV collector system, and about 0.705 kV per meter for the overhead segments of the double-circuit 34.5-kV collector system. For the underground segments of the 34.5-kV collector system, the electric field is contained within the cables, and no electric field is measurable at the ground surface.

Orion stated there would be no occupied buildings, including residences, within 200 feet on either side of the proposed centerline of the 230-kV and 500-kV electric transmission line alternatives. However, four residences and a proposed O&M building would lie within 200 feet of the centerline of the proposed 34.5-kV collector system. Until Orion has completed its final turbine site layout, it will not be possible to determine whether these structures will lie adjacent to underground or overhead segments of the proposed 34.5-kV collector system. In any event, it appears there would be no ground level electric fields associated with the underground segments of the 34.5-kV collector system, and the electric fields associated with the overhead segments of the 34.5-kV collector system would be well below the Council's limit of 9 kV per meter at one meter above the ground surface in areas that are accessible to the public.

To find that the certificate holder can comply with OAR 345-024-0090, the Council adopts the following conditions in the site certificate:

(53) The certificate holder shall design the transmission lines so that alternating current electric fields shall not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public.

(54) The certificate holder shall design the transmission lines so that induced voltages resulting from the transmission lines are as low as reasonably achievable.

Conclusions of Law

The Council concludes that, subject to the conditions stated in this Order, the certificate holder can design, construct and operate the proposed transmission lines so that

alternating current electric fields do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public. The Council concludes that, subject to the conditions stated in this Order, the certificate holder can design, construct and operate the proposed transmission lines so that induced currents resulting from the transmission lines and related or supporting facilities will be as low as reasonably achievable. The Council adopts Conditions (53) and (54) in the site certificate. Based on these findings and recommended conditions, the Council concludes that the proposed facility would comply with the Siting Standards for Transmission Lines.

4. Standards to Protect Wildlife

(a) Threatened and Endangered Species

OAR 345-022-0070
To issue a site certificate, the Council, after consultation with appropriate state agencies, must find that:

(1) For plant species that the Oregon Department of Agriculture has listed as threatened or endangered under ORS 564.105(2), the design, construction, operation and retirement of the proposed facility, taking into account mitigation:

(a) Are consistent with the protection and conservation program, if any, that the Oregon Department of Agriculture has adopted under ORS 564.105(3); or

(b) If the Oregon Department of Agriculture has not adopted a protection and conservation program, are not likely to cause a significant reduction in the likelihood of survival or recovery of the species; and

(2) For wildlife species that the Oregon Fish and Wildlife Commission has listed as threatened or endangered under ORS 496.172(2), the design, construction, operation and retirement of the proposed facility, taking into account mitigation, are not likely to cause a significant reduction in the likelihood of survival or recovery of the species.

Findings of Fact

Orion provided information about compliance with the Council standard in Exhibit Q of the application. The analysis area for threatened or endangered plant and wildlife species is the area within the site boundary and 5 miles from the site boundary.

Orion contacted the U.S. Fish and Wildlife Service (USFWS) and the Oregon Natural Heritage Information Center (ONHIC) to request information on threatened, endangered and sensitive species within the 5-mile analysis area. Orion reviewed available wildlife literature and scientific data and contacted the Oregon Department of Fish and Wildlife (ODFW) to request information on fish and wildlife habitat requirements and distribution in the area. In

addition, Orion contacted the Oregon Department of Agriculture (ODA) for information about plant distribution and protection and conservation programs.

Plant Identification and Survey Protocol

CH2M Hill conducted an investigation for rare plants in the analysis area. The survey included a thorough literature review and consultation with USFWS and ORNHIC and other sources. "Target" species for the investigation included plants listed as threatened or endangered by USFWS, as well as plants that have been formally proposed, or are candidates, for federal listing. In addition, target species included those defined as threatened or endangered by the ODA.

The analysis area is predominantly cultivated agricultural land under dry land wheat production. A few small native plant communities remain, mostly along the northern edge of turbine strings and steep side slopes of canyons. These areas consist largely of sagebrush and rabbitbrush-dominated shrub lands with an understory of native and invasive grasses and forbs. Large and small tracts of Conservation Reserve Program land are sprinkled through the analysis area.

CH2M Hill performed field surveys in June 2005. The rare plant field survey was designed to take in all ground potentially disturbed by construction or operation of Biglow, including all land within at least 400 feet on both sides of the centerline of all proposed turbine strings, underground and overhead electrical lines and access roads.

CH2M Hill's research found that the proposed Biglow area could provide at least small areas of suitable habitat for the three target plant species, but its field surveys did not locate any occurrences of the target species. Based on the research and field surveys conducted by CH2M Hill, the design, construction, operation and retirement of Biglow is unlikely to have any impact on state or federally listed threatened or endangered plant species.

Because Orion does not anticipate any direct facility-related impacts to any federal or state endangered, threatened, sensitive, proposed, or candidate plant species, the applicant has not proposed any species-specific mitigation measures. However, Orion proposed measures to mitigate possible indirect effects to any plant species of concern in the vicinity, including a plan for the control of noxious weeds (as discussed in the Siting Standards for Wind Energy Facilities section of the order) and a comprehensive fire control plan (as discussed in the Public Health and Safety Standard section of the order).

In its application supplement, Orion proposed transmission line and substation modifications that added nearly 40 acres located within the analysis area but not yet surveyed for threatened and endangered species. The unsurveyed acres occur in three locations. The first location is a sliver of 5.22 acres of Conservation Reserve Program land located adjacent to the site of the John Day substation. The land is designated habitat category 3. The second location is 12.91 acres of grassland land adjacent to and north of the transmission line. The land is designated habitat category 4. The third location is 21.14 acres of mostly Conservation Reserve Program land to the north of the proposed easterly substation. The land is designated habitat category 3.

The Department directed Orion to perform the appropriate surveys in the appropriate season for threatened and endangered plant and wildlife species in these areas and to provide the results for inclusion in the proposed order. However, Orion's results were scheduled for delivery at the end of June 2006 at about the same time as the Council was scheduled to make its decision on the order. As a result of this timing, Orion must now provide these results prior to commencement of construction.

The Council adopts the following condition in the site certificate:

(55) Before beginning construction of the facility, the certificate holder shall deliver to the Department surveys for threatened and endangered plant and wildlife species in newly affected areas as identified in the ASC Supplement.

Fish and Wildlife Identification and Survey Protocol

Orion requested database information from the USFWS and the ONHIC on the potential for occurrence of threatened, endangered and sensitive species within the 5-mile analysis area (the area within the site boundary and five miles beyond the site boundary). In addition, Orion conducted a literature search and consulted with ODFW regarding species distribution and habitat requirements. Based on the literature review and consultations, Orion identified the threatened or endangered species that have the potential to exist in the analysis area. These species are listed in Table 9.

Table 9

Threatened and Endangered Species That May Occur in the Analysis Area

Species	Status
Birds	
Bald Eagle (*Haliaeetus leucocephalus*)	Federal and state threatened species
American Peregrine Falcon (*Falco peregrinus anatum*)	State endangered species; no federal listing
Mammals	
Gray Wolf (Canis lupus)	Federal and state endangered species; considered extirpated.
Fish	
Steelhead – Mid-Columbia River ESU, summer run (Oncorhynchus mykiss)	Federal threatened species; state sensitive-vulnerable species
Steelhead – Snake River Basin ESU	Federal threatened species; no state listing
Steelhead – Upper Columbia River ESU	Federal endangered species; no state listing
Sockeye Salmon – Salmon River Tributary to the Snake River (Oncorhynchus nerka)	Federal endangered species; no state listing
Chinook Salmon – Snake River ESU, spring/summer and fall runs (Oncorhynchus tshawytscha)	Federal and state threatened species
Chinook Salmon – Upper Columbia River ESU	Federal endangered species

In addition to the literature review, Orion performed wildlife surveys as described in the *Wildlife Baseline Study Protocols (August 2005),* which is included in the application as Attachment P-1A, and the *Additional Wildlife Baseline Survey Protocols (Fall 2005),* which is included in the application as Attachment P-1B, and in the *Wildlife and Habitat Baseline Study Report (October 2005),* which is included in the application as Attachment P-2. In summary, these surveys included:

- General habitat mapping to delineate habitat categories within a minimum of 1,000 feet of all facilities as well as all areas within the interior of the project area.
- Ground surveys consisting of walking transect searches for sensitive species within 836 feet of all project component centerlines or boundaries located in non-cultivated or non-developed habitat. Searches were conducted twice during the spring nesting/breeding season.
- Nocturnal surveys to identify the presence of white-tailed jackrabbits and bats.
- Fixed-point avian use surveys: year-round avian use based on standard point counts and in-transit observations, with additional fall studies.
- Avian baseline raptor nesting survey, consisting of air surveys within a three-mile radius of the project area and follow-up ground surveys in the vicinity of some nests observed during the aerial surveys to determine activity/species.

In addition, the applicant analyzed existing mortality data for bats at existing regional wind projects in the Pacific Northwest to predict the potential impacts to bat populations from construction and operation of the proposed facility. The applicant also collected nocturnal Anabat information during the 2005 peak fall mortality period for migrating bats. In the 18 survey nights, six bat calls were detected, most likely from big brown bats (Eptesicus fuscus). Based on these results, the mean call rate (0.17 calls/night) for Biglow is lower than the mean call rate for existing wind energy facilities in the region.

Potential Impacts on Threatened or Endangered Wildlife Species

Because Orion has proposed siting its turbines anywhere within specified corridors, it has calculated potential impacts to threatened or endangered wildlife species using a "worst-case" approach. The impacts discussed below are the maximum impacts that could occur within the facility footprint.

The proposed facility would have no significant impact on any of the fish species listed in Table 9 because of the lack of fish habitat within or near the site boundary. Suitable habitat for the Washington ground squirrel includes native grassland and shrub-steppe habitat. Small areas of these habitat types occur within the site boundary, but there have been no reported sightings of the ground squirrel west of the John Day River.

Bald Eagle

The bald eagle is a federal and state-listed threatened species. The critical nesting period for the bald eagle is from January 1 to August 15. Based on the literature, no bald eagle nests, roosting areas or critical habitat areas exist within the analysis area. The nearest known bald eagle nest to the site is 10 miles west along the Columbia River.

The bald eagle wintering period is from November 15 to March 15. Wintering bald eagles favor undisturbed areas where food and water are abundant. Wintering bald eagles may roost communally at night near major foraging areas, typically isolated areas within old growth stands. Winter raptor surveys conducted by ODFW and others in the vicinity of Biglow have found bald eagles feeding on wintering waterfowl along the Columbia River corridor but have not found bald eagles using upland areas within or near the site boundary.

No bald eagles were observed during the project's avian baseline surveys. Accordingly, the design, construction, operation and retirement of Biglow is not expected to have any significant impact on bald eagles. Because nesting ranges and locations of bald eagles are constantly changing, the database should be reviewed again if construction of Biglow occurs after 2006.

Peregrine Falcon

The peregrine falcon is a state-listed endangered species. The species was removed from the federal list of endangered and threatened wildlife in August 1999. The critical nesting period for the peregrine falcon is mid-February through May. Peregrine falcons prefer to nest on ledges found along river courses and other large bodies of water, but they will also use suitable nesting ledges on man-made structures. Prey species may exist within the site boundary where suitable habitat exists. Grain elevators in the vicinity support pigeons, which are likely prey for peregrine falcons.

Peregrine falcons may occur in the analysis area year-round. There are three peregrine falcon eyries in the vicinity of Biglow. The two closest eyries are about three miles to the north along the south side of the Columbia River corridor. Data on these nests indicate they were active in 2003 and 2004, with all nests fledging young in 2003 and all but one nest fledging young in 2004. No peregrine falcons were observed during the project's avian baseline surveys. Accordingly, although the species may be present in the area, the design, construction, operation and retirement of the Biglow is not expected to have any significant impact on peregrine falcons. Because nesting ranges and locations of peregrine falcons eagles are constantly changing, the database should be reviewed again if construction of Biglow occurs after 2006.

To find that the certificate holder can comply with OAR 345-022-0070, the Council adopts the following conditions in the site certificate:

(56) If construction of the facility begins after 2006, the certificate holder shall review the ONHIC and USFWS databases and consult with an expert designated by ODFW on an annual basis before beginning construction to determine whether nesting bald eagles or peregrine falcons have been documented to occur within two miles of the facility. The certificate holder shall report the results of the database review and consultation to the Department and to ODFW and, if there have been new documentations of nesting bald eagles or peregrine falcons within two miles of the facility, the

certificate holder shall implement appropriate measures to protect the species from adverse impact, as approved by the Department and ODFW.

(57) The certificate holder shall implement measures to mitigate impacts to sensitive wildlife habitat during construction including, but not limited to, the following:

(a) Preparing maps to show sensitive areas, such as nesting or denning areas for sensitive wildlife species, that are off limits to construction personnel.

(b) Ensuring that a qualified person instructs construction personnel to be aware of wildlife in the area and to take precautions to avoid injuring or destroying wildlife or significant wildlife habitat.

(c) Avoiding unnecessary road construction, temporary disturbance and vehicle use.

Conclusions of Law

The Council concludes that no Oregon Department of Agriculture conservation program applies and that the design, construction, operation and retirement of the proposed facility, taking into account mitigation and subject to the conditions stated in this order, does not have the potential to significantly reduce the likelihood of the survival or recovery of any threatened or endangered species listed under Oregon law. The Council adopts Conditions (55), (56) and (57) in the site certificate. Based on these findings and recommended conditions, the Council concludes that the proposed facility complies with the Threatened and Endangered Species Standard.

(b) Fish and Wildlife Habitat

OAR 345-022-0060
To issue a site certificate, the Council must find that the design, construction, operation and retirement of the facility, taking into account mitigation, are consistent with the fish and wildlife habitat mitigation goals and standards of OAR 635-415-0025 in effect as of September 1, 2000.

Findings of Fact

A. Mitigation Goals and Standards

ODFW has defined six categories of habitat in order of value to wildlife. The rule establishes mitigation goals and corresponding implementation standards for each habitat category. The habitat definitions contained in OAR 635-415-0025 are as follows.[48]

"Habitat Category 1" is irreplaceable, essential habitat for a fish or wildlife species, population, or a unique assemblage of species and is limited on either a physiographic province or site-specific basis, depending on the individual species, population or unique assemblage.

The mitigation goal for Category 1 habitat is no loss of either habitat quantity or quality. This goal requires avoidance of impacts.

"Habitat Category 2" is essential habitat for a fish or wildlife species, population, or unique assemblage of species and is limited either on a physiographic province or site-specific basis depending on the individual species, population or unique assemblage.

[48] The ODFW rules define habitat into two broad classifications of "essential" and "important." OAR 635-415-0005 defines "essential habitat" as "any habitat condition or set of habitat conditions which, if diminished in quality or quantity, would result in depletion of a fish or wildlife species." The rule defines "important habitat" as "any habitat recognized as a contributor to sustaining fish and wildlife populations on a physiographic province basis over time."

If impacts are unavoidable, the mitigation goal for Category 2 habitat is no net loss of either habitat quantity or quality *and* provision of a net benefit of habitat quantity or quality. The Council interprets this to mean that both habitat quantity and quality must be preserved and either habitat quantity or habitat quality must be improved. To achieve this goal, impacts must be avoided or unavoidable impacts must be mitigated through reliable "in-kind, in-proximity" habitat mitigation to achieve no net loss of either pre-development habitat quantity or quality. In addition, a net benefit of habitat quantity or quality must be provided.

> *"Habitat Category 3" is essential habitat for fish and wildlife, or important habitat for fish and wildlife that is limited either on a physiographic province or site-specific basis, depending on the individual species or population.*

The mitigation goal for Category 3 habitat is no net loss of either habitat quantity or quality. The Council interprets this to mean that both habitat quantity and quality must be preserved. The goal is achieved by avoidance of impacts or by mitigation of unavoidable impacts through reliable "in-kind, in-proximity" habitat mitigation to achieve no net loss in either pre-development habitat quantity or quality.

> *"Habitat Category 4" is important habitat for fish and wildlife species.*

Like Category 3, the mitigation goal for Category 4 habitat is no net loss in either existing habitat quantity or quality. The Council interprets this to mean that both existing habitat quantity and quality must be preserved. The goal is achieved by avoidance of impacts or by mitigation of unavoidable impacts. In contrast to Category 3, mitigation options are less constrained and may involve reliable "in-kind or out-of-kind, in-proximity or off-proximity" habitat mitigation to achieve no net loss in either pre-development habitat quantity or quality.

> *"Habitat Category 5" is habitat for fish and wildlife having high potential to become either essential or important habitat.*

If impacts are unavoidable, the mitigation goal for Category 5 habitat is to provide a net benefit in habitat quantity or quality. The Council interprets this to mean that there must be some improvement in either habitat quality or quantity. The goal is achieved by avoidance of impacts or by mitigation of unavoidable impacts through actions that contribute to essential or important habitat.

> *"Habitat Category 6" is habitat that has low potential to become essential or important habitat for fish and wildlife.*

The mitigation goal for Category 6 habitat is to minimize impacts. The goal is achieved by actions that minimize direct habitat loss and avoid impacts to off-site habitat.

B. Habitat in the Analysis Area

Orion provided information in Exhibit P of the application and of the application supplement about compliance with the Habitat Standard. As described in the *Wildlife Baseline*

Study Protocol, which is included in the application as Attachment P-1A, Orion identified general habitat types within 1,000 feet of all project components based on field surveys and consultation with the Oregon Department of Fish and Wildlife (ODFW). Orion first used aerial photography to create a preliminary map, then determined the habitat area boundaries based on ground surveys that recorded dominant vegetation and habitat quality. Orion applied the ODFW habitat categories (1 through 6) using the ODFW habitat mitigation goals and standards defined in OAR 635-415-0025 to habitat within 750 feet of all project components. Figures P-1 through P-10 in the application identify and map the habitat types and categories within the analysis area. ODFW concurs with Orion's identification of the habitat categories.

While 2.64 acres of Category 1 habitat (upland trees with a Swainson's hawk nest) and 13.47 acres of Category 2 habitat (mostly higher value shrub-steppe) exist within the analysis area, none of these acres would be directly affected by the project. More than 90 percent of the habitat that would be affected by construction and operation of Biglow is Category 6 agricultural land. About eight acres of Category 3 habitat would be permanently affected, and about 15 acres of Category 3 habitat would be temporarily affected. About four acres of Category 4 habitat would be affected temporarily and the same amount permanently. The area of permanent and temporary habitat impact is shown in Table 10. "CRP" refers to the Conservation Reserve Program, a voluntary program for agricultural landowners to encourage them to plant long-term resource-conserving cover crops to improve soil, water and wildlife resources.

Because Orion has proposed siting its turbines anywhere within specified corridors, it has calculated potential impacts to fish and wildlife habitat using a "worst-case" approach. The impacts discussed below are the maximum impacts that could occur within the facility footprint.

Table 10

Area of Affected Habitat

Habitat Type	Area of temporary impact (acres)	Area of permanent impact (acres)
Category 3	**14.92**	**7.59**
CRP	13.47	7.42
Shrub-steppe	1.45	0.17
Category 4	**4.13**	**3.66**
CRP	3.07	2.70
Shrub-steppe	.06	.08
Grassland	1.00	0.88
Category 6	**368.73**	**161.64**
Developed	5.23	4.89
Agricultural	363.5	156.75
TOTAL	**387.78**	**172.89**

C. Habitat Impacts during Construction and Operation

Category 1 Habitat

Category 1 habitat consists of scattered patches of black locust and other upland trees that serve as home to raptor nests. The patches also contain varying degrees of understory deciduous shrubs, smaller locust trees and native and invasive grasses and forb species. These areas provide forage, cover and nesting habitat for sensitive species such as Swainson's hawks and potentially could provide habitat for ferruginous hawks as well as migratory songbirds. No Category 1 habitats lie within the facility footprint or within 500 feet of a turbine corridor. However, the transmission line labeled "Alternative 2" passes 269 feet south of a Swainson's hawk nest. Another Swainson's hawk nest sits in upland trees along an existing public road about 919 feet from a proposed turbine corridor. Three other upland tree active nest sites exist outside of the habitat analysis area. Those include two Swainson's hawk nests about 1,640 to 1969 feet from a turbine corridor and a red-tailed hawk nest about 902 feet from a turbine corridor.

The construction and operation of Biglow will not have any temporary or permanent direct impact on Category 1 habitat. However, the Swainson's nest close to the overhead transmission line could be indirectly affected by construction activities for the line. Impacts to the nest site from operations are not expected to be significant. The certificate holder will, during construction, protect the area within a 1300-foot buffer around any active Swainson's hawk nest during the sensitive period.

Category 2 Habitat

Category 2 habitat consists of either shrub-steppe or intermittent stream/riparian tree areas. A small area of shrub-steppe with old-growth sagebrush, understory native and invasive grasses and forbs and open areas with larger mammal burrows sits at the north end of a turbine corridor in the eastern region of the proposed project. While the area is grazed, it represents existing diverse vegetative structure important to wildlife that is limited within the agricultural landscape. However, the facility will cause no permanent or temporary direct impacts in the area, nor will the facility have any direct impact to the intermittent stream/riparian tree area located in the upper reach of Biglow Canyon. White poplar, willow, poplars, sagebrush and deciduous shrubs grow in the area. A spring-fed intermittent stream that ranges in width from about 0.5 to 2.0 meters feeds emergent wetland vegetation in the area. This habitat provides an important area to wildlife, is essential for food, water, cover and nesting, and is limited within the landscape.

Category 3 Habitat

Category 3 habitat within the analysis area consists of upland trees that lack raptor nests, intermittent streams, a pond, CRP land and shrub-steppe areas. Only the CRP and shrub-steppe lands would be affected by the proposed project. Shrub-steppe occurs primarily at the northern ends of turbine corridors in the eastern half of the proposed project, where the steeper slopes of John Day River drainages sit. Two additional areas exist along one of the proposed transmission line routes. This habitat consists of native sagebrush, rabbitbrush and mixed forb species. Several of the areas have shallow-soiled areas relatively resistant to invasive species while other areas are home to invasive species in varying quantities. These

areas are important to wildlife habitat, including sensitive species, and have the potential to be of higher quality if managed differently. Less than 0.2 acres of Category 3 shrub-steppe will be permanently affected and less than 2 acres temporarily affected by the proposed project.

Large tracts of Category 3 CRP habitat are found in the habitat analysis area. Once farmed, CRP areas have since been reseeded with grasses to provide vegetative cover for soil and wildlife conservation. Some tracts have larger, well-established sagebrush and rabbitbrush shrub cover, in addition to non-native grasses. Most, if not all, CRP lands were documented as having grasshopper sparrows, a sensitive species, and white-tailed jack rabbits also were documented in a few areas. These areas are important because they provide cover and food for wildlife and suitable habitat for grassland or ground-nesting birds. Out of the 710 acres of CRP in the analysis area, the project would affect nearly 7.42 acres permanently and a little more than 13.47 acres temporarily.

Category 4 Habitat

Category 4 habitat within the analysis area includes shrub-steppe, grassland and CRP. Category 4 grasslands are dominated by non-native weeds with occasional patches of native bunchgrass, Idaho fescue, rabbitbrush, or sagebrush. Some of these areas are narrow, small and isolated within a farmed area, containing deep-soiled areas too steep to cultivate. Other patches are shallow drainage areas within cultivated fields, again dominated by invasive species. Grasslands classified as Category 4 are important to wildlife, but they are small, covered by invasive weeds that limit wildlife forage or cover, bordered by cultivated farm ground and located where invasive species and disturbance likely will persist. Out of the 136 acres of Category 4 habitat in the analysis area, the project would affect less than an acre permanently and one acre temporarily.

Nearly 40 acres of shrub-steppe in the analysis area are labeled Category 4 habitat because of heavy livestock grazing, moderate to high levels of interspersed weeds, and only short and sparse stands of sagebrush and rabbitbrush. Such habitat has the potential for better quality if grazing intensity is modified. The project would permanently affect nearly an acre and temporarily affect less than an acre of Category 4 shrub steppe.

CRP land labeled Category 4 habitat within the analysis area is of lesser quality with less developed vegetation than other area CRP lands. While Category 4 CRP land could develop into a more diverse and dynamic wildlife habitat, it currently has limited wildlife value. Of 138.31 acres of Category 4 CRP within the analysis area, the project would affect nearly 3 acres permanently and a little more than 3 acres temporarily.

Category 6 Habitat

Category 6 habitats within the analysis area include nearly 10,500 acres of non-irrigated agricultural croplands and about 64 acres of developed areas. The agricultural areas are a monoculture of dryland winter wheat and include those areas currently in production as well as cut, fallow fields. Developed areas include residential yards and outbuildings, road and road margins, utility structures for farming, grain storage facilities, feed lots and corrals. Developed areas are highly disturbed and lack native vegetation. Due to the high level of

disturbance, these areas are unlikely to become important or essential wildlife habitat in the foreseeable future.

The proposed facility would permanently affect 156.75 acres of Category 6 agricultural land and would have a temporary impact on about 363.5 acres. The proposed facility would permanently affect 4.89 acres of Category 6 developed land and would have a temporary impact on about 5.23 acres.

D. Mitigation and Monitoring

The lack of well-established regional information about certain wind energy facility impacts on fish, wildlife and habitat has been a continuing issue for the Department as it reviews wind facility applications and recommends appropriate mitigation to the Council. In particular, recent discussions have questioned the cumulative effects on birds of miles of wind farms in a region, the potential for individual turbines to have heightened impacts, the fatality levels at which mitigation should occur for particular species, which impacts in one region may become heightened in another, the appropriate way to mitigate for certain impacts, and other issues. Some of the mitigation formulae and calculations included in this and other orders on Oregon wind energy facilities are based on the best available science, which in turn is based on limited research. The Department notes this lack of information in this order to avoid giving the appearance of setting a precedent for future wind energy facilities with respect to mitigation or other related issues. There are no calculations or formulae in this order that would not be benefited by better regionally focused information and more research. Indeed, the Department aims to work with other stakeholders to sponsor a wind conference in the near future to begin identifying and working through regional wind issues in a more systematic manner than is possible in a case-by-case review of wind energy facility applications.

Table 11 summarizes the levels of mitigation that are required under the ODFW habitat mitigation goals and standards:

Table 11

ODFW Mitigation Standards

Habitat Category	Mitigation
Category 3	"In-kind, in-proximity" habitat mitigation to achieve no net loss of either habitat quantity or quality
Category 4	"In-kind or out-of-kind, in-proximity or off-proximity" habitat mitigation to achieve no net loss in either existing habitat quantity or quality
Category 6	Minimize direct habitat loss and avoid impacts to off-site habitat

Orion designed the proposed facility to avoid or minimize adverse impacts to wildlife habitat to the extent practical, including the avoidance of Category 1 and Category 2 habitat. The Council allows the certificate holder to microsite turbines and other facility components with the 500-foot corridors shown on Figures P-1 through P-10 of the ASC and ASC Supplement, subject to the conditions in this order that address potential habitat impact.

Micrositing considerations include the size of the turbine selected and available for the project, optimization of capture of the wind energy resource, geotechnical factors, avoidance of higher-value wildlife habitat and reduction of adverse impacts on accepted farm practices in the area. Before beginning construction, the certificate holder would provide to the Department a description of the final design layout, taking into consideration the micrositing considerations. During construction, the certificate holder would avoid or reduce construction activity that could interfere with any raptors nesting in areas within a half-mile of proposed turbine or other construction locations. If construction is scheduled during the sensitive nesting periods for Swainson's hawk, golden eagle, ferruginous hawk or burrowing owl, a qualified independent third-party biological monitor, as approved by the Department, shall survey potential nesting areas near the proposed turbine strings. High-impact construction activities, such as blasting or other major ground disturbance, would be avoided during the nesting period until the monitor has determined that the nest locations are unoccupied (or, if occupied, that the young have fledged).

As described in the "Habitat Mitigation Plan"("mitigation plan") incorporated into this order as Attachment C, Orion has proposed a 117-acre mitigation site for meeting ODFW mitigation standards for land permanently disturbed by the project, for potential displacement impacts, and for potential future impacts. Under Orion's "worst-case" micrositing calculations for siting within the project's proposed corridors, Biglow would permanently affect a maximum of 7.59 acres of Category 3 habitat and a maximum of 3.66 acres of Category 4 habitat. Thus, Orion must mitigate for 11.25 acres of permanently disturbed Category 3 and 4 habitat.

In addition, Orion proposes adding acres to the mitigation site to enhance 97 acres as mitigation for potential bird displacement. The operation of wind energy facilities is believed to have a displacement impact on grassland/shrub-steppe bird species. Orion points out that existing studies show some displacement effect on birds out to between 50-to-100 meters from turbines, but that little information exists about whether displacement is temporary or whether displacement translates into true impacts on population size or reproduction. Nonetheless, Orion proposes mitigating for the small portion of the proposed facility that is located in nesting habitat for grassland/shrub steppe species and that could be subject to displacement effects. The Council approves mitigation for the potential displacement impact that might result from operation of Biglow, in lieu of a multi-year study of grassland bird displacement.

The formula Orion originally proposed for calculating mitigation acreage first calculates the amount of CRP, grassland and shrub steppe within 80 meters of each turbine and new access road. The formula then conservatively assumes that the average reduction in density of nesting species in the calculated acreage is 50 percent. For Biglow, the formula results in a maximum of 97 acres that would be added to the mitigation project area. Several days before the release of the draft proposed order, Orion proposed changing the formula to be consistent with the formula used on the Klondike III Wind Project, a change that would reduce Orion's mitigation obligation for potential displacement effects to 33 acres, although Orion remained committed to the original level of mitigation. Orion later also committed to meeting success criteria for the entire mitigation site. As a result, Orion would be required to

mitigate for nearly 45 acres, but would commit to enhancing 117 acres. The 72 acres that Orion would enhance beyond its mitigation obligation would be "banked" for consideration as meeting any future mitigation obligation.

Orion proposes a mitigation site that occupies about 117 acres located to the northeast of the Biglow site, less than 0.5 miles from the John Day River and just more than 0.5 miles form the nearest wind turbine. The site contains existing degraded grassland, shrub steppe and riparian habitat, and it has recently and historically been grazed. The entire site is generally categorized as Category 4 habitat. Within the mitigation area, the certificate holder would improve the quality of wildlife habitat by weed control, grazing exclusion, revegetation with native grass species and water project enhancements. To protect the area for the benefit of wildlife, a conservation easement, deed restriction or other legal means would be used for the life of the facility.

As described in the mitigation plan, to mitigate for the permanent loss of 11.25 acres of Category 3 and Category 4 habitat as a result of Biglow turbines, roads and other facilities, the site certificate holder would reseed 11.25 acres of deep-soiled Category 4 habitat within the mitigation site along the upper, more level slopes adjacent to cultivated areas. Reseeding is expected to enhance about 11.25 acres of deep-soiled Category 4 habitat to Category 2 and Category 3 grassland habitats. To mitigate for the 97 acres calculated for the potential displacement effect, the site certificate holder would install fences to remove livestock grazing from the 117-acre mitigation site. In combination with other actions described below, fencing is expected to improve most of the portion of the mitigation site that is not reseeded (about 106 acres) from Category 4 to at least Category 3 habitat. The mitigation plan also calls for planting enhancement at an existing spring and the installation of a wildlife guzzler.

To meet the ODFW habitat mitigation standard for impacts to Category 6 habitat, Orion proposes to design and construct facility components that are the minimum size needed for operations, to replace agricultural topsoil to original condition after construction, to use best management practices to prevent loss of topsoil during construction and to control noxious weeds in areas disturbed by construction activities. Agricultural areas temporarily disturbed during construction would be restored upon completion of construction. During operation, facility repair and maintenance activities would avoid impact on agricultural areas.

Wildlife Monitoring and Mitigation Plan

A common element of the ODFW mitigation goals and standards applicable to Category 3 and 4 habitat is the protection of habitat quality as well as quantity. In both of these habitat categories, the ODFW goal is "no net loss" of habitat quality. To address the issue of habitat quality and to ensure that the operation of Biglow complies with the Council's Fish and Wildlife Habitat Standard, the certificate holder would conduct wildlife monitoring. Based on the results of the monitoring, the certificate holder would provide additional mitigation, as needed. The overall objectives for wildlife monitoring for the Biglow facility are:

- To determine whether the operation of the facility causes significant fatalities of birds and bats,

- To determine whether the operation of the facility results in a reduction of nesting activity or nesting success of raptor species, and

- To determine whether the operation of the facility results in a significant loss of habitat quality.

Monitoring requirements, as well as details of the monitoring components, statistical analysis and data reporting, are described in the Biglow Canyon Wind Farm Wildlife Monitoring and Mitigation Plan (WMMP), incorporated in this order as Attachment A. The requirement of monitoring during the operation of the Biglow facility is a necessary part of finding compliance with the Fish and Wildlife Habitat Standard. Adequate monitoring provides data necessary to evaluate the impacts of facility operation on nearby wildlife habitat. If monitoring reveals significant unforeseen impacts, additional mitigation may be needed to ensure that operation of the facility is consistent with the habitat mitigation goals and standards. If the data show significant fatalities of avian species, adverse impact to raptor nesting, or other loss of habitat quality, the Department may require the certificate holder to implement additional mitigation, subject to approval by the Council.

The WMMP includes “thresholds of concern” for five species groups: raptors, raptor species of special concern, grassland species, State Sensitive avian species listed under OAR 635-100-0040, and bat species as a group. The thresholds are expressed as fatalities per MW of peak generating capacity, and Orion would be required to calculate the average annual fatality rates for species groups after two years of monitoring. If that data show that a threshold of concern for a species group has been exceeded, the Department would determine whether additional mitigation is appropriate based on analysis of the data, consultation with ODFW, and consideration of any other significant information available at the time. In addition, mitigation might be appropriate if the Department were to determine that fatality rates for individual avian or bat species (especially State Sensitive Species) were higher than expected and at a level of biological concern.

The Department developed the thresholds of concern for species groups in consultation with Orion, Orion’s wildlife consultants, ODFW, and the Department’s own wildlife consultant. The Department also considered the analysis of monitoring results from the Stateline Wind Project. Although the threshold numbers provide a rough measure for deciding whether the Council should be concerned about observed fatality rates, the thresholds have a very limited scientific basis. The exceeding of a threshold, by itself, would not be a scientific indicator that operation of the facility would result in range-wide population level declines of any of the species affected. The thresholds are provided in the WMMP to guide consideration of additional mitigation based on two years of monitoring data.

At the Council's first reading of the Biglow draft proposed order on June 6, 2006, Council members generally expressed two concerns: Council members wanted more and longer monitoring on wind projects, and Council members wanted a way to "reopen" a site certificate in the future should relevant research point to a need for operational changes to protect the environment. Because Orion asked the Department to produce a proposed order

three days after the Council's first reading of the draft, staff had limited time in which to address the Council's comments. The Oregon Department of Justice advised staff that the Council likely did not have the authority to insert a general "reopener" into the site certificate that preserved the right to adjust site certificate monitoring and mitigation conditions based on future environmental research.

As a result, staff researched the most appropriate long-term monitoring for the Biglow site with the idea in mind that each forthcoming wind project under the Council's jurisdiction might be subject to some kind of long-term monitoring for specific species of concern at a particular site. For the Biglow project, raptors are the primary focus of concern. On another project, grassland birds or Washington ground squirrels may be the primary focus because of the surrounding habitat, leading to possible long-term monitoring of other species.

In the Wildlife Monitoring and Mitigation Plan (Attachment A), staff has proposed long-term monitoring for nesting raptors. In addition, in the Habitat Mitigation Plan, staff has proposed evaluating future results from Stateline 3 grassland bird displacement studies to determine if Biglow's assumed displacement mitigation remains suitable in light of the new data.

Although the long-term monitoring of bats remains of interest to staff, ODFW and at least some Council members, staff understands that the best bat study is likely to be one carried out across a wider area than the Biglow project alone. Staff recommends that the Council direct the Department to work collaboratively outside of the site certificate process with wind applicants and site certificate holders to pursue a long-term monitoring plan for bat impacts.

E. Habitat Impacts and Mitigation During Retirement of the Facility

As required under Council rules and as discussed above, retirement would proceed according to a Council-approved final retirement plan. The retirement plan would ensure minimal impacts to fish, wildlife and the environment and provide for restoration of the site and temporarily disturbed areas to a useful, non-hazardous condition. Retirement of the facility would include removal of facility structures and restoration of the underlying land to farm or habitat uses. It is anticipated that site restoration activities would temporarily affect additional habitat adjacent to the facility site as needed to accommodate the movement and placement of cranes and other heavy equipment used during facility demolition. This adjacent area is likely to be similar in size to the area temporarily disturbed during construction.

F. General Findings of Consistency with ODFW Goals and Standards

Design

The proposed facility would occupy a permanent footprint of about 177 acres or less. About 157 acres of the affected habitat would be Category 6 agricultural land. The component parts of a wind facility (turbines, access roads, transmission lines and substations) must be disbursed over a wide area to capture the wind resource effectively. Locating the majority of facility primarily components within Category 6 habitat ensures the least impact on higher-

value habitat, although some amount of impact is unavoidable. The design of the proposed Biglow facility is consistent with ODFW's habitat mitigation goals and standards (OAR 635-415-0025).

Construction

More than 90 percent of the area that would be temporarily disturbed during construction is Category 6 habitat. There would be no impact to intermittent streams and stream habitat. The certificate holder would avoid construction activity within a buffer area around raptor nests during the sensitive nesting period. Upon completion of construction, areas of temporary disturbance would be restored and re-planted to pre-construction condition or better. Construction would be carried out in a manner consistent with ODFW's mitigation goals and standards (OAR 635-415-0025).

Operation

The certificate holder would establish a habitat mitigation area and would undertake habitat enhancement activities to improve the value of the area to wildlife. The habitat area would be protected from other development during the life of the facility. Operational monitoring as described in the Biglow Canyon Wind Farm Wildlife Monitoring and Mitigation Plan would provide data necessary to evaluate the operational impacts of the facility on habitat quality. If analysis of monitoring data indicates significant impacts further mitigation may be required. Taking into account the mitigation of impacts, operation of the facility would be consistent with ODFW's mitigation goals and standards (OAR 635-415-0025).

Retirement

Retirement of the facility would likely cause temporary disturbance to an area of habitat similar in size to the area temporarily disturbed during construction, most of which would be Category 6 agricultural land. Retirement would include restoration and revegetation of the area of temporary disturbance in addition to the area occupied by the proposed facility. Retirement would be done subject to a final retirement plan approved by the Council. The final retirement plan would provide for minimizing impact to fish and wildlife habitat. Retirement can be carried out in a manner consistent with ODFW's mitigation goals and standards (OAR 635-415-0025).

To find that Orion can comply with OAR 345-022-0060, the Council adopts the following conditions in the site certificate:

(58) The certificate holder shall design and construct all aboveground transmission line support structures following the practices suggested by the Avian Powerline Interaction Committee (APLIC 1996, referenced in the site certificate application, p. P-33) and shall install anti-perching devices on transmission pole tops and cross arms where the poles are located within one-half mile of any wind turbine.

(59) The certificate holder may construct turbines and other facility components within the 500-foot corridors shown on Figures P-1 through P-10 of the site certificate application and March 2006 supplement, subject to the following requirements addressing potential habitat impact:

(a) The certificate holder shall not construct any facility components within areas of Category 1 or Category 2 habitat and shall avoid temporary disturbance of Category 1 or Category 2 habitat.

(b) The certificate holder shall design and construct facility components that are the minimum size needed for safe operation of the energy facility.

(c) To the extent possible, the certificate holder shall construct facility components in the locations shown on Figure C-2 of the March 2006 site certificate application supplement.

(60) During construction, the certificate holder shall protect the area within a 1300-foot buffer around any active nests of the following species during the sensitive period, as provided in this condition:

Species	Sensitive Period	Early Release Date
Swainson's hawk	April 1 to August 15	May 31
Golden eagle	February 1 to August 31	May 31
Ferruginous hawk	March 15 to August 15	May 31
Burrowing owl	April 1 to August 15	July 15

The 1300-foot buffer may be reduced, with Department approval, if there is an adequate physical barrier between the nest site and the construction impacts such that a 1300-foot buffer proves to be excessive.

During the year in which construction of any phase occurs, the certificate holder shall use a protocol approved by the Oregon Department of Fish and Wildlife (ODFW) to determine whether there are any active nests of these species within a half-mile of any areas that would be disturbed during construction. If a nest is occupied by any of these species after the beginning of the sensitive period, the certificate holder shall not engage in high-impact construction activities (activities that involve blasting, grading or other major ground disturbance) or allow high levels of construction traffic within 1300 feet of the nest site, or such lesser distance as may be approved by the Department in the event there is an adequate physical barrier between the nest site and the construction impacts.

In addition, the certificate holder shall flag the boundaries of the 1300-foot buffer area, or such lesser distance as may be approved by the Department in the event there is an adequate physical barrier between the

nest site and the construction impacts, and shall instruct construction personnel to avoid any unnecessary activity within the buffer area. The certificate holder shall direct a qualified independent third-party biological monitor, as approved by the Department, to observe the active nest sites during the sensitive period for signs of disturbance and to notify the Department of any non-compliance with this condition. If the monitor observes nest site abandonment or other adverse impact to nesting activity, the certificate holder shall implement appropriate mitigation, in consultation with ODFW and subject to the approval of the Department, unless the adverse impact is clearly shown to have a cause other than construction activity. The certificate holder may begin or resume high impact construction activities before the ending day of the sensitive period if any known nest site is not occupied by the early release date. If a nest site is occupied, then the certificate holder may begin or resume high-impact construction before the ending day of the sensitive period with the approval of ODFW, after the young are fledged. The certificate holder shall use a protocol approved by ODFW to determine when the young are fledged (the young are independent of the core nest site).

(61) The certificate holder shall conduct wildlife monitoring and mitigation in accordance with the Wildlife Monitoring and Mitigation Plan that is incorporated in the order as Attachment A and as may be amended from time to time.

(62) The certificate holder shall restore areas that are temporarily disturbed during construction in accordance with the methods, monitoring procedures and success criteria set forth in the Revegetation Plan that is incorporated in the order as Attachment B and as may be amended from time to time.

(63) Before beginning construction of the facility, the certificate holder shall acquire the legal right to create, maintain and protect a habitat mitigation area for the life of the facility by means of an outright purchase, conservation easement or similar conveyance and shall provide a copy of the documentation to the Department. Within the habitat mitigation area, the certificate holder shall improve the habitat quality in accordance with the Habitat Mitigation Plan that is incorporated in the order as Attachment C and as may be amended from time to time.

(64) For the life of the project, the certificate holder shall provide to the appropriate staff of the Confederated Tribes of the Warm Springs Reservation of Oregon the same annual mitigation and monitoring reports it submits to the Department.

(65) For the life of the project, the certificate holder shall consult annually with the appropriate staff of the Confederated Tribes of the Warm Springs

Reservation of Oregon to discuss noxious weed or other issues that may arise from the close proximity of the facility site and tribal lands. The certificate holder shall provide a summary of that consultation in the annual report it provides to the Department.

Conclusions of Law

The Council concludes that the design, construction, operation and retirement of the proposed facility, taking into account mitigation and subject to the conditions stated in this order, would be consistent with ODFW's habitat mitigation goals and standards (OAR 635-415-0025). The Council adopts Conditions (58), (59), (60), (61), (62), (63), (64) and (65) in the site certificate. Based on these findings and recommended conditions, the Council concludes that the proposed facility complies with the Council's Fish and Wildlife Habitat Standard.

5. Standards Not Applicable to Site Certificate Eligibility

Under ORS 469.501(4), the Council may issue a site certificate without making the findings required by the standards discussed in this section (Structural Standard, Historic, Cultural and Archaeological Resources Standard, Public Services Standard and Waste Minimization Standard). Nevertheless, the Council may impose site certificate conditions based on the requirements of these standards.

(a) Structural Standard

OAR 345-022-0020

(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that:

(a) The applicant, through appropriate site-specific study, has adequately characterized the site as to seismic zone and expected ground motion and ground failure, taking into account amplification, during the maximum credible and maximum probable seismic events; and

(b) The applicant can design, engineer, and construct the facility to avoid dangers to human safety presented by seismic hazards affecting the site that are expected to result from all maximum probable seismic events. As used in this rule "seismic hazard" includes ground shaking, landslide, liquefaction, lateral spreading, tsunami inundation, fault displacement, and subsidence;

(c) The applicant, through appropriate site-specific study, has adequately characterized the potential geological and soils hazards of the site and its vicinity that could, in the absence of a seismic event, adversely affect, or be aggravated by, the construction and operation of the proposed facility; and

(d) The applicant can design, engineer and construct the facility to avoid dangers to human safety presented by the hazards identified in subsection (c).

(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.
** * **

Proposed Conditions

Orion provided information about the seismic characteristics of the site and possible seismic and geological hazards in Exhibit H of the ASC. The analysis area for the Structural Standard is the area within the site boundary. Orion assessed the geologic and seismic conditions of the site by reference to relevant available literature, examination of aerial photographs, and field reconnaissance. Orion did not perform site-specific subsurface and geophysical investigations as part of this preliminary assessment. Before beginning construction of the facility, Orion would conduct a detailed site-specific geotechnical investigation to assess subsurface and geologic conditions and provide information what would be used for the design of turbine foundations and foundations of other significant facility structures and installation of underground collector cables and overhead transmission lines. Council rules include mandatory conditions regarding geotechnical investigation and protection of the public from seismic hazards.

The proposed facility site is located in the north-central part of Sherman County, in north-central Oregon. The site is just south of the Columbia River, in an area bounded by the John Day River to the east and US Highway 97 to the west. The local topography is characterized by gently rolling hills consisting primarily of wheat fields and other cultivated crops, and the site is at an elevation more than 1,000 feet above the Columbia River. Bedrock is believed to be generally shallow (less than 10 feet in most locations), and the groundwater table is deep.

In conducting its seismic hazard assessment, Orion found that the seismic hazard in the vicinity of the proposed facility site would result from three seismic sources: Cascadia Subduction Zone interplate events, Cascadia Subduction Zone intraslab events, and crustal events.

Interplate and intraslab events are related to the subduction of the Juan De Fuca plate beneath the North American Plate. Interplate events occur because of movement at the interface of these two tectonic plates. Intraslab events originate within the subducting tectonic plate, away from its edges, when built-up stresses within the subducting plate are released. These source mechanisms are referred to as the Cascadia Subduction Zone (CSZ) source mechanisms. The CSZ is located near the coastlines of Oregon, Washington and British Columbia. The CSZ interplate and intraslab source mechanisms are currently thought to be capable of producing maximum earthquakes with moment magnitudes of about 9.0 and 7.5, respectively.

Earthquakes caused by movements along crustal faults, generally in the upper 10 to 15 miles, result in the third source mechanism. In the vicinity of Biglow, earthquakes occur within the crust of the North American tectonic plate when built-up stresses near the surface are released through fault rupture. There are several crustal faults in the vicinity of Biglow, including several northwest-striking faults that have been mapped near The Dalles and Arlington-Shutler Buttes Faults. None of these fault zones have been identified in the facility area, and the faults are generally considered to be inactive or to have a low probability of activity.

Orion estimated the peak ground acceleration (PGA) at the proposed facility site from a seismic event on one of the three source mechanisms using a database developed by the USGS in its National Seismic Hazard Mapping Facility. The USGS database includes estimated PGA at a theoretical soft rock/stiff soil interface for different probabilities of exceedance. Deaggregation information included in the database provides estimates of the mean earthquake moment magnitude and mean epicentral distance associated with given probability of exceedance at a given location.

The maximum probable earthquake (MPE) is considered to be an earthquake that has a probability of exceedance of approximately 10 percent in 50 years (an approximate 500-year recurrence interval). The USGS deaggregation information indicates that the MPE mean moment magnitude for the proposed facility site would be magnitude 6.25 at a mean distance of 40 miles, with an associated PGA at the soft rock/stiff soil interface of 0.087g.

The maximum considered earthquake (MCE) is considered to be an earthquake that has a probability of exceedance of approximately 2 percent in 50 years (an approximate 2,500-year recurrence interval). The USGS database indicates that a MCE mean moment magnitude of 6.1 at a distance of 16 miles from the proposed facility site would produce a PGA of 0.19g.

Based on the USGS data available for the site of the proposed facility, Orion believes that a design based on the MPE 500-year event would be well within the design code site-specific spectra set forth in the 2003 International Building Code that is now applied in measuring compliance with Oregon Building Code.

Based on topographic features of the proposed facility site, Orion believes the potential for ground rupture, earthquake-induced landslides and slope instability, lateral spreading, liquefaction, and settlement or subsidence is low. Tsunami inundation is not a hazard at the inland site, which is not located near any large water bodies and lies over 1,000 feet above the Columbia River.

Orion would employ current engineering standards in the design of the proposed facility. These standards require that under the design earthquake, the resistance factors used in design must exceed certain values. For example, in the case of slope design, a factor of safety of at least 1.1 is normally required during evaluation of seismic stability. In the event the factor of safety for slope stability is not met, the common practice is to estimate amounts

of soil displacement. If the displacement is predicted to cause permanent structural damage or risk to occupants, remedial measures are required. Such measures could include use of ground improvement methods, including retaining structures, to limit the movement to acceptable levels.

The Council adopts the following conditions in the site certificate:

(66) Before beginning construction of the facility, the certificate holder shall conduct a site-specific geotechnical investigation and shall report its findings to the Oregon Department of Geology & Mineral Industries (DOGAMI). The certificate holder shall conduct the geotechnical investigation after consultation with DOGAMI and in accordance with the Oregon Board of Geologists Examiners guidelines entitled: Guidelines for Engineering Geology Reports and Site-Specific Seismic Hazard Report.

(67) The certificate holder shall design and construct the facility in accordance with requirements set forth by the State of Oregon's Building Code Division and any other applicable codes and design procedures.

(68) The certificate holder shall design, engineer and construct the facility to avoid dangers to human safety presented by non-seismic hazards. As used in this condition, "non-seismic hazards" include settlement, landslides, flooding and erosion.

(b) Historic, Cultural and Archaeological Resources

OAR 345-022-0090

(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that the construction, operation and retirement of the facility, taking into account mitigation, are not likely to result in significant adverse impacts to:

(a) Historic, cultural or archaeological resources that have been listed on, or would likely be listed on the National Register of Historic Places;

(b) For a facility on private land, archaeological objects, as defined in ORS 358.905(1)(a), or archaeological sites, as defined in ORS 358.905(1)(c); and

(c) For a facility on public land, archaeological sites, as defined in ORS 358.905(1)(c).

(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

** * **

Proposed Conditions

Orion provided information regarding historic, cultural and archaeological resources in Exhibit S of the ASC. The analysis area for potential impacts to these resources is the area within the site boundary. Orion commissioned CH2M Hill to prepare a Cultural Resources Survey Report applicable to the analysis.

CH2M Hill searched the files maintained by the State Historic Preservation Office (SHPO) to assess the cultural and environmental background and history of the proposed facility site and to develop an interpretive context for the cultural resources inventory. Literature was reviewed to examine the location and nature of potential Traditional Cultural Properties in the analysis area. CH2M Hill then conducted a cultural resources inventory to check for the presence or absence of historic properties and cultural resources that otherwise might not meet the threshold of significance necessary to qualify them as historic properties. The study methods followed applicable National Environmental Policy Act (NEPA) regulations and were consistent with standards for cultural resource survey and documentation outlined in Section 106 of the National Historic Preservation Act.

In conducting the cultural resources inventory, CH2M Hill surveyed the proposed turbine corridors to a width of about 500 feet with 30-meter transect intervals, the proposed transmission line corridors with 75-meter transact intervals, and the proposed roadways with 60-meter transact intervals. The proposed staging areas and O&M facility sites were surveyed with buffers of about 25 percent to allow for some variation in the final placement of facilities.

In its Cultural Resources Survey for Biglow Canyon Wind Farm, CH2M Hill concluded there were no cultural sites formally recorded in the analysis area. Within the area surveyed, CH2M Hill identified three historic sites and one archaeological site:

- Homestead A, a wheat farm and cattle ranch operation associated with an occupied residence. The residence is a heavily altered, remodeled Victorian farmhouse believed by its current owners to be one of the earliest homesteads in the vicinity.
- Homestead B, an abandoned Victorian farmhouse with associated outbuildings and cached older farm equipment. The farmhouse is believed to be one of the earliest homesteads in the vicinity.
- An isolated garage building now used for storage of a non-functioning automobile.
- A small historic period surface dump feature that does not seem to have any direct connection with any nearby homesteads.

For reasons enumerated in the ASC, CH2M Hill does not believe any of the three historic sites or the archaeological site would meet the criteria for listing on the National Register of Historic Places.

Orion states that Homestead A could undergo direct physical impacts from construction of the facility, but, because the property is not an eligible resource, impacts

would not be significant. Orion goes on to state that all other cultural resources would be avoided during construction, operation and retirement of the Biglow facility.

By letter dated January 26, 2006, SHPO notified the Department that it had reviewed the report prepared by CH2M Hill and that Biglow would have "no effect on any known cultural resources" and "no further archaeological research is needed with this project." By letter dated February 2, 2006, SHPO notified the Department it had received a citizen inquiry noting the complete absence of the Oregon Trail in the analysis of cultural resources impacts. In response to that inquiry, SHPO engaged in further discussions with CH2M Hill and Orion and was satisfied that the cultural resources inventory did not locate any above ground evidence for the trail or any associated cultural objects and that "due to the lack of visible remains of the Oregon Trail, it is difficult to envision an adverse impact to it." In addition, on March 22, 2006, the Department met with staff to the Oregon Trails Advisory Council to ensure that concerns about the Oregon Trail had been addressed.

On May 4, 2006, the Department received an e-mail message from Sally Bird, Cultural Resources Director for the Confederated Tribes of the Warm Springs Reservation of Oregon, in which she forwarded an earlier letter address to CH2M Hill that expressed concern about cultural, wildlife and habitat issues related to the Biglow facility. After discussions between the Department, Ms. Bird and CH2M Hill, Ms. Bird later on May 4, 2006, e-mailed a second time to note that the Tribe's concerns would be addressed given several conditions. The Department has included those conditions in this section and in the Wildlife Mitigation and Monitoring Plan included with this order as Attachment A.

The Council adopts the following conditions in the site certificate:

(69) Before beginning construction of any phase of the facility, the certificate holder shall provide to the Department a map showing the final design locations of all components of that phase of the facility and areas that would be temporarily disturbed during construction and also showing the areas surveyed by CH2M Hill in preparing the Cultural Resources Survey for Biglow Canyon Wind Farm included in the site certificate application as Attachment S-1. The certificate holder shall hire qualified personnel to conduct field investigation of all areas of permanent or temporary disturbance that CH2M Hill did not previously survey and shall provide to the Department a written report of the field investigation. If any significant historic, cultural or archaeological resources are found during the field investigation, the certificate holder shall ensure that construction and operation of the facility will have no impact on the resources. The certificate holder shall instruct all construction personnel to avoid areas where the resources were found and shall implement other appropriate measures to protect the resources.

(70) The certificate holder shall ensure that a qualified person instructs construction personnel in the identification of cultural resources.

(71) The certificate holder shall ensure that a qualified archaeologist is present on site during any ground-disturbing activities, including grading and graveling; or, the certificate holder shall implement an alternate monitoring procedure, including a testing strategy, as agreed to in consultation with the Department, SHPO, and the tribes.

(72) The certificate holder shall ensure that construction personnel cease all ground-disturbing activities in the immediate area if any archaeological or cultural resources are found during construction of the facility until a qualified archaeologist can evaluate the significance of the find. The certificate holder shall notify the Department and the State Historic Preservation Office (SHPO) of the find. If the archaeologist determines that the resource is significant, the certificate holder shall make recommendations to the Council for mitigation, including avoidance or data recovery, in consultation with the Department, SHPO, and other appropriate parties. The certificate holder shall not restart work in the affected area until the certificate holder has demonstrated to the Department that it has complied with the archaeological permit requirements administered by SHPO.

(73) The certificate holder shall ensure that construction personnel proceed carefully in the vicinity of the mapped alignment of the Oregon Trail. If any intact physical evidence of the trail is discovered, the certificate holder shall avoid any disturbance to the intact segments, by redesign, re-engineering or restricting the area of construction activity. The certificate holder shall promptly notify the Department and SHPO of the discovery. The certificate holder shall consult with the Department and with SHPO to determine appropriate mitigation measures.

(c) Public Services

OAR 345-022-0110

(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that the construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impact to the ability of public and private providers within the analysis area described in the project order to provide: sewers and sewage treatment, water, storm water drainage, solid waste management, housing, traffic safety, police and fire protection, health care and schools.

(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

* * *

Proposed Conditions

Orion provided information in Exhibit U about the potential impacts of the facility on public services. The analysis area for public services is the area within the site boundary and 30 miles from the site boundary, including area within the State of Washington. The analysis area includes parts of Gilliam, Sherman and Wasco Counties in Oregon and Klickitat County in Washington. Incorporated communities within the analysis area include: Arlington, Rufus, Wasco, Moro, Grass Valley and The Dalles in Oregon and Goldendale and Dallasport in Washington.

A. Sewage, Storm Water and Solid Waste

During construction of the facility, the impact on sewers and sewage treatment would be minimal. The certificate holder would provide and maintain portable toilets for on-site sewage handling during construction. Storm water drainage during construction would be subject to the NPDES Storm Water Discharge General Permit #1200-C, which would ensure appropriate on-site handling of storm water. There are no local sewers to be affected. Construction of Biglow would generate solid waste that would be transported for off-site disposal. Orion would contract with a local commercial hauler or haulers, *e.g.*, Sunrise Disposal and Recycling, for transport and disposal of waste generated during construction of the facility. The public landfill nearest the facility site is Columbia Ridge Recycling and Landfill near Arlington, Oregon, which has an estimated 50-year capacity.

During operation of the facility, sewage from the O&M building would be disposed of in an on-site septic system. Appropriate measures would be used to avoid or reduce erosion from storm water run-off during operation of the facility, and there are no local storm sewers that would be affected. Orion would control water used for blade-washing activities in accordance with a Wastewater General Permit #1700 issued by the Department of Environmental Quality. Solid waste generated during operation of the facility would be insignificant and would be recycled or transported for disposal at Columbia Ridge Recycling and Landfill by a licensed hauler.

B. Water

Orion estimates that about 12 million gallons of water would be used for road compaction, underground collection line installation, dust suppression and concrete mixing during construction of Biglow. The construction contractor would be responsible for arranging for delivery of water to the site by means of water trucks from a source with an existing water right. Orion has an agreement with the City of Wasco to provide all water required for construction of the facility at the rate of up to 125,000 gallons per day. However, the Department of Water Resources has not made a final determination that the City of Wasco wells targeted for supply are available for the use. If additional water is needed, if the City of Wasco determines that at specific periods it will not release water to the facility because of other water use needs or commitments, or if the City of Wasco well is unavailable for use, the contractor would be required to secure additional water from another permitted source.

During operation of the facility, less than 5,000 gallons per day would be required for domestic purposes at the O&M facility. This water would come from an on-site well that requires no water permit provided the use is less than 5,000 gallons per day. The facility's use of water during operation of the facility would have no impact on municipal water systems. The small volume of water required during operation of the facility is unlikely to have an impact on other wells that serve local landowners.

The Council adopts the following conditions in the site certificate:

(74) During construction of the facility, the certificate holder and its contractors shall obtain all water required for construction activities from off-site sources previously permitted for such uses.

(75) Before beginning operation of the facility, the certificate holder shall have in operation a well suitable for delivering water, not exceeding 5,000 gallons per day, for domestic use at the facility's O&M building and, provided the rate of extraction would not exceed 5,000 gallons per day, blade-washing activities. The certificate holder shall not change the source of water for the facility's domestic use without prior Council approval.

(76) During operation of the facility, the certificate holder and its contractors shall obtain all water required for blade-washing activities from off-site sources previously permitted for such uses or from the on-site well, provided such use of well water would not cause the rate of extraction to exceed 5,000 gallons in any one-day period.

C. Housing, Police and Fire Protection, Health Care and Schools

Orion estimates that construction of the facility would take about 10 months at full build-out and would employ a maximum of 250 workers during peak construction, or an average of about 125 workers. Locally hired workers would be employed for road and turbine pad construction, and specialized workers would be employed for specialized construction, *e.g.*, substation and electrical transmission construction, turbine erection and turbine testing. Orion estimated that about 30 percent of the construction workers would be hired locally and the remainder would come from outside the local area. Based on vacancy rates in communities within the analysis area, Orion believes there is sufficient housing to accommodate temporary construction workers.

During operation, Orion estimates that 15 to 20 people would be employed at the facility. Most of the operations and maintenance staff would be hired locally, with the exception of those positions that require previous experience at other wind energy facilities. Orion estimates that permanent housing for about four new households would be required starting in 2007, so no significant adverse housing impacts would be anticipated.

Orion does not anticipate that the additional temporary and permanent work force would place significant new demands on the providers of police protection in the area. The Sherman County Sheriff's Office provides services in the area of the proposed facility, and, if needed, backup law enforcement services would be available from the Oregon State Police (The Dalles Area Command in The Dalles) and from local police in the surrounding jurisdictions. No significant adverse impacts on the ability of surrounding communities to provide police protection or law enforcement services would be anticipated from construction and operation of Biglow.

Orion received confirmation from the Sherman County Emergency Services Director that there would be no concerns about providing fire protection services in connection with construction and operation of the facility[49]. Orion would take steps for preventing fires during construction, including establishing roads before accessing the site to keep vehicles away from grass, using diesel vehicles whenever possible to prevent potential ignition by catalytic converters, avoiding idling vehicles in grassy areas, and keeping cutting torches and similar equipment away from grass. In addition, Orion would implement measures to promote fire prevention during operation of the facility. No significant adverse impacts on the ability of surrounding communities to provide fire protection services would be anticipated from construction and operation of Biglow.

The hospital nearest Biglow would be the Mid-Columbia Medical Center, located in The Dalles. Private service providers contract with Sherman County to provide ambulance service in the area. Providers offer basic, intermediate and advanced life support emergency medical care and transportation. Orion received confirmation from the Sherman County Emergency Services Director that there would be no concerns about providing ambulance services in connection with construction and operation of the facility.[50] No significant adverse impacts on the ability of surrounding communities to provide health care services would be anticipated from construction and operation of Biglow.

Five school districts and 14 individual schools are located in the analysis area. The schools closest to the proposed facility are operated by the Sherman County School District. The elementary schools are located in Wasco and Grass Valley; the high school (grades 7-12) is located in Moro. Because construction work for the facility would be short term and temporary, and because peak construction would occur during the summer months, no new students are anticipated in connection with construction of the facility. Assuming that four new permanent households would result from operation of the facility, about eight new school children (assuming two children per household) could move to the analysis area. No significant adverse impacts on the ability of surrounding communities to provide schooling would be anticipated from construction and operation of Biglow.

D. Traffic Safety

[49] Letter from Shawn Payne, Director, Sherman County Emergency Services, dated August 17, 2005, included as Attachment U-1, Exhibit U, ASC.
[50] *Id*

Construction-related traffic could cause short-term traffic delays on highways and local roads in the vicinity of the proposed facility, including I-84, US 97 and ORE 206, during deliveries of turbines, construction-related equipment, concrete and other building materials. Such delays would be short term and temporary. During construction, flaggers would be used at appropriate locations to direct traffic.

Conditions on a segment of US 97 between I-84 and the Wasco-Heppner Highway are poor. Because Orion has included this segment as a potential transporter route, the condition would be reviewed before any construction traffic is added. If conditions were determined to be unsafe for construction traffic, Orion would discuss improvement options with the Oregon Department of Transportation (ODOT) before beginning construction of the facility.

Assuming the roadways are deemed safe for construction traffic, Orion would develop a system for monitoring for degradation, *e.g.*, major potholes, so that safe travel paths may be maintained. The monitoring system could include site inspection and photographic cataloguing of existing road conditions so that pre-construction conditions can be compared with conditions after construction has been completed. Orion would discuss monitoring methods and preferred mitigation efforts with Sherman County Public Works and ODOT before beginning construction of the facility.

Pavement conditions on local county roadways vary from paved to dirt or gravel. For most segments of county roadways that would be used as transporter routes, the surface is paved. Gravel road segments would be evaluated before and after construction of the facility to determine what, if any, degradation had occurred. Orion would assume responsibility for repairing these gravel roadways to pre-existing conditions or better.

The volumes of traffic that would be generated by the facility represent a minimal amount of traffic with respect to the state highway system average daily traffic volumes. Based on traffic trips on transporter routes, construction of the facility is not expected to cause any traffic safety impacts to the state highway system. With respect to existing county roadways, the volumes of traffic that would be generated by construction of the facility would represent an increase, but traffic volumes are not expected to exceed capacity. Even with traffic increases, construction is not expected to cause adverse impacts to traffic operations.

Although construction-related traffic could cause short-term traffic delays, those delays would be temporary and would be mitigated with measures that would reduce impacts. Measures Orion would implement to reduce traffic delays would include:

- Provide notice to adjacent landowners when construction takes place to help minimize access disruptions.
- Provide proper road signage and warnings of “Equipment on Road,” “Truck Access,” or “Road Crossings.”
- Implement traffic diversion equipment, such as advance signage and pilot cars, whenever possible when slow or oversized loads are being hauled.
- Encourage carpooling for the construction workforce to reduce traffic volume.

- Employ flaggers, as necessary, to direct traffic when large equipment is entering or exiting public roads to minimize risk of accidents.
- Maintain at least one travel lane at all times so that roadways will not be closed to traffic as a result of construction vehicles entering or exiting public roads.

During operation of the facility, the anticipated permanent workforce of 15 to 20 workers would not significantly increase traffic in the analysis area. The use of area highways and local roads by employees and during occasional deliveries is not likely to result in a significant adverse impact on traffic safety.

The Council adopts the following conditions in the site certificate:

(77) Before beginning construction of the facility, the certificate holder shall develop a system for monitoring state highways and local roads that would serve as transporter routes for delivering equipment to the facility site for degradation, *e.g.*, major potholes, so that safe travel paths may be maintained. The monitoring system shall include site inspection and photographic cataloguing of existing road conditions so that pre-construction conditions can be compared with conditions after construction has been completed. Orion shall coordinate monitoring methods and preferred mitigation efforts with Sherman County Public Works and the Oregon Department of Transportation.

(78) After completing construction of the facility, the certificate holder shall restore state highways and county roads affected by facility construction activities to at least their pre-construction conditions, to the satisfaction of Sherman County Public Works and the Oregon Department of Transportation.

(79) During construction of the facility, the certificate holder shall implement the following measures to reduce traffic delays on county roads serving as transporter routes for delivery of equipment to the facility site:

(a) Provide notice to adjacent landowners when construction takes place to help minimize access disruptions;
(b) Provide proper road signage and warnings of "Equipment on Road," "Truck Access," or "Road Crossings;"
(c) Implement traffic diversion equipment, such as advance signage and pilot cars, whenever possible when slow or oversized loads are being hauled;
(d) Encourage carpooling for the construction workforce to reduce traffic volume;
(e) Employ flaggers, as necessary, to direct traffic when large equipment is entering or exiting public roads to minimize risk of accidents; and

(f) Maintain at least one travel lane at all times so that roadways will not be closed to traffic as a result of construction vehicles entering or exiting public roads.

(d) Waste Minimization

OAR 345-022-0120

(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that, to the extent reasonably practicable:

(a) The applicant's solid waste and wastewater plans are likely to minimize generation of solid waste and wastewater in the construction, operation, and retirement of the facility, and when solid waste or wastewater is generated, to result in recycling and reuse of such wastes;

(b) The applicant's plans to manage the accumulation, storage, disposal and transportation of waste generated by the construction and operation of the facility are likely to result in minimal adverse impact on surrounding and adjacent areas.

(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

** * **

Proposed Conditions

Orion provided information about waste minimization in Exhibit V of the ASC.

A. Solid Waste

During construction of the facility, Orion would generate a variety of non-hazardous, inert wastes. The major solid waste types generated during construction of the facility would be concrete waste from turbine pad construction, wood waste from wood forms used for concrete pad construction, and scrap steel from turbine tower construction. Additional waste would include erosion control materials, such as straw bales and silt fencing, and packaging materials for associated turbine parts and other electrical equipment. Some minor and potentially hazardous waste would include oily rags or similar waste.

Orion proposes to minimize the generation of construction waste by carefully estimating its materials needs and by means of efficient construction practices. Waste generated during construction would be recycled to the extent feasible. Steel scrap would be collected and transported to a recycling facility. Wood waste would also be recycled to the greatest extent feasible, depending on size and quantity of scrap or leftover materials. Packaging waste, such as paper and cardboard, would be separated and recycled. Any non-

recyclable waste would be collected and transported to a local landfill. Orion would store all oily waste, such as rags or dirt, in sealable drums and remove the oily waste for recycling or disposal by a licensed contractor. In addition, Orion would maintain spill kits containing items such as absorbent pads on equipment and in the temporary on-site storage facilities to respond to accidental spills that might occur.

Orion proposes to use concrete waste as fill on site or at another site or, if no reuse option were available, to transport the waste to a local landfill. In the event Orion uses concrete waste as fill on site, disposal would be conducted in accordance with OAR 340-093-0080 and other applicable regulations. With agreement of the landowner, the construction contractor would bury concrete waste in an excavated hole, cover the waste with at least 3 feet of topsoil, and regrade the area to match existing contours.

The main waste generated during operation of the facility would be office waste related to the O&M facility, such as paper and food packaging scraps. Some minor and potentially hazardous waste would include oily rags or similar waste related to turbine lubrication and other maintenance. The only other waste Orion expects to generate during operation of the facility would be incidental waste from repair or replacement of electrical or turbine equipment.

Waste from the O&M facility would be collected and recycled, as feasible. Non-recyclable waste would be collected and transported to a local landfill, most likely the Columbia Ridge Recycling and Landfill located near Arlington, Oregon. The actual site of disposal would depend on Orion's selection of the contracted waste hauler. Orion would store all oily waste, such as rags or dirt, in sealable drums and remove the oily waste for recycling or disposal by a licensed contractor. In addition, Orion would maintain spill kits containing items such as absorbent pads on equipment and in the on-site storage facilities to respond to accidental spills that might occur.

Measures for reducing, reusing and recycling solid waste upon retirement of the facility would be addressed as part of the retirement plan that the Council must approve before retirement of the facility.

B. Wastewater

During construction of the facility, wastewater would be generated from the wash down of concrete trucks after concrete loads had been emptied. Wash down would occur at tower foundation locations or existing permitted off-site facilities, *i.e.*, the permitted concrete plant or gravel pit where the truck was loaded. If wash down of concrete trucks occurs at tower foundation locations, Orion would ensure that wash down wastewater does not run off the construction site into otherwise undisturbed areas and that the wastewater is disposed of on backfill piles and buried underground with the backfill over the tower foundation. During construction, portable toilets would be provided for on-site sewage handling and would be pumped and cleaned regularly by the construction contractor.

During operation of the facility, wastewater would be generated from wash-down of the turbine blades. Orion has filed Wastewater General Permit #1700 with the Oregon Department of Environmental Quality to address blade-washing activities. Sewage from the on-site O&M building would be discharged to an on-site septic system. Any wastewater generated during retirement of the facility would be addressed as part of the retirement plan that the Council must approve before retirement of the facility.

C. Impact on Surrounding and Adjacent Areas

The accumulation, storage, disposal and transportation of waste generated by construction and operation of the facility would have minimal adverse impact on surrounding and adjacent areas. Most waste would be removed from the site and reused, recycled or transported for disposal at an appropriate facility.

Transportation of wastes to landfills or recycling facilities would involve periodic truck trips over public and private roads between the facility site and the landfill or recycling facilities. Because of the expected low volume of waste materials, these trips would not have an adverse impact on surrounding or adjacent areas.

Water used on site during construction for dust suppression and road compaction would evaporate or infiltrate into the ground. Water would not be discharged to wetlands, lakes, rivers or streams.

During construction of the facility, the certificate holder would ensure that contractors manage and monitor waste generation and recycle or dispose of wastes in an appropriate manner. During operation of the facility, the certificate holder would be responsible for a waste management program ensuring that solid waste is recycled to the extent feasible or transported for disposal at appropriate landfills and that hazardous wastes are properly handled and disposed of in accordance with applicable regulations.

The Council adopts the following conditions in the site certificate:

(80) The certificate holder shall use hazardous materials in a manner that protects public health, safety and the environment and shall comply with applicable local, state and federal environmental laws and regulations.

(81) If a spill or release of hazardous materials occurs during construction or operation of the facility, the certificate holder shall notify the Department within 72 hours and shall clean up the spill or release and dispose of any contaminated soil or other materials according to applicable regulations. The certificate holder shall ensure that spill kits containing items such as absorbent pads are located on equipment and storage facilities to respond to accidental spills and shall instruct employees handling hazardous materials in the proper handling, storage and cleanup of these materials.

(82) **During construction of the facility, the certificate holder shall provide portable toilets for on-site sewage handling and shall ensure that the portable toilets are pumped and cleaned regularly by a licensed contractor that is qualified to pump and clean portable toilet facilities.**

(83) **During operation of the facility, the certificate holder shall discharge sanitary wastewater generated at the O&M building to a licensed on-site septic system in compliance with county permit requirements. The certificate holder shall design the septic system with a capacity that is less than 2,500 gallons per day.**

(84) **During construction of the facility, the certificate holder shall implement a waste management plan that includes but is not limited to the following measures:**

- **(a)** **Training employees to minimize and recycle solid waste;**
- **(b)** **Minimizing the generation of wastes from construction through detailed estimating of materials needs and through efficient construction practices;**
- **(c)** **Recycling steel and other metal scrap;**
- **(d)** **Recycling wood waste;**
- **(e)** **Recycling packaging wastes, such as paper and cardboard;**
- **(f)** **Collecting non-recyclable waste for transport to a landfill by a licensed waste hauler; and**
- **(g)** **Segregating all hazardous wastes, such as used oil, oily rags and oil-absorbent materials, mercury-containing lights and lead-acid and nickel-cadmium batteries for disposal by a licensed firm specializing in the proper recycling or disposal of hazardous wastes.**

(85) **The certificate holder may dispose of waste concrete on site with the permission of the landowner and in accordance with OAR 340-093-0080 and other applicable regulations. The certificate holder shall dispose of waste concrete on site by placing the material in an excavated hole, covering the concrete with at least 3 feet of topsoil, and grading the area to match existing contours. If the waste concrete is not disposed of on site, the certificate holder shall arrange for proper disposal in a licensed landfill.**

(86) **During construction of the facility, the certificate holder shall ensure that the wash down of concrete trucks occurs only at a contractor-owned batch plant or at tower foundation locations. If such wash down occurs at tower foundation locations, then the certificate holder shall ensure that wash down wastewater does not run off the construction site into otherwise undisturbed areas and that the wastewater is disposed of on backfill piles and buried underground with the backfill over the tower foundation.**

(87) During operation of the facility, the certificate holder shall implement a waste management plan that includes but is not limited to the following measures:

(a) Training employees to minimize and recycle solid waste;
(b) Recycling paper products, metals, glass and plastics;
(c) Collecting non-recyclable waste for transport to a landfill by a licensed waste hauler; and
(d) Segregating all hazardous wastes, such as used oil, oily rags and oil-absorbent materials, mercury-containing lights and lead-acid and nickel-cadmium batteries for disposal by a licensed firm specializing in the proper recycling or disposal of hazardous wastes.

(88) During operation of the facility, the certificate holder shall engage in blade-washing activities only in accordance with the appropriate Wastewater General Permit #1700 issued by the Oregon Department of Environmental Quality and all applicable regulations.

V. OTHER APPLICABLE REGULATORY REQUIREMENTS: FINDINGS AND CONCLUSIONS

1. Requirements under Council Jurisdiction

Under ORS 469.503(3) and under the Council's General Standard of Review (OAR 345-022-0000, the Council must determine that the proposed facility complies with "all other Oregon statutes and administrative rules identified in the project order, as amended, as applicable to the issuance of a site certificate for the proposed facility." Applicable Oregon statutes and administrative rules that are not otherwise addressed in Section IV of this order include the noise control regulations adopted by the Environmental Quality Commission, the Division of State Lands' regulations for removal or fill of material affecting waters of the state, the Water Resources Department's (WRD) regulations for appropriating ground water and the Council's statutory authority to consider protection of public health and safety.

(a) Noise Control Regulations

The applicable noise control regulations are as follows:

OAR 340-035-0035
Noise Control Regulations for Industry and Commerce
(1) Standards and Regulations:
* * *

(b) New Noise Sources:
* * *

(B) New Sources Located on Previously Unused Site:

(i) No person owning or controlling a new industrial or commercial noise source located on a previously unused industrial or commercial site shall cause or permit the operation of that noise source if the noise levels generated or indirectly caused by that noise source increase the ambient statistical noise levels, L10 or L50, by more than 10 dBA in any one hour, or exceed the levels specified in Table 8, as measured at an appropriate measurement point, as specified in subsection (3)(b) of this rule, except as specified in subparagraph (1)(b)(B)(iii).

(ii) The ambient statistical noise level of a new industrial or commercial noise source on a previously unused industrial or commercial site shall include all noises generated or indirectly caused by or attributable to that source including all of its related activities. Sources exempted from the requirements of section (1) of this rule, which are identified in subsections (5)(b) - (f), (j), and (k) of this rule, shall not be excluded from this ambient measurement.

(iii) For noise levels generated or caused by a wind energy facility:

(I) The increase in ambient statistical noise levels is based on an assumed background L50 ambient noise level of 26 dBA or the actual ambient background level. The person owning the wind energy facility may conduct measurements to determine the actual ambient L10 and L50 background level.

(II) The "actual ambient background level" is the measured noise level at the appropriate measurement point as specified in subsection (3)(b) of this rule using generally accepted noise engineering measurement practices. Background noise measurements shall be obtained at the appropriate measurement point, synchronized with windspeed measurements of hub height conditions at the nearest wind turbine location. "Actual ambient background level" does not include noise generated or caused by the wind energy facility.

(III) The noise levels from a wind energy facility may increase the ambient statistical noise levels L10 and L50 by more than 10 dBA (but not above the limits specified in Table 8), if the person who owns the noise sensitive property executes a legally effective easement or real covenant that benefits the property on which the wind energy facility is located. The easement or covenant must authorize the wind energy facility to increase the ambient statistical noise levels, L10 or L50 on the sensitive property by more than 10 dBA at the appropriate measurement point.

(IV) For purposes of determining whether a proposed wind energy facility would satisfy the ambient noise standard where a landowner has not waived the standard, noise levels at the appropriate measurement point are predicted assuming that all of the proposed wind facility's turbines are operating between cut-in speed and the wind speed corresponding to the maximum sound power level

established by IEC 61400-11 (version 2002-12). These predictions must be compared to the highest of either the assumed ambient noise level of 26 dBA or to the actual ambient background L10 and L50 noise level, if measured. The facility complies with the noise ambient background standard if this comparison shows that the increase in noise is not more than 10 dBA over this entire range of wind speeds.

(V) For purposes of determining whether an operating wind energy facility complies with the ambient noise standard where a landowner has not waived the standard, noise levels at the appropriate measurement point are measured when the facility's nearest wind turbine is operating over the entire range of wind speeds between cut-in speed and the windspeed corresponding to the maximum sound power level and no turbine that could contribute to the noise level is disabled. The facility complies with the noise ambient background standard if the increase in noise over either the assumed ambient noise level of 26 dBA or to the actual ambient background L10 and L50 noise level, if measured, is not more than 10 dBA over this entire range of wind speeds.

(VI) For purposes of determining whether a proposed wind energy facility would satisfy the Table 8 standards, noise levels at the appropriate measurement point are predicted by using the turbine's maximum sound power level following procedures established by IEC 61400-11 (version 2002-12), and assuming that all of the proposed wind facility's turbines are operating at the maximum sound power level.

(VII) For purposes of determining whether an operating wind energy facility satisfies the Table 8 standards, noise generated by the energy facility is measured at the appropriate measurement point when the facility's nearest wind turbine is operating at the windspeed corresponding to the maximum sound power level and no turbine that could contribute to the noise level is disabled.

** * **

Findings of Fact

Applicable Regulations

The proposed facility would be a "new industrial or commercial noise source" under OAR 340-035-0035 because construction of the facility would begin after January 1, 1975.[51] The noise control regulations impose different limits on new noise sources constructed on a "previously used industrial or commercial site" compared to the limits imposed on sources constructed on a "previously unused industrial or commercial site." A site is considered a "previously unused industrial or commercial site" if the site has not been used by any

[51] OAR 340-035-0015(33) defines "new industrial or commercial noise source."

industrial or commercial noise source at any time during the 20 years preceding the construction of a new noise source on the site.[52]

According to Orion, all the equipment associated with Biglow would be located on property that has not been used for industrial or commercial operations during the past 20 years. Therefore, the noise generated by the proposed facility must comply with OAR 340-035-0035(1)(b)(B).

The regulation quoted above requires that the noise generated by a new wind energy facility located on a previously unused site must comply with two tests. Facility-generated noise must not increase the ambient hourly L_{10} or L_{50} noise levels at any noise sensitive property by more than 10 decibels (dBA)[53] when turbines are operating "between cut-in speed and the wind speed corresponding to the maximum sound power level."[54] This requirement is known as the "ambient noise degradation" test. To show that a proposed facility complies with this test, the applicant may use an assumed ambient hourly L_{50} noise level of 26 dBA; otherwise, the applicant must measure the actual ambient hourly noise levels at the noise sensitive property in accordance with the procedures specified in the regulation. OAR 340-035-0035(1)(b)(B)(iii)(III) relieves the applicant from having to show compliance with the ambient degradation test "if the person who owns the noise sensitive property executes a legally effective easement or real covenant that benefits the property on which the wind energy facility is located."

The potential "waiver" of the ambient degradation test does not relieve the wind facility from compliance with the second test imposed under OAR 340-035-0035(1)(b)(B). A new wind energy facility located on a previously unused site must not radiate sound levels to any noise sensitive property exceeding the noise limits specified in Table 8 of the regulation. This is known as the "Table 8" or "maximum allowable" test. Table 8 provides the following limits:

[52] OAR 340-035-0015(47) defines "previously unused industrial or commercial site." Agricultural activities are specifically excluded from this definition.

[53] The sound pressure level (in decibels), as measured on a sound level meter using the A-weighted filter network, which corresponds to the frequency response of the human ear.

[54] The regulation applies the test "as measured at an appropriate measurement point." The "appropriate measurement point," as defined by OAR 340-035-0015(3), is "25 feet (7.6 meters) toward the noise source from that point on the noise sensitive building nearest the noise source" or "that point on the noise sensitive property line nearest the noise source," whichever is farther from the source. OAR 340-035-0015(38) defines "noise sensitive property" as "real property normally used for sleeping, or normally used as schools, churches, hospitals, or public libraries." Private residences are the only "noise sensitive properties" potentially affected by Biglow. We refer to these as the "noise sensitive property."

Statistical Noise Limits for Industrial and Commercial Sources		
Statistical Descriptor	**Maximum Permissible Statistical Noise Levels (dBA)**	
	Daytime (7:00 AM - 10:00 PM)	**Nighttime (10:00 PM - 7:00 AM)**
L_{50}	55	50
L_{10}	60	55
L_1	75	60
The hourly L_{50}, L_{10} and L_1 noise levels are defined as the noise levels equaled or exceeded 50 percent, 10 percent and 1 percent of the hour, respectively.		

The proposed energy facility would operate on a 24-hour basis. Therefore, the noise radiating from the proposed facility must not exceed the maximum allowable nighttime noise limits (10:00 PM to 7:00 AM). Consequently, to comply with the maximum allowable test, the noise radiating from Biglow must not exceed an hourly L_{50} noise level of 50 dBA at any noise sensitive property. For the purpose of determining whether a proposed wind facility would comply with this test, noise levels must be predicted "assuming that all of the proposed wind facility's turbines are operating at the maximum sound power level."

Compliance with the Regulations

OAR 340-035-0035(5)(g) specifically exempts noise caused by construction activities. Construction of Biglow would produce localized, short duration noise levels similar to those produced by any large construction project with heavy construction equipment. Much of the project work would be far removed from any noise sensitive property. Nevertheless, in those areas near residences, the certificate holder should confine the noisiest construction activities to daylight hours to help mitigate noise impacts at the residences.

Orion has elected to use the assumed ambient hourly L_{50} noise level of 26 dBA for the background ambient noise level rather than to conduct noise measurements at the noise sensitive properties in the vicinity of the facility. Accordingly, to show compliance with the ambient degradation test, the noise generated by the operation of the proposed Biglow wind turbines between cut-in wind speed and maximum sound power level wind speed must not cause the hourly L_{50} noise level at any noise sensitive property to exceed 36 dBA.

Orion proposes to use either 1.5-MW or 3.0-MW wind turbines in construction of the wind energy facility. The exact make and model of the turbines has not been selected, but for the purpose of predicting the noise generated by the wind facility, Orion used the sound data provided by GE for the GE 1.5-MW turbines (a guaranteed maximum sound power level of 104 dBA). Because sound data was not yet available for GE's 3.0-MW turbines, Orion estimated the sound level of those turbines by adding 2 dB to the levels associated with the GE 1.5-MW turbines to arrive at a maximum sound power level of 106 dBA. Orion provided

no explanation as to why the addition of 2 dB to the levels associated with the 1.5-MW turbines would provide reliable data for the larger turbines. For the sake of conservatism, Orion then added 2 dB to the maximum sound power level for both turbines in conducting its noise analysis. In predicting the noise that would be generated by substation transformers, Orion used sound data for transformers having a National Electrical Manufacturers Association (NEMA) sound rating of 87 dBA.

Noise analyses were made to identify those noise sensitive properties where the facility-generated noise levels could exceed the ambient noise degradation criteria level of 36 dBA and the maximum allowable noise level criteria of 50 dBA. To perform the noise analyses, Orion used the noise model, CADNA/A by DataKustik GmbH of Munich, Germany. An analysis was made for the Minimum Turbine Layout (225 1.5-MW turbines) and for the Maximum Turbine Layout (150 3.0-MW turbines). In the analyses, all turbines were assumed to be located in the center of a 500-foot-wide corridor and operating at their maximum sound power level. Three step-up transformers were assumed to be located at one of two possible substation locations. Atmospheric conditions for the analyses included temperature of 10°C and relative humidity of 70 percent. No terrain shielding was included in the analyses.

Orion identified 25 noise sensitive properties that have the potential of receiving hourly L_{50} noise levels equaling or exceeding 36 dBA from the proposed facility. At two of the properties, the noise levels were predicted to equal or exceed the DEQ L_{50} noise level criteria of 50 dBA. Table 12 shows the predicted maximum hourly L_{50} noise levels at the 25 noise sensitive properties.[55]

Table 12

Predicted Noise Based on GE Turbines and Assumed Turbine Locations

Noise Sensitive Property	**Predicted Maximum Hourly L_{50} Noise Level at Noise Sensitive Property** (dBA)
R1	45
R2	47
R3	46
R4	46
R5	47
R6	46

[55] The table shows results based on modeling data from CH2M-Hill generated in response to a December 25, 2005 request for additional information.

R7	47
R8	54
R9	45
R10	45
R11	50
R12	46
R13	47
R14	36
R15	37
R16	35
R17	37
R18	41
R19	37
R20	36
R21	39
R22	39
R23	43
R24	38
R25	37

As shown in Table 12, the predicted noise levels at all locations except R14, R16, and R20 exceed the ambient noise degradation limit of 36 dBA. The predicted noise level at R8 and R11 meet or exceed the DEQ maximum allowable noise level limit of 50 dBA. The predicted noise levels include the sound contributed by the transformers proposed at a single substation.

In a response to a request for additional information, Orion provided information showing the amount of noise each turbine and substation would contribute to the total noise level at each noise sensitive property. That data demonstrates that in order to meet the ambient noise degradation rule, Orion must obtain ambient noise degradation waivers for most of the noise sensitive properties or eliminate or relocate further from the noise sensitive properties (but within the micrositing corridors) many of the proposed turbines. Even with the waivers, there will be a need to either eliminate or move some of the turbines influencing noise sensitive properties R8 and R11 to bring the levels into compliance with the maximum allowable noise level rule.

At the Council's first reading on the draft proposed order on June 6, 2006, Council members generally expressed reservations about the use of non-occupancy agreements as one means of demonstrating that the noise standard has been met at noise sensitive properties where the predicted noise level would meet or exceed the DEQ maximum allowable noise level limit of 50 dBA.

As provided under OAR 340-035-0035(1)(b)(B)(iii)(III), the certificate holder would be relieved from having to show compliance with the ambient degradation test by obtaining a "legally effective easement or real covenant" from the affected landowner where the noise level would exceed 36 dBA but not exceed 50 dBA. To ensure that Biglow would comply with the applicable state noise control regulations, the Council adopts a condition that would require the certificate holder, before beginning construction of the facility, to present to the Department data demonstrating that the final selected make, model and location of all turbines and substations would not generate noise in excess of 36 dBA at those properties for which Orion has not obtained an ambient noise degradation waiver.

To find that the siting, construction and operation of the proposed facility are consistent with Oregon noise control regulations, the Council adopts the following conditions in the site certificate:

(89) To reduce noise impacts at nearby residential areas, the certificate holder shall:

(a) Confine the noisiest operation of heavy construction equipment to the daylight hours;

(b) Require contractors to install and maintain exhaust mufflers on all combustion engine-powered equipment; and

(c) Establish a complaint response system at the construction manager's office to address noise complaints.

(90) If the GE 1.5-MW turbines (for which the certificate holder states the maximum sound power level warranted by the manufacturer is 104 dBA) or the GE 3.0-MW turbines (provided the certificate holder is able to demonstrate, by means of the manufacturer's warranty or other means acceptable to the Department, that the maximum sound power level of the GE 3.0-MW turbine is 106 dBA) will be used at the facility, before beginning construction, the certificate holder shall present information demonstrating to the satisfaction of the Department that each of the following requirements have been met at all 25 properties identified as noise sensitive properties in the site certificate application:

(a) For any noise sensitive property listed in Table 12 where the predicted maximum hourly L_{50} noise level caused by the facility would equal or exceed 50 dBA, the certificate holder shall identify

the final design locations of all turbines to be built and perform a noise analysis demonstrating, in accordance with OAR 340-035-0035(1)(b)(B)(iii)(IV), that the total hourly L_{50} noise level generated by the facility would not exceed 50 dBA at the appropriate measurement point. The certificate holder shall perform the noise analysis using the CADNA/A by DataKustik GmbH of Munich, Germany, and shall assume the following input parameters:

- **The maximum sound power level warranted by the manufacturer or confirmed by other means acceptable to the Department**
- **The exact locations of the proposed turbines**
- **The environmental factors included in the original noise analysis, *i.e.*, the temperature, relative humidity, barrier effects and ground effects used in the original analysis. If the certificate holder has cause to believe the environmental factors included in the original noise analysis are no longer valid for a particular receiver, the certificate holder shall perform the noise analysis for that receiver using both the environmental factors included in the original noise analysis and the environmental factors the certificate holder now believes to be applicable to that receiver.**

(b) Where the hourly L_{50} noise levels caused by the facility would exceed 36 dBA but not exceed 50 dBA at any noise sensitive property listed in Table 12, the certificate holder has obtained a legally effective easement or real covenant pursuant to which the owner of the property authorizes the certificate holder's operation of the facility to increase ambient statistical noise levels L_{10} and L_{50} by more than 10 dBA at the appropriate measurement point. A legally effective easement or real covenant shall: (i) include a legal description of the burdened property (the noise sensitive property); (ii) be recorded in the real property records of the county; (iii) expressly benefit the certificate holder; (iv) expressly run with the land and bind all future owners, lessees or holders of any interest in the burdened property; and (v) not be subject to revocation without the certificate holder's written approval.

(c) If, for any noise sensitive property listed in Table 12 where the hourly L_{50} noise levels caused by the facility would exceed 36 dBA but not exceed 50 dBA, the certificate holder has not obtained a legally effective easement or real covenant as described in (b) above, the certificate holder shall identify the final design locations of all turbines to be built and perform a noise analysis demonstrating, in accordance with OAR 340-035-0035(1)(b)(B)(iii)(IV), that the total noise generated by the facility would meet the ambient noise degradation test at the appropriate

measurement point on those noise sensitive properties. The certificate holder shall perform the noise analysis using the CADNA/A by DataKustik GmbH of Munich, Germany, and shall assume the following input parameters:

- **The maximum sound power level warranted by the manufacturer or confirmed by other means acceptable to the Department**
- **The exact locations of the proposed turbines**
- **The environmental factors included in the original noise analysis, *i.e.*, the temperature, relative humidity, barrier effects and ground effects used in the original analysis. If the certificate holder has cause to believe the environmental factors included in the original noise analysis are no longer valid for a particular receiver, the certificate holder shall perform the noise analysis for that receiver using both the environmental factors included in the original noise analysis and the environmental factors the certificate holder now believes to be applicable to that receiver.**

(91) If turbines other than the GE 1.5-MW turbines (for which the certificate holder states the maximum sound power level warranted by the manufacturer is 104 dBA) or the GE 3.0-MW turbines (for which the certificate holder has assumed a maximum sound power level of 106 dBA) will be used at the facility, before beginning construction of the facility the certificate holder shall identify the final design locations of all turbines to be built, perform a complete new noise analysis for all turbines, and generate a new table listing each noise sensitive property, as defined in OAR 340-035-0015(3), and the predicted maximum hourly L_{50} noise level at each noise sensitive property. The certificate holder shall perform the noise analysis using the CADNA/A by DataKustik GmbH of Munich, Germany, and shall assume the following input parameters:

- **The maximum sound power level warranted by the manufacturer or confirmed by other means acceptable to the Department**
- **The exact locations of the proposed turbines**
- **The environmental factors included in the original noise analysis, *i.e.*, the temperature, relative humidity, barrier effects and ground effects used in the original analysis. If the certificate holder has cause to believe the environmental factors included in the original noise analysis are no longer valid for a particular receiver, the certificate holder shall perform the noise analysis for that receiver using both the environmental factors included in the original noise analysis and the environmental factors the certificate holder now believes to be applicable to that receiver.**

After generating the new table identifying noise sensitive properties and the predicted maximum hourly L_{50} noise level at each noise sensitive property, the

certificate holder shall meet Conditions (90)(a), (90)(b) and (90)(c) with respect to the noise sensitive properties identified in that table.

Conclusions of Law

Based on these findings and recommended conditions, the Council concludes that the proposed facility would comply with the applicable state noise control regulations in (OAR 340-035-0035(1)(b)(B)). The Council adopts Conditions (89), (90) and (91) in the site certificate.

(b) Removal-Fill Law

The Oregon Removal-Fill Law (ORS 196.800 through 990) and regulations (OAR 141-085-0005 through 141-085-0090) adopted by the Department of State Lands (DSL) require a permit if 50 cubic yards or more of material is removed, filled or altered within any "waters of the state" at the proposed site.[56] The Council must determine whether a permit is needed. The U.S. Army Corps of Engineers administers Section 404 of the Clean Water Act, which regulates the discharge of fill into waters of the United States (including wetlands). A Nationwide or Individual fill permit may be required.

Findings of Fact

Orion provided information about wetlands and other waters of the State in Exhibit J of the ASC. The analysis areas for its field investigations included a 400-foot buffer on either side of proposed access roads and the centerline of proposed turbine corridors. Included in that area are 22 intermittent streams that cross or lie adjacent to proposed turbine corridors, access roads or collector lines. None of the soil types in the analysis area were found to be hydric, and all crossings were examined in the field for indications of potential jurisdictional status under state and federal guidelines for waters of the State or United States.

Based on its literature review and fieldwork, Orion found 22 crossings of USGS-mapped drainages in the analysis area. Of these 22 crossings, Orion identified eight crossings of six potentially jurisdictional waters of the State. It also found one wetland within the analysis area. In consultation with the Oregon Department of State Lands (DSL), Orion was advised that seven of these crossings did not meet the definition of "intermittent stream" and, because Orion would avoid disturbance of the eighth crossing, a state removal-fill permit would not be required for Biglow.[57] By locating the collector system so as to avoid any impacts, Orion would also avoid disturbance of the one wetland found in the course of fieldwork in the analysis area.

[56] OAR 141-085-0010(225) defines "Waters of this State." The term includes wetlands and certain other water bodies.

[57] Letter to Orion Sherman County Wind Farm LLC from Eric D. Metz, Eastern Region Operations Manager, Wetlands and Waterways Conservation Division, Oregon Department of State Lands, dated February 3, 2006.

Conclusions of Law

Based on these findings, the Council concludes that a Removal-Fill Permit is not required.

(c) Ground Water Act

Through the provisions of the Ground Water Act of 1955, ORS 537.505 to 537.796, and OAR Chapter 690, the Oregon Water Resources Commission administers the rights of appropriation and use of the ground water resources of the state. Under OAR 345-022-0000(1), the Council must determine whether the proposed Biglow facility complies with these statutes and administrative rules.

Findings of Fact

Construction and operation of Biglow would not require a new or transferred water right. During construction, Orion would use about 12 million gallons of water for road compaction, underground collector line installation, dust suppression, and concrete mixing. About half of the water would be used for dust control and the remaining half would be used for all other construction activities. Orion will hold its construction contractors responsible for arranging for delivery of water to the site via water trucks from a source with an existing water right. The City of Wasco, Oregon (City), has agreed to provide the construction contractors with water for construction activities. Orion included in the ASC a copy of the City's agreement to provide this water, together with a copy of the City's existing water right. The City's water right and water delivery system would allow it to provide up to about 125,000 gallons per day. However, the Oregon Department of Water Resources has not made a final determination that the City of Wasco wells targeted for use are available. If available, the City water alone should be adequate for all construction activities. If additional water is needed or the City's water is unavailable, Orion's contractors will be required to secure additional water from another permitted source.

During operation of the facility, water would come from a new on-site well. Because the volume of water used would be less than 5,000 gallons per day, Orion would not be required to obtain a new water right. ORS 537.545(1)(f) provides that a new water right is not required for industrial and commercial uses of up to 5,000 gallons per day. During operation of the facility, well water would be used for domestic purposes at the O&M facility and blade washing. During operation of the facility, Orion would also require a source of water for turbine blade washing. Orion or its contractors would acquire water for blade washing from off-site, permitted sources or from the on-site well, provided the rate of consumption would not exceed 5,000 gallons per day.

To find that the siting, construction and operation of the proposed facility are consistent with the Ground Water Act of 1955 and the rules of the Water Resources Department, the Council adopts the conditions recommended under the Public Services standard pertaining to water use.

Conclusions of Law

Based on these findings, the Council concludes that the proposed use of ground water for the construction and operation of the proposed facility would comply with the Ground Water Act of 1955 and the rules of the Water Resources Department.

(d) Public Health and Safety

Under ORS 469.310, the Council is charged with ensuring that the "siting, construction and operation of energy facilities shall be accomplished in a manner consistent with protection of the public health and safety …" State law also provides that "the site certificate shall contain conditions for the protection of the public health and safety …" ORS 469.401(2).

Findings of Fact

The site certificate will contain conditions for the protection of the public health and safety with respect to several Council standards. In this section, we discuss the issues of fire protection, electric and magnetic fields, and coordination with the Oregon Public Utility Commission.

A. Fire Protection

Orion would equip wind turbines in the facility with built-in fire prevention measures that allow the turbines to shut down automatically before mechanical problems create excess heat or sparks. The use of underground collector cables would substantially reduce the risk of fire from short circuits caused by wildlife or lightning. Most of the facility's new access roads would be oriented perpendicular to the prevailing winds and could be expected to act as firebreaks. Throughout construction of the facility, Orion would clear vegetation from a laydown area adjacent to each wind turbine. After completion of construction, there would be no welding, cutting, grinding, or other flame- or spark-producing operations near the turbines. Orion would reseed the laydown area with agricultural crops or native grasses, as appropriate.

All on-site employees during both construction and operation of the facility would receive annual fire prevention and response training by a professional fire-safety training firm. The volunteer fire departments from the City of Rufus and the City of Wasco would be asked to participate in this training. Employees would be prohibited from smoking outside of company vehicles during dry summer months.

Each on-site company vehicle would contain a fire extinguisher, water spray can, shovel, emergency response procedures book, and two-way radio for immediate communication with the O&M facility. The O&M facility staff would coordinate fire response efforts.

Orion would place water-carrying trailers ("water buffaloes") at appropriate locations around the facility site, to be determined in consultation with the local fire departments. A

water buffalo would be brought to the site of any work where there is a substantial risk of fire. Each water buffalo would have a capacity of 500 gallons of water and would be equipped with a pump and hoses. The pumps would be 5-horsepower, engine-driven units with a pumping rate of 60 gallons per minute. One-inch hoses would be stored with each water buffalo. The water buffalos could be towed by a variety of vehicles, including service trucks and pickup trucks. Such vehicles would be present on the site in sufficient numbers at all times during construction and operation of the facility.

Local fire departments would be provided with maps and gate keys to the facility site.

To find that the siting, construction and operation of the proposed facility are consistent with protection of the public health and safety, the Council adopts the following conditions in the site certificate:

(92) During operation of the facility, the certificate holder shall maintain built-in fire prevention measures in each turbine that would shut down the turbine automatically before mechanical problems create excess heat or sparks.

(93) During construction and operation of the facility, the certificate holder shall develop and implement fire management plans in consultation with local fire control authorities to minimize the risk of fire and to respond appropriately to any fires that occur on the facility site. In developing the fire management plans, the certificate holder should take into account the dry nature of the region and should address risks on a seasonal basis.

(94) During construction and operation of the facility, the certificate holder shall ensure that each on-site company vehicle contains a fire extinguisher, water spray can, shovel, emergency response procedures book, and two-way radio for immediate communication with the O&M facility.

(95) During construction of the facility, the certificate holder shall clear vegetation from a laydown area adjacent to each wind turbine where welding, cutting, grinding, or other flame- or spark-producing operations are likely to occur.

(96) Upon beginning operation of the facility, the certificate holder shall provide to all local fire departments maps of the facility site. During operation of the facility, the certificate holder shall provide to all local fire departments the names and telephone numbers of facility personnel available to respond on a 24-hour basis in case of an emergency on the facility site.

(97) During operation of the facility, the certificate holder shall ensure that all on-site employees receive annual fire prevention and response training by qualified instructors or members of the local fire department and that all

employees are instructed to keep vehicles on roads and off dry grassland, except when off-road operation is required for emergency purposes.

(98) During operation of the facility, the certificate holder shall ensure that water-carrying trailers ("water buffaloes") are maintained at strategic locations around the facility site and that a water buffalo is always present at a job site where there is substantial risk of fire. Each water buffalo shall be equipped with one-inch hoses, have a capacity of 500 gallons of water, and be equipped with a 5-horsepower pump with a pumping rate of 60 gallons per minute. Each water buffalo shall be capable of being towed by on-site service vehicles or pickup trucks.

B. Electric and Magnetic Fields

Electric Fields. Electric fields can induce voltages in structures, causing electric shock when the structure is touched. That is, the induced voltage causes an unwanted current to flow in a person contacting the structure. Protection can be effected by either isolating the structure to prevent contact or by grounding or bonding the structure. Grounding or bonding provides a free path for electric current through a conducting wire or metal rod to the ground, serving a function similar to that of a lightning rod. Electricity follows the path of least resistance to ground, thereby reducing the possibility of a shock hazard due to stray currents.

Magnetic Fields. There has been public concern that exposure to magnetic fields might cause health risks. This issue has been the subject of considerable scientific research and discussion.

The Council considered this issue in 1993. Based on its review, the Council concluded that the credible evidence relating health risks to low levels of exposure to magnetic fields was inconclusive and that there was insufficient information upon which to set "health based" limits for exposure to magnetic fields. The Council recommended that, given the uncertainty as to health consequences, those who propose transmission lines under the Council's jurisdiction should use low-cost ways to reduce or manage public exposure to magnetic fields. This approach is sometimes referred to as "prudent avoidance."

Several other authorities have considered this issue and have reached conclusions similar to those of the Council. As part of the 1992 Energy Policy Act, the U.S. Congress authorized the Electric and Magnetic Fields Research and Public Information Dissemination Program. It culminated in a report by the National Institute of Environmental Health Sciences ("NIEHS") in May 1999, entitled "Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields" (NIH Publication No. 99-4493).

The NIEHS report includes the following conclusions.

1. The scientific evidence suggesting that extremely low frequency electric and magnetic fields ("ELF-EMF") exposures pose any health risk is weak. The only health impacts of concern are childhood leukemia and chronic

lymphocytic leukemia in occupationally exposed adults. Epidemiological studies of humans show a pattern of small increased risk of leukemia with increasing exposure to ELF-EMF.

2. Mechanistic studies and experimental studies on non-humans do not indicate any increase in leukemia as a result of exposure to ELF-EMF, although sporadic findings of increases in other forms of cancer in experimental animals have been reported. A causal link that would explain the weak epidemiological evidence of increased leukemia has not been found.

3. ELF-EMF cannot be recognized as entirely safe. However, the evidence that exposure may pose a leukemia hazard is too weak to warrant aggressive regulatory concern. Passive regulatory action is warranted.

In June 2002, the California Department of Health Services (DHS) published an assessment of the biological effects of magnetic fields. In general, the DHS found reason to suspect a greater likelihood of adverse effects on human health than did the NIEHS report. Like the NIEHS report, the DHS assessment reports substantial uncertainty on the effects of magnetic fields. The DHS assessment has not been used by the Council to modify its existing policy of prudent avoidance.

The states of Florida and New York have limits on magnetic fields from transmission lines. For 500-kV lines, both states limit magnetic fields at the edge of the right-of-way to 200 mG. Florida has a 150-mG limit at the edge of the right-of-way for lines of 69 kV to 230 kV.

Orion calculated the potential magnetic field strengths for the proposed transmission lines. The calculations showed that the greatest magnetic fields would be about 78.6 mG for the 500-kV transmission line, about 305 mG for the 230-kV transmission line, about 82.6 mG for the overhead segments of a single-circuit 34.5-kV collector system, and about 143.7 mG for the overhead segments of a double-circuit 34.5-kV collector system. These field strengths would occur at the centerline of the right-of-way. At the edge of the right-of-way (75 feet from the centerline for the 230-kV transmission line, 100 feet from the centerline for the 500-kV transmission line, and 200 feet from the centerline for the 34.5-kV collector system), the calculated field strengths were about 55.7 mG for the 230-kV transmission line, about 11 to 13 mG for the 500-kV transmission line, about 1.2 mG for the single-circuit 34.5-kV collector system, and about 2.8 mG for the double-circuit 34.5-kV collector system. For the underground segments of the 34.5-kV collector system, the magnetic field was calculated at about 62.9 mG at the centerline of the right-of-way. The magnetic fields at the edges of the rights-of-way are lower than the most restrictive limits imposed by Florida.

With respect to the potential for radio and TV interference from the proposed transmission lines, Orion points out that the alternative 230-kV and 500-kV transmission lines may generate random corona radiation during wet weather. However, the power levels would be low and difficult to detect. Orion also notes that the 34.5-kV collector system, operating in a clean environment, would not cause measurable or problematic foul-weather corona noise.

To find that the siting, construction and operation of the proposed facility are consistent with protection of the public health and safety, the Council adopts the following condition in the site certificate:

(99) The certificate holder shall take reasonable steps to reduce or manage exposure to electromagnetic fields (EMF), consistent with Council findings presented in the "Report of EMF Committee to the Energy Facility Siting Council," March 30, 1993, and subsequent findings. Effective on the date of this site certificate, the certificate holder shall provide information to the public, upon request, about EMF levels associated with the energy facility and related transmission lines.

C. Coordination with the PUC

The Oregon Public Utility Commission Safety and Reliability Section ("OPUC") has previously requested that the Council ensure that certificate holders coordinate with OPUC staff on the design and specifications of electrical transmission lines. The OPUC has explained that others in the past have made inadvertent, but costly, mistakes in the design and specifications of transmission lines that could have easily been corrected early if the developer had consulted with the OPUC staff responsible for the safety codes and standards.

To promote coordination between Orion and the OPUC regarding the design and specifications of electrical transmission lines, the Council adopts the following condition in the site certificate to ensure timely consultation:

(100) At least 30 days before beginning preparation of detailed design and specifications for the electrical transmission lines, the certificate holder shall consult with the Oregon Public Utility Commission staff to ensure that its designs and specifications are consistent with applicable codes and standards.

Conclusions of Law

The Council concludes that, subject to the conditions stated in this Order, the siting, construction and operation of the proposed facility are consistent with protection of the public health and safety. The Council adopts Conditions (92), (93), (94), (95), (96), (97), (98), (99) and (100) in the site certificate.

2. Requirements That Are Not Under Council Jurisdiction

(a) Federally-Delegated Programs

Under ORS 469.503(3), the Council does not have jurisdiction for determining compliance with statutes and rules for which the federal government has delegated the decision on compliance to a state agency other than the Council. Nevertheless, the Council may rely on the determinations of compliance and the conditions in the federally-delegated

permits issued by these state agencies in deciding whether the proposed facility meets other standards and requirements under its jurisdiction.

Orion has applied to the Oregon Department of Environmental Quality (DEQ) for a NPDES Storm Water Discharge General Permit #1200-C (for construction activities), and DEQ has issued the permit. Orion has also applied to DEQ for a Wastewater General Permit #1700 for blade washing activities.

(b) Requirements That Do Not Relate to Siting

Under ORS 469.401(4), the Council does not have authority to preempt the jurisdiction of any state agency or local government over matters that are not included in and governed by the site certificate or amended site certificate. Such matters include design-specific construction or operating standards and practices that do not relate to siting. Nevertheless, the Council may rely on the determinations of compliance and the conditions in the permits issued by these state agencies and local governments in deciding whether the facility meets other standards and requirements under its jurisdiction.

VI. CONDITIONS REQUIRED BY COUNCIL RULES

This section lists conditions to be included in the site certificate as specifically required by OAR 345-027-0020 (Mandatory Conditions in Site Certificates), OAR 345-027-0028 (Monitoring Conditions), and OAR Chapter 345, Division 26 (Construction and Operation Rules for Facilities). All references to the Office of Energy or Office shall be construed to refer to the Department of Energy. These conditions should be read together with the specific facility conditions included in Sections IV and V to ensure compliance with the siting standards of OAR Chapter 345, Divisions 22 and 24, and to protect the public health and safety. The certificate holder shall comply with all site certificate conditions.

In addition to all other conditions stated in this order, the site certificate holder is subject to all conditions and requirements contained in the rules of the Council and in local ordinances and state law in effect on the date the certificate is executed. Under ORS 469.401(2), upon a clear showing of a significant threat to the public health, safety or the environment that requires application of later-adopted laws or rules, the Council may require compliance with such later-adopted laws or rules.

The Council recognizes that many specific tasks related to the design, construction, operation and retirement of the facility will be undertaken by the certificate holder's agents or contractors. Nevertheless, the certificate holder is responsible for ensuring compliance with all provisions of the site certificate.

(101) <u>OAR 345-027-0020(1):</u> The Council shall not change the conditions of the site certificate except as provided for in OAR Chapter 345, Division 27.

(102) **<u>OAR 345-027-0020(2):</u> Except as provided in OAR 345-027-0023(6), before beginning construction, the certificate holder shall submit to the Office of Energy a legal description of the site.**

(103) **<u>OAR 345-027-0020(3):</u> The certificate holder shall design, construct, operate and retire the facility:**

(a) **Substantially as described in the site certificate;**

(b) **In compliance with the requirements of ORS Chapter 469, applicable Council rules, and applicable state and local laws, rules and ordinances in effect at the time the site certificate is issued; and**

(c) **In compliance with all applicable permit requirements of other state agencies.**

(104) **<u>OAR 345-027-0020(4):</u> The certificate holder shall begin and complete construction of the facility by the dates specified in the site certificate.**

(105) **<u>OAR 345-027-0020(5):</u> Except as necessary for the initial survey or as otherwise allowed for transmission lines or pipelines under this section, the certificate holder shall not begin construction, as defined in OAR 345-001-0010, or create a clearing on any part of the site until the certificate holder has construction rights on all parts of the site. For the purpose of this rule, "construction rights" means the legal right to engage in construction activities. For transmission lines or pipelines, if the certificate holder does not have construction rights on all parts of the site, the certificate holder may nevertheless begin construction, as defined in OAR 345-001-0010, or create a clearing on a part of the site if:**

(a) **The certificate holder has construction rights on that part of the site; and**

(b) **The certificate holder would construct and operate part of the facility on that part of the site even if a change in the planned route of the transmission line or pipeline occurs during the certificate holder's negotiations to acquire construction rights on another part of the site.**

(106) **<u>OAR 345-027-0020(6):</u> If the Council requires mitigation based on an affirmative finding under any standards of Division 22 or Division 24 of this chapter, the certificate holder shall consult with affected state agencies and local governments designated by the Council and shall develop specific mitigation plans consistent with Council findings under the relevant standards. The certificate holder must submit the mitigation**

plans to the Office and receive Office approval before beginning construction or, as appropriate, operation of the facility.

(107) OAR 345-027-0020(7): The certificate holder shall prevent the development of any conditions on the site that would preclude restoration of the site to a useful, non-hazardous condition to the extent that prevention of such site conditions is within the control of the certificate holder.

(108) OAR 345-027-0020(8): Before beginning construction of the facility, the certificate holder shall submit to the State of Oregon, through the Council, a bond or letter of credit, satisfactory to the Council, in an amount specified in the site certificate to restore the site to a useful, non-hazardous condition. The certificate holder shall maintain a bond or letter of credit in effect at all times until the facility has been retired. The Council may specify different amounts for the bond or letter of credit during construction and during operation of the facility.

(109) OAR 345-027-0020(9): The certificate holder shall retire the facility if the certificate holder permanently ceases construction or operation of the facility. The certificate holder shall retire the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0110. The certificate holder shall pay the actual cost to restore the site to a useful, non-hazardous condition at the time of retirement, notwithstanding the Council's approval in the site certificate of an estimated amount required to restore the site.

(110) OAR 345-027-0020(10): The Council shall include as conditions in the site certificate all representations in the site certificate application and supporting record the Council deems to be binding commitments made by the applicant.

(111) OAR 345-027-0020(11): Upon completion of construction, the certificate holder shall restore vegetation to the extent practicable and shall landscape portions of the site disturbed by construction in a manner compatible with the surroundings and proposed use. Upon completion of construction, the certificate holder shall dispose of all temporary structures not required for facility operation and all timber, brush, refuse and flammable or combustible material resulting from clearing of land and construction of the facility.

(112) OAR 345-027-0020(12): The certificate holder shall design, engineer and construct the facility to avoid dangers to human safety presented by seismic hazards affecting the site that are expected to result from all maximum probable seismic events. As used in this rule "seismic hazard"

includes ground shaking, landslide, liquefaction, lateral spreading, tsunami inundation, fault displacement and subsidence.

(113) <u>OAR 345-027-0020(13):</u> The certificate holder shall notify the Office, the State Building Codes Division and the Department of Geology and Mineral Industries promptly if site investigations or trenching reveal that conditions in the foundation rocks differ significantly from those described in the application for a site certificate. After the Office receives the notice, the Council may require the certificate holder to consult with the Department of Geology and Mineral Industries and the Building Codes Division and to propose mitigation actions.

(114) <u>OAR 345-027-0020(14):</u> The certificate holder shall notify the Office, the State Building Codes Division and the Department of Geology and Mineral Industries promptly if shear zones, artesian aquifers, deformations or clastic dikes are found at or in the vicinity of the site.

(115) <u>OAR 345-027-0020(15):</u> Before any transfer of ownership of the facility or ownership of the site certificate holder, the certificate holder shall inform the Office of the proposed new owners. The requirements of OAR 345-027-0100 apply to any transfer of ownership that requires a transfer of the site certificate.

(116) <u>OAR 345-027-0020(16):</u> If the Council finds that the certificate holder has permanently ceased construction or operation of the facility without retiring the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0110, the Council shall notify the certificate holder and request that the certificate holder submit a proposed final retirement plan to the Office within a reasonable time not to exceed 90 days. If the certificate holder does not submit a proposed final retirement plan by the specified date, the Council may direct the Office to prepare a proposed a final retirement plan for the Council's approval. Upon the Council's approval of the final retirement plan, the Council may draw on the bond or letter of credit described in section (8) to restore the site to a useful, non-hazardous condition according to the final retirement plan, in addition to any penalties the Council may impose under OAR Chapter 345, Division 29. If the amount of the bond or letter of credit is insufficient to pay the actual cost of retirement, the certificate holder shall pay any additional cost necessary to restore the site to a useful, non-hazardous condition. After completion of site restoration, the Council shall issue an order to terminate the site certificate if the Council finds that the facility has been retired according to the approved final retirement plan.

(117) <u>OAR 345-027-0023(4):</u> If the energy facility or related or supporting facility is a transmission line, the certificate holder shall restore the

reception of radio and television at residences and commercial establishments in the primary reception area to the level present prior to operations of the transmission line, at no cost to residents experiencing interference resulting from the transmission line.

(118) OAR 345-027-0023(5): If the facility includes any high voltage transmission line under Council jurisdiction:

(a) The certificate holder shall design, construct and operate the transmission line in accordance with the requirements of the National Electrical Safety Code (American National Standards Institute, Section C2, 1997 Edition); and

(b) The certificate holder shall develop and implement a program that provides reasonable assurance that all fences, gates, cattle guards, trailers, or other objects or structures of a permanent nature that could become inadvertently charged with electricity are grounded or bonded throughout the life of the line.

(119) OAR 345-027-0023(6): If the proposed energy facility is a pipeline or a transmission line or has, as a related or supporting facility, a pipeline or transmission line, the Council shall specify an approved corridor in the site certificate and shall allow the certificate holder to construct the pipeline or transmission line anywhere within the corridor, subject to the conditions of the site certificate. If the applicant has analyzed more than one corridor in its application for a site certificate, the Council may, subject to the Council's standards, approve more than one corridor. Before beginning operation of the facility, the certificate holder shall submit to the Office a legal description of the permanent right-of-way where the applicant has built the pipeline or transmission line within an approved corridor. The site of the pipeline or transmission line subject to the site certificate is the area within the permanent right-of-way.

(120) OAR 345-027-0028: The following general monitoring conditions apply:

(a) The certificate holder shall consult with affected state agencies, local governments and tribes and shall develop specific monitoring programs for impacts to resources protected by the standards of divisions 22 and 24 of this chapter and resources addressed by applicable statutes, administrative rules and local ordinances. The certificate holder must submit the monitoring programs to the Office of Energy and receive Office approval before beginning construction or, as appropriate, operation of the facility.

(b) The certificate holder shall implement the approved monitoring programs described in section (a) and monitoring programs required by permitting agencies and local governments.

(c) For each monitoring program described in sections (a) and (b), the certificate holder shall have quality assurance measures approved by the Office before beginning construction or, as appropriate, before beginning commercial operation.

(d) If the certificate holder becomes aware of a significant environmental change or impact attributable to the facility, the certificate holder shall, as soon as possible, submit a written report to the Office describing the impact on the facility and any affected site certificate conditions.

(121) OAR 345-026-0048: Following receipt of the site certificate, the certificate holder shall implement a plan that verifies compliance with all site certificate terms and conditions and applicable statutes and rules. As a part of the compliance plan, to verify compliance with the requirement to begin construction by the date specified in the site certificate, the certificate holder shall report promptly to the Office of Energy when construction begins. Construction is defined in OAR 345-001-0010. In reporting the beginning of construction, the certificate holder shall describe all work on the site performed before beginning construction, including work performed before the Council issued the site certificate, and shall state the cost of that work. For the purpose of this exhibit, "work on the site" means any work within a site or corridor, other than surveying, exploration or other activities to define or characterize the site or corridor. The certificate holder shall document the compliance plan and maintain it for inspection by the Department or the Council.

(122) OAR 345-026-0080: The certificate holder shall report according to the following requirements:

(a) General reporting obligation for non-nuclear facilities under construction or operating:

(i) Within six months after beginning construction, and every six months thereafter during construction of the energy facility and related or supporting facilities, the certificate holder shall submit a semiannual construction progress report to the Council. In each construction progress report, the certificate holder shall describe any significant changes to major milestones for construction. The certificate holder shall include such information related to construction as specified in the site certificate. When the reporting date

coincides, the certificate holder may include the construction progress report within the annual report described in this rule;

(ii) The certificate holder shall, within 120 days after the end of each calendar year after beginning construction, submit an annual report to the Council addressing the subjects listed in this rule. The Council secretary and the certificate holder may, by mutual agreement, change the reporting date.

(iii) To the extent that information required by this rule is contained in reports the certificate holder submits to other state, federal or local agencies, the certificate holder may submit excerpts from such other reports to satisfy this rule. The Council reserves the right to request full copies of such excerpted reports.

(b) In the annual report, the certificate holder shall include the following information for the calendar year preceding the date of the report:

(i) Facility Status: An overview of site conditions, the status of facilities under construction, and a summary of the operating experience of facilities that are in operation. In this section of the annual report, the certificate holder shall describe any unusual events, such as earthquakes, extraordinary windstorms, major accidents or the like that occurred during the year and that had a significant adverse impact on the facility;

(ii) Reliability and Efficiency of Power Production: For electric power plants,

(A) The plant availability and capacity factors for the reporting year. If equipment failures or plant breakdowns had a significant impact on those factors, the certificate holder shall describe them and its plans to minimize or eliminate their recurrence;

(B) The efficiency with which the power plant converts fuel into electric energy. If the fuel chargeable to power heat rate was evaluated when the facility was sited, the certificate holder shall calculate efficiency using the same formula and assumptions, but using actual data; and

(C) The facility's annual hours of operation by fuel type and, every five years after beginning operation, a summary of the annual hours of operation by fuel type as described in OAR 345-024-0590(5);

(iii) Status of Surety Information: Documentation demonstrating that bonds or letters of credit as described in the site certificate are in full force and effect and will remain in full force and effect for the term of the next reporting period;

(iv) Industry Trends: A discussion of any significant industry trends that may affect the operations of the facility;

(v) Monitoring Report: A list and description of all significant monitoring and mitigation activities performed during the previous year in accordance with site certificate terms and conditions, a summary of the results of those activities, and a discussion of any significant changes to any monitoring or mitigation program, including the reason for any such changes;

(vi) Compliance Report: A description of all instances of noncompliance with a site certificate condition. For ease of review, the certificate holder shall, in this section of the report, use numbered subparagraphs corresponding to the applicable sections of the site certificate;

(vii) Facility Modification Report: A summary of changes to the facility that the certificate holder has determined do not require a site certificate amendment in accordance with OAR 345-027-0050; and

(viii) Nongenerating Facility Carbon Dioxide Emissions: For nongenerating facilities that emit carbon dioxide, a report of the annual fuel use by fuel type and annual hours of operation of the carbon dioxide emitting equipment as described in OAR 345-024-0630(4).

(123) <u>OAR 345-026-0100:</u> The certificate holder shall promptly notify the Office of Energy of any changes in major milestones for construction, decommissioning, operation or retirement schedules. Major milestones are those identified by the certificate holder in its construction, retirement or decommissioning plan.

(124) <u>OAR 345-026-0105:</u> The certificate holder and the Office of Energy shall exchange copies of all correspondence or summaries of correspondence related to compliance with statutes, rules and local ordinances on which the Council determined compliance, except for material withheld from public disclosure under state or federal law or under Council rules. The certificate holder may submit abstracts of reports in place of full reports; however, the certificate holder shall provide full copies of abstracted reports and any summarized correspondence at the request of the Office of Energy.

(125) <u>OAR 345-026-0170:</u> The certificate holder shall notify the Office of Energy within 72 hours of any occurrence involving the facility if:

(a) There is an attempt by anyone to interfere with its safe operation;

(b) A natural event such as an earthquake, flood, tsunami or tornado, or a human-caused event such as a fire or explosion affects or threatens to affect the public health and safety or the environment; or

(c) There is any fatal injury at the facility.

VII. GENERAL CONCLUSION

In accordance with ORS 469.503, in order to issue a site certificate, the Council must determine that the preponderance of the evidence on the record supports the following conclusions:

1. The proposed Biglow Canyon Wind Farm complies with the requirements of the Oregon Energy Facility Siting statutes, ORS 469.300 to 469.520.

2. The proposed Biglow Canyon Wind Farm complies with the standards adopted by the Council pursuant to ORS 469.501.

3. The proposed Biglow Canyon Wind Farm complies with the statewide planning goals adopted by the Land Conservation and Development Commission.

4. The proposed Biglow Canyon Wind Farm complies with all other Oregon statutes and administrative rules identified in the project order as applicable to the issuance of a site certificate for the proposed facility.

Based on the findings of fact, reasoning, and conclusions of law in this order, the Council concludes that these requirements are met, subject to the conditions stated in this order.

VIII. FINAL ORDER

The Council grants issuance of a site certificate, subject to the terms and conditions set forth above, to Orion Sherman County Wind Farm LLC for the Biglow Canyon Wind Farm.

Issued this 30th day of June 2006.

OREGON ENERGY FACILITY SITING COUNCIL

By: _____
Hans Neukomm, Chair

Attachments
Attachment A: Wildlife Monitoring and Mitigation Plan
Attachment B: Revegetation Plan
Attachment C: Habitat Mitigation Plan

NOTICE OF THE RIGHT TO APPEAL

You have the right to appeal this order to the Oregon Supreme Court pursuant to ORS 469.405. To appeal, you must file a petition for judicial review with the Supreme Court within 60 days from the day this order was served on you. If this order was personally delivered to you, the date of service is the date you received this order. If this order was mailed to you, the date of service is the date it was mailed, not the day you received it. If you do not file a petition for judicial review within the 60-day time period, you lose your right to appeal.

BIGLOW CANYON WIND FARM: WILDLIFE MONITORING AND MITIGATION PLAN
[JUNE 30, 2006]

This plan describes wildlife monitoring that the certificate holder shall conduct during operation of the Biglow Canyon Wind Farm ("Biglow")[1]. The monitoring objectives are to determine whether operation of the facility causes significant fatalities of birds and bats and to determine whether the facility results in a loss of habitat quality. The Biglow facility consists of up to 225 wind turbines with a maximum generating capacity of 450 MW, up to 10 permanent meteorological towers and other related or supporting facilities as described in the site certificate. Biglow may be built in phases.

The certificate holder shall use experienced personnel to manage the monitoring required under this plan and properly trained personnel to conduct the monitoring, subject to approval by the Oregon Department of Energy ("Department") as to professional qualifications. For all components of this plan except the Wildlife Incident Response and Handling System, the certificate holder shall direct a qualified independent third-party biological monitor, as approved by the Department, to perform monitoring tasks.

The Wildlife Monitoring and Mitigation Plan for Biglow has the following components:

1) Fatality Monitoring Program including:

   a) Removal Trials

   b) Searcher Efficiency Trials

   c) Fatality Monitoring Search Protocol

   d) Statistical Analysis

2) Raptor Nesting Surveys

3) Avian Use and Behavior Surveys

4) Wildlife Incident Response and Handling System

Following is a discussion of the components of the monitoring plan, statistical analysis methods for fatality data, data reporting and potential mitigation.

The selection of the mitigation actions that the certificate holder may be required to implement under this plan should allow for flexibility in creating appropriate responses to

[1] This document does not address all mitigation. The Application for Site Certificate includes proposed actions taken to avoid and reduce impacts. The Revegetation Plan addresses actions to restore habitat damaged by construction. The Habitat Mitigation Plan address actions to mitigate for the permanent loss of habitat from the "footprint" of the facility as well as assumed reduction in habitat quality due to "displacement" of bird species that rely on grassland habitat. The Proposed Order contains conditions the certificate holder must meet.

monitoring results that cannot be known in advance. If the Department determines that mitigation is needed, the certificate holder shall propose appropriate mitigation actions to the Department and shall carry out mitigation actions approved by the Department, subject to review by the Oregon Energy Facility Council ("Council").

1. Fatality Monitoring

(a) Definitions and Methods

Seasons

This plan uses the following dates for defining seasons:

Season	Dates
Spring Migration	March 16 to May 15
Summer/Breeding	May 16 to August 15
Fall Migration	August 16 to October 31
Winter	November 1 to March 15

Search Plots

The certificate holder shall conduct fatality monitoring within search plots. The certificate holder, in consultation with the Oregon Department of Fish and Wildlife ("ODFW"), shall select search plots based on the following sampling scheme, consistent with the sample size requirements for that phase of the facility, as outlined below: All end-of-row and 2nd-to-end-of-row wind turbines closest to the John Day River will be searched within the 8 proposed turbine corridors closest to the John Day River. Among the remaining turbines in that phase of the facility, representative turbines (e.g., every third turbine) will be sampled based on a systematic sample, consistent with the sample size described below. Turbine corridors will be broken into square or circular search plots that contain one turbine each. The edge of each plot will be no closer to the center of the turbine tower than the distance equal to the distance from the ground to the rotor tip when the rotor is in the 12 o'clock position ("maximum tip height").

The certificate holder shall provide maps of the search plots to the Department and ODFW before beginning fatality monitoring at the facility. The certificate holder will use the same search plots for each search conducted during each specific monitoring year. During the second monitoring year, the same end-of-row turbines nearest the John Day River will be sampled, but new samples will be selected from the turbines not sampled during the first monitoring year.

Sample Size for Standardized Carcass Searches

The sample size for fatality monitoring is the number of turbines searched per monitoring year. The facility may be built in phases. For the first phase of development, standardized carcass searches (fatality monitoring) during the first two monitoring years will be conducted in search plots that include a minimum of 40 percent of the wind turbines in that phase but not fewer than

50 turbines, unless the entire phase is fewer than 50 turbines, in which event all turbines will be sampled.

The sample size for future phases of the facility, if they are built, will be based on whether, under Section 1(g) of this plan, mitigation is required based on the results of fatality monitoring of the first phase.

If no mitigation is required under Section 1(g) of this plan based on the results of fatality monitoring of the first phase, then the sample size for monitoring future phases of the facility may be reduced appropriately if the Department concurs.

However, if mitigation is required under Section 1(g) of this plan based on the results of fatality monitoring of the first phase, then the certificate holder shall propose an appropriate sample size for monitoring the next phase of the facility. The need for, and scope of, fatality monitoring for subsequent phases are subject to the approval of the Department.

Scheduling and Sampling Frequency

Fatality monitoring will begin upon the commencement of commercial operation of the facility. If the facility is constructed in phases, fatality-monitoring studies for each phase will begin upon commercial operation of that phase.

For each phase, the first fatality monitoring year will commence on the first day of the month following the commercial operation date of that phase of the facility and will conclude twelve months later (for example, if commercial operation begins in October of 2007, the monitoring year will commence on November 1, 2007, and conclude on October 31, 2008). Subsequent monitoring years of that phase will follow the same schedule (for example, the second monitoring year would begin November 1, 2008) unless the second fatality-monitoring year is postponed with the concurrence of the Department.

In each monitoring year, the certificate holder shall conduct fatality-monitoring searches at the rates of frequency shown below. Over the course of one monitoring year, the certificate holder would conduct 16 searches[2], as follows:

Season	**Frequency**
Spring Migration	2 searches per month (4 searches)
Summer/Breeding	1 search per month (3 searches)
Fall Migration	2 searches per month (5 searches)
Winter	1 search per month (4 searches)

[2] Fewer than 16 searches may be conducted if searches are not possible due to safety reasons or severe weather.

Duration of Fatality Monitoring

Fatality monitoring of the first phase of the facility will be complete after two monitoring years, except as follows: A "worst-case" analysis will be used to resolve any uncertainty in the results of the two years of monitoring data for purposes of determining the mitigation requirements for the facility. If the first two years of monitoring data indicate the potential for unexpected impacts of a type that cannot be resolved appropriately by "worst-case" analysis and appropriate mitigation, additional, targeted monitoring may be conducted for the first phase of the facility for up to an additional two years before determining the mitigation requirements for the facility, or, alternatively, sample sizes larger than those outlined above will be used in monitoring of subsequent phases of development of the facility.

Meteorological Towers

The facility will most likely use unguyed meteorological towers. Unguyed towers are known to cause little if any bird and bat mortality. Therefore, monitoring will not occur at unguyed meteorological towers. If the meteorological towers are guyed, the certificate holder shall search all towers on the same monitoring schedule as fatality monitoring. The certificate holder will use circular search plots. The radius of the circular search plots will extend a minimum of 5 meters beyond the most distant guy wire anchor point.

(b) Removal Trials

The objective of the removal trials is to estimate the length of time avian and bat carcasses remain in the search area. Carcass removal studies will be conducted during each season in the vicinity of the search plots. Estimates of carcass removal rates will be used to adjust carcass counts for removal bias. "Carcass removal" is the disappearance of a carcass from the search area due to predation, scavenging or other means such as farming activity. Removal rates will be estimated by habitat and season.

During the first phase, the certificate holder shall conduct carcass removal trials within each of the seasons defined above during the years in which fatality monitoring occurs. During the first year in which fatality monitoring occurs, trials will occur in at least eight different calendar weeks in a year, with at least one calendar week between starting dates. Trials will be spread throughout the year to incorporate the effects of varying weather, farming practices and scavenger densities. At least two trials will be started in each season. Each trial will use at least 20 carcasses. For each trial, at least 5 small bird carcasses and at least 5 large bird carcasses will be distributed in cultivated agriculture habitat and at least 3 small bird carcasses and at least 3 large bird carcasses will be distributed in non-cultivated habitat (grassland/shrub-steppe and CRP). In a year, about 100 carcasses will be placed in cultivated agriculture and about 60 in non-cultivated grassland/shrub-steppe and CRP for a total of about 160 trial carcasses. The number of removal trials may be reduced to one per season (80 trial carcasses) during the second year of fatality monitoring, subject to approval by the Department, if the certificate holder can demonstrate that the calculation of fatality rates will continue to have statistical validity with the reduced sample size.

The need for, and scope of, removal trials for subsequent phases may be modified based on the variability of results of removal trials for the first phase, subject to the approval of the Department.

The "small bird" size class will use carcasses of house sparrows, starlings, commercially available game bird chicks or legally obtained native birds to simulate passerines. The "large bird" size class will use carcasses of raptors provided by agencies, commercially available adult game birds or cryptically colored chickens to simulate raptors, game birds and waterfowl. If fresh bat carcasses are available, they may also be used.

To avoid confusion with turbine-related fatalities, planted carcasses will not be placed in fatality monitoring search plots. Planted carcasses will be placed in the vicinity of search plots but not so near as to attract scavengers to the search plots. The planted carcasses will be located randomly within the carcass removal trial plots.

Carcasses will be placed in a variety of postures to simulate a range of conditions. For example, birds will be: 1) placed in an exposed posture (e.g., thrown over the shoulder), 2) hidden to simulate a crippled bird (e.g., placed beneath a shrub or tuft of grass) and, 3) partially hidden. Trial carcasses will be marked discreetly for recognition by searchers and other personnel. Trial carcasses will be left at the location until the end of the carcass removal trial.

It is expected that carcasses will be checked as follows, although actual intervals may vary. Carcasses will be checked for a period of 40 days to determine removal rates. They will be checked about every day for the first 4 days, and then on day 7, day 10, day 14, day 20, day 30 and day 40. This schedule may vary depending on weather and coordination with the other survey work. At the end of the 40-day period, the trial carcasses and scattered feathers will be removed.

(c) Searcher Efficiency Trials

The objective of searcher efficiency trials is to estimate the percentage of bird and bat fatalities that searchers are able to find. The certificate holder shall conduct searcher efficiency trials on the fatality monitoring search plots in both grassland/shrub-steppe and cultivated agriculture habitat types. Searcher efficiency will be estimated by habitat type and season. Estimates of searcher efficiency will be used to adjust carcass counts for detection bias.

During the first phase, searcher efficiency trials will be conducted in each season as defined above, during the years in which the fatality monitoring occurs. Trials will be spread throughout the year to incorporate the effects of varying weather, farming practices and scavenger densities. At least two trials will be conducted in each season. Each trial will use about 20 carcasses, although the number will be variable so that the searcher will not know the total number of trial carcasses being used in any trial. For each trial, both small bird and large bird carcasses will be used in about equal numbers. "Small bird" and "large bird" size classes and carcass selection are as described above for the removal trials. A greater proportion of the trial carcasses will be distributed in cultivated agriculture habitat than in non-cultivated habitat (grassland/shrub steppe and CRP). In a year, about 100 carcasses will be placed in cultivated

agriculture and about 60 in non-cultivated grassland/shrub steppe and CRP for a total of about 160 trial carcasses. The number of searcher efficiency trials may be reduced to one per season (80 trial carcasses) during the second year of fatality monitoring, subject to approval by the Department, if the certificate holder can demonstrate that the calculation of fatality rates will continue to have statistical validity with the reduced sample size.

The need for, and scope of, searcher efficiency trials for subsequent phases may be modified based on the variability of results of searcher efficiency trials for the first phase, subject to the approval of the Department.

Personnel conducting searches will not know in advance when trials are conducted; nor will they know the location of the trial carcasses. If suitable trial carcasses are available, trials during the fall season will include several small brown birds to simulate bat carcasses. Legally obtained bat carcasses will be used if available.

On the day of a standardized fatality monitoring search (described below) but before the beginning of the search, efficiency trial carcasses will be placed at random locations within areas to be searched. If scavengers appear attracted by placement of carcasses, the carcasses will be distributed before dawn.

Searcher efficiency trials will be spread over the entire season to incorporate effects of varying weather and vegetation growth. Carcasses will be placed in a variety of postures to simulate a range of conditions. For example, birds will be: 1) placed in an exposed posture (thrown over the shoulder), 2) hidden to simulate a crippled bird and 3) partially hidden.

Each non-domestic carcass will be discreetly marked so that it can be identified as an efficiency trial carcass after it is found. The number and location of the efficiency trial carcasses found during the carcass search will be recorded. The number of efficiency trial carcasses available for detection during each trial will be determined immediately after the trial by the person responsible for distributing the carcasses.

If new searchers are brought into the search team, additional detection trials will be conducted to ensure that detection rates incorporate searcher differences.

(d) Coordination with the Klondike III Wind Project

The proposed Klondike III Wind Project lies to the south of the Biglow on similar terrain and habitat. If the Council approves site certificates for both facilities and requires similar wildlife monitoring, coordination of removal trials and searcher efficiency trials would be possible. Subject to the approval of both certificate holders and the Department, the number of trials at each site and the number of trial carcasses used at each site can be reduced by combining the removal data and efficiency data from both facilities, if the certificate holder can demonstrate that the calculation of fatality rates will continue to have statistical validity for both facilities and that combining the data will not affect any other requirements of the monitoring plans for either facility.

(e) Fatality Monitoring Search Protocol

The objective of fatality monitoring is to estimate the number of bird and bat fatalities that are attributable to facility operation and associated variances. The certificate holder shall conduct fatality monitoring using standardized carcass searches.

The certificate holder shall use a worst-case analysis to resolve any uncertainty in the results and to determine whether the data indicate that additional mitigation should be considered. The Department may require additional, targeted monitoring if the data indicate the potential for significant impacts that cannot be addressed by worst-case analysis and appropriate mitigation.

The certificate holder shall estimate the number of avian and bat fatalities attributable to operation of the facility based on the number of avian and bat fatalities found at the facility site. All carcasses located within areas surveyed, regardless of species, will be recorded and, if possible, a cause of death determined based on blind necropsy results. If a different cause of death is not apparent, the fatality will be attributed to facility operation. The total number of avian and bat carcasses will be estimated by adjusting for removal and searcher efficiency bias.

Personnel trained in proper search techniques ("the searchers") will conduct the carcass searches by walking parallel transects within the search plots.[3] Transects will be initially set at 6 meters apart in the area to be searched. A searcher will walk at a rate of about 45 to 60 meters per minute along each transect searching both sides out to three meters for casualties. Search area and speed may be adjusted by habitat type after evaluation of the first searcher efficiency trial. The searchers will record the condition of each carcass found, using the following condition categories:

- Intact – a carcass that is completely intact, is not badly decomposed and shows no sign of being fed upon by a predator or scavenger
- Scavenged – an entire carcass that shows signs of being fed upon by a predator or scavenger, or portions of a carcass in one location (e.g., wings, skeletal remains, legs, pieces of skin, etc.)
- Feather Spot – 10 or more feathers at one location indicating predation or scavenging or 2 or more primary feathers

All carcasses (avian and bat) found during the standardized carcass searches will be photographed as found, recorded and labeled with a unique number. Distance from observer to the carcass will be measured (to the nearest 0.25 meters), as will the perpendicular distance from the transect line to the carcass. Each carcass will be bagged and frozen for future reference and possible necropsy. A copy of the data sheet for each carcass will be kept with the carcass at all times. For each carcass found, searchers will record species, sex and age when possible, date and time collected, location, condition (e.g., intact, scavenged, feather spot) and any comments that may indicate cause of death. Searchers will map the find on a detailed map of the search area showing the location of the wind turbines and associated facilities such as power lines. The

[3] Where search plots are adjacent, the search area may be rectangular.

certificate holder shall coordinate collection of state endangered, threatened or protected species with ODFW. The certificate holder shall coordinate collection of federal endangered, threatened or protected species with the U.S. Fish and Wildlife Service (USFWS). The certificate holder shall obtain appropriate collection permits from ODFW and USFWS.

The searchers might discover carcasses incidental to formal carcass searches (e.g., while driving within the project area). For each incidentally discovered carcass, the searcher shall identify, photograph, record data and collect the carcass as would be done for carcasses within the formal search sample during scheduled searches

If the incidentally discovered carcass is found within a formal search plot, the fatality data will be included in the calculation of fatality rates. If the incidentally discovered carcass is found outside a formal search plot, the data will be reported separately.

The certificate holder shall coordinate collection of incidentally discovered state endangered, threatened or protected species with ODFW. The certificate holder shall coordinate collection of incidentally discovered federal endangered, threatened or protected species with the USFWS.

The certificate holder shall develop and follow a protocol for handing injured birds. Any injured native birds found on the facility site will be carefully captured by a trained project biologist or technician and transported to Jean Cypher (wildlife rehabilitator) in The Dalles, the Blue Mountain Wildlife Rehabilitation Center in Pendleton or the Audubon Bird Care Center in Portland in a timely fashion.[4] The certificate holder shall pay costs, if any are charged, for time and expenses related to care and rehabilitation of injured native birds found on the site, unless the cause of injury is clearly demonstrated to be unrelated to the facility operations.

(f) Statistical Methods for Fatality Estimates

The estimate of the total number of wind facility-related fatalities is based on:

(1) The observed number of carcasses found during standardized searches during the two monitoring years for which the cause of death is attributed to the facility.[5]

(2) Searcher efficiency expressed as the proportion of planted carcasses found by searchers.

(3) Non-removal rates expressed as the estimated average probability a carcass is expected to remain in the study area and be available for detection by the searchers during the entire survey period.

[4] The people and centers listed here may be changed with Department approval.
[5] If a different cause of death is not apparent, the fatality will be attributed to facility operation.

Definition of Variables

The following variables are used in the equations below:

c_i	the number of carcasses detected at plot *i* for the study period of interest (e.g., one year) for which the cause of death is either unknown or is attributed to the facility
n	the number of search plots
k	the number of turbines searched (includes the turbines centered within each search plot and a proportion of the number of turbines adjacent to search plots to account for the effect of adjacent turbines on the 90-meter search plot buffer area)
$\bar{c}$	the average number of carcasses observed per turbine per year
s	the number of carcasses used in removal trials
s_c	the number of carcasses in removal trials that remain in the study area after 40 days
se	standard error (square of the sample variance of the mean)
t_i	the time (days) a carcass remains in the study area before it is removed
$\bar{t}$	the average time (days) a carcass remains in the study area before it is removed
d	the total number of carcasses placed in searcher efficiency trials
p	the estimated proportion of detectable carcasses found by searchers
I	the average interval between searches in days
$\hat{\pi}$	the estimated probability that a carcass is both available to be found during a search and is found
m_t	the estimated annual average number of fatalities per turbine per year, adjusted for removal and observer detection bias
C	nameplate energy output of turbine in megawatts (MW)

Observed Number of Carcasses

The estimated average number of carcasses ($\bar{c}$) observed per turbine per year is:

$$\bar{c} = \frac{\sum_{i=1}^{n} c_i}{k}. \quad (1)$$

Estimation of Carcass Removal

Estimates of carcass removal are used to adjust carcass counts for removal bias. Mean carcass removal time ($\bar{t}$) is the average length of time a carcass remains at the site before it is removed:

$$\bar{t} = \frac{\sum_{i=1}^{s} t_i}{s - s_c}. \quad (2)$$

This estimator is the maximum likelihood estimator assuming the removal times follow an exponential distribution and there is right-censoring of data. Any trial carcasses still remaining at 40 days are collected, yielding censored observations at 40 days. If all trial carcasses are removed before the end of the trial, then s_c is 0, and $\bar{t}$ is just the arithmetic average of the removal times. Removal rates will be estimated by carcass size (small and large) and season.

Estimation of Observer Detection Rates

Observer detection rates (i.e., searcher efficiency rates) are expressed as *p*, the proportion of trial carcasses that are detected by searchers. Observer detection rates will be estimated by carcass size and season.

Estimation of Facility-Related Fatality Rates

The estimated per turbine annual fatality rate (m_t) is calculated by:

$$m_t = \frac{\bar{c}}{\hat{\pi}}, \quad (3)$$

where $\hat{\pi}$ includes adjustments for both carcass removal (from scavenging and other means) and observer detection bias assuming that the carcass removal times t_i follow an exponential distribution unless a different assumption about carcass removal is made with the approval of the Department. Under these assumptions, this detection probability is estimated by:

$$\hat{\pi} = \frac{\bar{t} \cdot p}{I} \cdot \left[\frac{\exp\left(I / \bar{t} \right) - 1}{\exp\left(I / \bar{t} \right) - 1 + p} \right]. \quad (4)$$

The estimated per MW annual fatality rate (m) is calculated by:

$$m = \frac{m_t}{C}. \quad (5)$$

The certificate holder shall calculate fatality estimates for: (1) all birds, (2) small birds, (3) large birds, (4) raptors, (5) target grassland birds, (6) nocturnal avian migrants, 7) avian State Sensitive Species listed under OAR 635-100-0040, and 8) bats. The final reported estimates of *m*, associated standard errors and 90% confidence intervals will be calculated using bootstrapping (Manly 1997). Bootstrapping is a computer simulation technique that is useful for calculating point estimates, variances and confidence intervals for complicated test statistics. For each iteration of the bootstrap, the plots will be sampled with replacement, trial carcasses will be sampled with replacement and $\bar{c}$, $\bar{t}$, p, $\hat{\pi}$ and m will be calculated. A total of 5,000 bootstrap iterations will be used. The reported estimates will be the means of the 5,000 bootstrap estimates. The standard deviation of the bootstrap estimates is the estimated standard error. The lower 5th and upper 95th percentiles of the 5000 bootstrap estimates are estimates of the lower limit and upper limit of 90% confidence intervals.

Nocturnal Migrant and Bat Fatalities

Differences in observed nocturnal avian migrant and bat fatality rates for lit turbines, unlit turbines that are adjacent to lit turbines, and unlit turbines that are not adjacent to lit turbines will be compared graphically and statistically.

(g) Mitigation

Mitigation may be appropriate if analysis of the fatality data collected after two monitoring years shows fatality rates for avian species that exceed a threshold of concern. For the purpose of determining whether a threshold has been exceeded, the certificate holder shall calculate the average annual fatality rates for the species groups after the initial two years of monitoring. Based on current knowledge of the species that are likely to use the habitat in the area of the facility, the following thresholds apply to Biglow:

Species Group	**Threshold of Concern** (fatalities per MW)
Raptors (All eagles, hawks, falcons and owls, including burrowing owls.)	0.09
Raptor species of special concern (Swainson's hawk, ferruginous hawk, peregrine falcon, golden eagle, bald eagle, burrowing owl and any federal threatened or endangered raptor species.)	0.06
Target grassland birds (All native bird species that rely on grassland habitat and are either resident species, occurring year round, or species that nest in the area, excluding horned lark, burrowing owl and northern harrier.)	0.59
State sensitive avian species listed under OAR 635-100-0040 (Excluding raptors listed above.)	0.20

Bat species as a group	2.50
Guyed Meteorological Tower Mortality	
Raptor T&E species and raptor species of special concern, as a group (Swainson's hawk, ferruginous hawk, golden eagle and burrowing owl; bald eagle, peregrine falcon, and any other federal threatened or endangered raptor species)	0.20/ guyed tower
Avian State Sensitive Species listed under OAR 635-100-0040 (Excluding raptors)	0.20/ guyed tower

In addition, mitigation may be appropriate if fatality rates for individual species (especially State Sensitive Species) are higher than expected and at a level of biological concern. If the data show that a threshold of concern for a species group has been exceeded or that the fatality rate for any individual species is at a level of biological concern, mitigation shall be required if the Department determines that mitigation is appropriate based on analysis of the data and any other significant information available at the time. If mitigation is appropriate, the certificate holder, in consultation with ODFW, shall propose mitigation measures designed to benefit the affected species. This may take into consideration whether mitigation required or provided for other impacts, such as raptor nesting or grassland bird displacement, would also benefit the affected species.

The certificate holder shall implement mitigation as approved by the Council. The Department may recommend additional, targeted data collection if the need for mitigation is unclear based on the information available at the time. The certificate holder shall implement such data collection as approved by the Council.

Mitigation shall be designed to benefit the affected species group. Mitigation may include, but is not limited to, protection of nesting habitat for the affected group of native species through a conservation easement or similar agreement. Tracts of land that are intact and functional for wildlife are preferable to degraded habitat areas. Preference should be given to protection of land that would otherwise be subject to development or use that would diminish the wildlife value of the land. In addition, mitigation measures might include: enhancement of the protected tract by weed removal and control; increasing the diversity of native grasses and forbs; planting sagebrush or other shrubs; constructing and maintaining artificial nest structures for raptors; reducing cattle grazing; improving wildfire response; and local research that would aid in understanding more about the species and conservation needs.

If the threshold for bats species as a group is exceeded, the Certificate Holder shall contribute to Bat Conservation International or to a Pacific Northwest bat conservation group ($10,000 per year for three years) to fund new or ongoing research in the Pacific Northwest to better understand impacts to the bat species impacted by the facility and to develop possible ways to reduce impacts to the affected species.

In addition, mitigation may be appropriate if fatality rates for a State Sensitive bat species listed under OAR 635-100-0040 are higher than expected and at a level of concern. If the data show that a threshold of concern for a species group has been exceeded or that the fatality rate for any individual species is at a level of concern, mitigation shall be required if the Department determines that mitigation is appropriate based on analysis of the data and any other significant information available at the time. If mitigation is appropriate, the certificate holder, in

consultation with ODFW, shall propose mitigation measures designed to benefit the affected species. The certificate holder shall implement mitigation as approved by the Council.

2. Raptor Nest Surveys

The objectives of raptor nest surveys are to estimate the size of the local breeding populations of tree or other above-ground-nesting raptor species in the vicinity of the facility and to determine whether operation of the facility results in a reduction of nesting activity or nesting success in the local populations of the following raptor species: Swainson's hawk, ferruginous hawk and golden eagle.

(a) Survey Protocol

For the species listed above, aerial and ground surveys will be used to gather nest success data on active nests, nests with young and young fledged. The certificate holder will share the data with state and federal biologists. The certificate holder shall conduct two years of post-construction raptor nest surveys for each phase of construction and long-term raptor nest surveys for the completed facility during the sensitive nesting and breeding season. One year of post-construction surveys will be done in the first nesting season after construction of the phase is completed. The second year of post-construction surveys will be done after construction of the phase is completed at a time recommended by the certificate holder and approved by the Department. Long-term surveys will be conducted starting in the fifth year following completion of the last post-construction survey and each five years thereafter for the life of the facility. The certificate holder may collaborate with other certificate holders in the vicinity of the facility in the development of useful information about future impacts on raptor nesting activity and nesting success.

Prior to the raptor nesting surveys, the locations of known raptor nests will be reviewed from the Biglow and Klondike Wind Project pre-construction surveys as well as any nest survey data collected after construction. All known nest sites and any new nests observed within the Biglow site and within two miles of the Biglow site will be given identification numbers. Nest locations will be recorded on U.S. Geological Survey 7.5-minute quadrangle maps. Global positioning system coordinates will be recorded for each nest and integrated with the baseline database. Locations of inactive nests will also be recorded as they may become occupied during future years.

During each raptor nesting monitoring year, the certificate holder shall conduct a minimum of one helicopter survey in late May or early June within the Biglow site and a 2-mile zone around the turbines to determine nest occupancy. Determining nest occupancy will likely require two visits to each nest: The second visit may be done by air or by ground as appropriate. For occupied nests of the species identified above, the certificate holder shall determine nesting success by a minimum of one ground visit to determine species, number of young and nesting success. "Nesting success" means that the young have successfully fledged (the young are independent of the core nest site). Nests that cannot be monitored due to the landowner denying access will be checked from a distance where feasible.

(b) Mitigation

The certificate holder shall analyze the raptor nesting data collected after two monitoring years to determine whether a reduction in either nesting success or nest use has occurred in the vicinity of Biglow. If the analysis indicates a reduction in nesting success by Swainson's hawk, ferruginous hawk or golden eagle within two miles of the facility (including the Biglow site), then the certificate holder shall propose appropriate mitigation and shall implement mitigation as approved by the Council. At a minimum, if the analysis shows that any of these species has abandoned a nest territory within the facility site or within ½ mile of the facility site, or has not fledged any young over the two-year period within the facility site or within ½ mile of the facility site, the certificate holder shall assume the abandonment or unsuccessful fledging is the result of the facility unless another cause can be demonstrated convincingly. If the Biglow facility and the Klondike facility are both required to provide mitigation for the same nest, the two certificate holders shall coordinate the required mitigation with the approval of the Department.

Given the very low buteo nesting densities in the area, statistical power to detect a relationship between distance from a wind turbine and nesting parameters (*e.g.*, number of fledglings per reproductive pair) will be very low. Therefore, impacts may have to be judged based on trends in the data, results from other wind energy facility monitoring studies and literature on what is known regarding the populations in the region.

If the analysis shows that mitigation is appropriate, the certificate holder shall propose mitigation for the affected species in consultation with the Department and ODFW, and shall implement mitigation as approved by the Council. Mitigation should be designed to benefit the affected species or contribute to overall scientific knowledge and understanding of what causes nest abandonment or nest failure. Mitigation may be designed to proceed in phases over several years. It may include, but is not limited to, additional raptor nest monitoring, protection of natural nest sites from human disturbance or cattle activity (preferably within the general area of the facility), or participation in research projects designed to improve scientific understanding of the needs of the affected species. Mitigation may take into consideration whether mitigation required or provided for other impacts, such as fatality impacts or grassland bird displacement, would also benefit the raptor species whose nesting success was adversely affected.

3. Avian Use and Behavior Surveys

The certificate holder shall conduct a before/after avian behavior and monitoring study to determine whether operation of Biglow reduces bird use and abundance in the area (often referred to as displacement). The results of this study will aid in estimating indirect avian impacts of Biglow and guide potential mitigation.

The before/after study will use two of the observation stations that were used during the baseline study (H and I) and two new survey stations (A5 and A6). Avian use and behavior will be monitored at these four stations about 6 times each month from November 2005 – August 15, 2006 (pre-construction period) and about 6 times each month during two post-construction monitoring years (after construction of wind turbines located near these survey stations).

These four stations are located in the northeastern portion of the Biglow area near the John Day River canyon. The areas surrounding these survey stations were subject to numerous micrositing decisions during facility layout. Primary micrositing decisions included shortening and re-orientating turbine corridors to avoid native habitat, maintaining a minimum one-mile distance from the centerline of the John Day River, and avoiding locating turbines on steep slopes.

Each survey will consist of one 30-minute observation period at each of these four stations using the same protocol that was used for baseline data collection. In particular, raptor and waterfowl use estimates and behavior relative to turbine locations, and flight path maps will be compared between the pre- and post-construction periods to provide information on raptor and waterfowl displacement and to estimate indirect impacts on raptors and waterfowl.

In addition to surveys at these four stations, searchers will also record live birds observed and their behavior in relation to turbines before or after each standardized carcass search (as described in Section 1(e) above). Observations will be recorded during 5-minute surveys at each turbine sampled during the fatality monitoring program, using standard variable circular plot point count survey methods. Collection and recording of these additional observations of live birds will be carried out in a manner that does not distract searchers from carrying out the standardized carcass searches.

All of these avian use and behavior data, as well as raptor and waterfowl mortality observed at the turbines near these stations, will be used to understand direct and indirect impacts of the Biglow facility on raptors, waterfowl and other species.

4. Biglow Wildlife Incident Response and Handling System

The Wildlife Incident Response and Handling System is a monitoring program set up for responding to and handling avian and bat casualties found by construction and maintenance personnel during construction and operation of the facility. This monitoring program includes the initial response, the handling and the reporting of bird and bat carcasses discovered incidental to construction and maintenance operations ("incidental finds"). Construction and maintenance personnel will be trained in the methods needed to carry out this program.

All carcasses discovered by construction or maintenance personnel will be photographed, recorded and collected.

If construction or maintenance personnel find carcasses within the plots for protocol searches, they will notify a qualified independent third-party biologist, as approved by the Department, who will collect the carcasses. The fatality data will be included in the calculation of fatality rates.

If construction or maintenance personnel discover incidental finds that are not within plots for fatality monitoring protocol searches, they will notify a qualified biologist, and the carcass will be collected by a carcass-handling permittee (a person who is listed on state and

federal scientific or salvage collection permits). Data for these incidental finds will be reported separately from standardized fatality monitoring data.

The certificate holder shall coordinate collection of state endangered, threatened or protected species with ODFW. The certificate holder shall coordinate collection of federal endangered, threatened or protected species with the USFWS.

5. Data Reporting

The certificate holder will report the monitoring data and analysis to the Department. Monitoring data include fatality monitoring program data, raptor nest survey data, avian use and behavior survey data and data on incidental finds by fatality searchers and Biglow personnel. The report may be included in the annual report required under OAR 345-026-0080 or may be submitted as a separate document at the same time the annual report is submitted. In addition, the certificate holder shall provide to the Department any data or record generated in carrying out this monitoring plan upon request by the Department.

The certificate holder shall immediately notify USFWS and ODFW, respectively, in the event that any federal or state endangered or threatened species are killed or injured on the facility site.

The public will have an opportunity to receive information about monitoring results and to offer comment. Within 30 days after receiving the annual report of monitoring results, the Department will make the report available to the public on its website and will specify a time in which the public may submit comments to the Department.[6]

6. Amendment of the Plan

This Wildlife Monitoring and Mitigation Plan may be amended from time to time by agreement of the certificate holder and the Council. Such amendments may be made without amendment of the site certificate. The Council authorizes the Department to agree to amendments to this plan and to mitigation actions that may be required under this plan. The Department shall notify the Council of all amendments and mitigation actions, and the Council retains the authority to approve, reject or modify any amendment of this plan or mitigation action agreed to by the Department.

[6] The certificate holder may establish a Technical Advisor Committee (TAC) but is not required to do so. If the certificate holder establishes a TAC, the TAC may offer comments to the Council about the results of the monitoring required under this plan.

BIGLOW CANYON WIND FARM: REVEGETATION PLAN
[JUNE 30, 2006]

BACKGROUND

This plan describes methods and standards for revegetating areas temporarily disturbed as a result of construction of the proposed Biglow Canyon Wind Farm (Biglow), sited about 2.5 miles northeast of Wasco, Oregon. The objective of this plan is to restore temporarily disturbed areas to pre-construction condition or better. The site certificate for the facility requires restoration of these areas.

Biglow is located on privately owned agricultural land used primarily for dry wheat production and, to a lesser extent, cattle grazing. The grazed land is grassland, shrub-steppe rangeland and/or fallow wheat stubble fields. A few large tracts of land have been enrolled in the Conservation Reserve Program (CRP).

This plan specifies seed mixes, planting methods, and weed control techniques developed specifically for Biglow through consultations with the affected agencies (e.g., Natural Resources Conservation Service), reviews of current literature, and site visits by revegetation specialists. This plan also specifies monitoring procedures to evaluate the success of revegetation efforts, including recommended remedial action should initial revegetation efforts prove unsuccessful.

REVEGETATION PROCEDURES

The following methods are to be used in areas of temporary ground and/or vegetation disturbance in the Conservation Reserve Program (CRP) grasslands and native grassland and shrub-steppe upland habitats throughout the Biglow site. Because no disturbance to wetland habitats is expected, this plan does not specify wetland revegetation methods.

Cultivated Areas

The site certificate holder shall reseed with dry land wheat those cultivated agricultural areas temporarily disturbed by construction activities. The species composition, seed and fertilizer application rates, and application method for dry land wheat shall be coordinated with the appropriate landowner and/or farmer.

Seed Mixture

Temporarily disturbed areas in non-cultivated/fallow areas are primarily CRP lands, with some additional grassland and shrub steppe. A seed mixture was developed in consultation with Mary Beth Smith at the local Natural Resources Conservation Service office based upon anticipated high value to both big game and non-game wildlife, and the historic vegetative climax community for the area (Table 1).

Seed Planting Methods

Planting shall occur in February- early April (after the last chance of frost because forbs are being used in the seed mixture) for disturbance that occurs during the winter and spring. Planting shall occur in October-November for disturbance that occurs after the spring seeding window. Disturbed, unseeded ground may require chemical or mechanical weed control in May or June before weeds have a chance to go to seed. In general, a weed-free seedbed shall be prepared using conventional tillage equipment. Herbicide shall be sprayed to control weedy and/or noxious species, following the Oregon Department of Agriculture's Guidelines. Summer fallowing may be required.

Areas to be seeded shall be disked twice in early spring and spot-sprayed on the ground with an herbicide. This area shall then be harrowed prior to seeding. A conventional seed drill shall be used, except in areas where a rangeland drill is deemed more applicable, with a spacing less than 12 inches and at a depth of 1/8-1/4 inch. A packing type roller shall be used to properly compact the soil over the planted seed. The prescribed seed mixture (Table 1) shall be drilled at a rate of 12 pounds pure live seed per acre. If fallowing the area is to be used to increase soil moisture content, then the same procedure shall be followed, but without seeding. Seeding would then occur the following spring.

MONITORING

The site certificate holder shall direct a qualified independent third-party botanist or revegetation specialist, as approved by the Department, to conduct monitoring of seeded grassland, shrub-steppe and CRP areas.

In the fall of the year following each seeding, and continuing annually thereafter until the vegetation success criteria have been met, the qualified investigator shall examine a representative cross-section of the revegetated sites. At each site, the investigator shall evaluate the percent cover for the following classes:

- native forbs and grasses;
- non-native forbs and grasses;
- shrubs; and
- bare ground and rock.

After the success criteria have been met, the qualified investigator shall revisit the sites at least every five years for the life of the Biglow project to ensure that the habitat has not degraded. The site certificate holder shall report the investigator's findings and recommendations regarding revegetation progress and success to the Department on an annual basis as part of the annual report on Biglow.

SUCCESS CRITERIA

Non-cultivated areas will be deemed successfully revegetated when total canopy cover of all vegetation exceeds 30 percent[1], and at least 25 percent of the ground surface is covered by native species and species in the seed mixture.

In each monitoring report to the Department, the certificate holder shall provide an assessment of revegetation success in grassland, shrub-steppe and CRP restoration areas. The Department may require reseeding or other corrective measures in those areas that do not meet the success criteria. The Department may exclude small areas from the reseeding requirement, if erosion from construction activities is low, if total vegetative cover (of native and non-native species together) exceeds 30 percent and if weed encroachment has made native seed establishment impossible. Cultivated agricultural areas are successfully revegetated if the replanted areas achieve crop production comparable to adjacent non-disturbed cultivated areas. The certificate holder shall consult with the landowner or farmer to determine whether these areas have been successfully revegetated and shall report to the Department on the success of revegetation in these areas.

AMENDMENT OF PLAN

This Revegetation Plan may be amended by agreement of the site certificate holder and the Energy Facility Siting Council (Council) or the Oregon Department of Energy (ODOE). Such amendments may be made without amendment of the site certificate. The Council authorizes the ODOE to agree to amendments to this plan. The ODOE shall notify the Council of all amendments, and the Council retains the authority to approve, reject or modify any amendment of this plan agreed to by the ODOE.

Table 1. Seed mixture to be used for revegetation of temporarily disturbed areas.

Common Name	**Scientific Name**	**Pounds of pure live seed/ Acre**
Luna pubescent wheatgrass	*Thinopyrum intermedium*	1
Sherman big bluegrass	*Poa ampla*	1
Magnar basin wildrye	*Leymus cinereus*	1
Whitmar beardless wheatgrass	*Pseudoroegneria spicata* ssp. *Inermis*	2
Small burnett	*Sanguisorba minor*	0.5
Alfalfa	*Medicago sativa*	1
Sanfoin	*Psoralea onobrychis*	0.5
Sandberg bluegrass	*Poa secunda*	2
Idaho fescue	*Festuca idahoensis*	2
Basin big sagebrush	*Artemisia tridentata* ssp. *Tridentate*	1
TOTAL		12

[1] NRCS Draft Guidelines for CRP Stand Certification

BIGLOW CANYON WIND FARM: HABITAT MITIGATION PLAN
[JUNE 30, 2006]

I. Introduction

This Habitat Mitigation Plan ("plan") describes methods and standards for enhancement of an area of land near the Biglow Canyon Wind Farm ("Biglow") to mitigate for certain impacts of Biglow on wildlife habitat. The applicant has proposed an approximate 117-acre habitat mitigation site ("mitigation site" or "site") as described below. The certificate holder shall enhance the mitigation site as described in this plan and shall place the site into a conservation easement for the life of the Biglow facility.

The objective of the enhancement methods is to improve the habitat value of the mitigation area and to protect the area for wildlife use for the life of the facility. This plan has been prepared to guide the habitat enhancement efforts on the mitigation site. The plan specifies the primary actions the certificate holder must undertake and the goals, monitoring procedures, and success criteria to evaluate enhancement success.

Prior to any construction of Biglow, the site certificate holder shall acquire the legal right to create, maintain and protect this habitat mitigation area for the life of the facility by means of an outright purchase, conservation easement or similar conveyance and shall provide a copy of the documentation to the Department of Energy ("Department"). Prior to any construction of Biglow, the site certificate holder shall complete an "Implementation Plan" approved by the Department that describes in detail how the Habitat Mitigation Plan will be enacted. During construction of Biglow, the site certificate holder will implement the Habitat Mitigation Plan so that all mitigation efforts in the plan are complete by the end of construction of Biglow's first phase.

II. Description of the Permanent Impacts

Biglow would permanently affect a maximum of about 177 acres. Most of the area of permanent impact (about 157 acres) would be within currently cultivated agricultural fields. This area is lower-value habitat (Category 6). Biglow would occupy – or have a permanent impact on – a maximum of about 11.25 acres of higher-value Category 3 or Category 4 habitat. The actual area of each habitat category that Biglow will permanently occupy will depend on the final design layout of the facility after consideration of micrositing factors.

Data collected at other wind energy facilities indicate that the operation of wind turbines may adversely affect the quality of nearby habitat that is important or essential for grassland avian species. This is often referred to as a "displacement" impact. Conducting a study at Biglow to determine whether operation of the facility had a displacement effect on grassland birds would take several years. If the study concluded that an adverse impact had occurred, additional mitigation would be needed. In lieu of conducting a multi-year study, the certificate holder has proposed to provide additional mitigation, based on the assumed likelihood that operation of Biglow would reduce the

quality of nearby habitat that is important or essential for grassland bird species. The affected habitat near the Biglow wind turbines includes grassland, Conservation Reserve Program ("CRP") and shrub-steppe habitat in Categories 3 and 4.

As defined by the fish and wildlife habitat mitigation goals and standards of the Oregon Department of Fish and Wildlife (ODFW), the affected habitat and corresponding mitigation goals are as follows:

- **Category 3:** Essential habitat for fish and wildlife, or important habitat for fish and wildlife that is limited either on a physiographic province or site-specific basis, depending on the individual species or population.

  Mitigation Goal: No net loss of either habitat quantity or quality. Mitigation must be in-kind.

- **Category 4:** Important habitat for fish and wildlife species.

  Mitigation Goal: No net loss in either existing habitat quantity or quality. Mitigation may be either in-kind or out-of-kind.

III. Calculation of Impacts and Size of Mitigation Area

The area needed to mitigate for the amount of higher-value habitat occupied by Biglow turbines and related facilities is determined by Biglow's permanent impact within each habitat category. The amount of additional area needed to mitigate for a displacement effect that is uncertain cannot be precisely calculated. To determine a reasonable area for displacement mitigation, the applicant has performed a rough calculation of potential displacement impact by assuming a 50-percent reduction in use by grassland birds within 50 meters of wind turbines in native grassland/shrub steppe habitat and a 25 percent reduction in use by grassland birds within 50 meters of wind turbines in CRP habitat. The applicant further assumed that the final design locations of wind turbines within the micrositing corridors would be such that the maximum area of native grassland would be affected (the "worst case"). The area of impact within each affected habitat category and the corresponding mitigation area for each category are as follows:

- The permanent impact is about 11.25 acres, of which about 7.59 acres are Category 3 habitat (grassland, CRP and shrub-steppe combined) and about 3.66 acres are Category 4 habitat (grassland, CRP and shrub-steppe combined).

- The calculated potential displacement impact is estimated to be about 33 acres, of which about 67 percent is Category 3 CRP habitat, 2 percent is Category 3 grassland/shrub steppe habitat, 26 percent is Category 4 CRP habitat, and 4 percent is Category 4 grassland/shrub steppe habitat.

- The combined impacts equal about 45 acres. Mitigation must be sufficient to replace the quantity and quality of this combined impact in order to achieve "no net loss" in habitat quantity or quality. The mitigation site must be large enough to be capable of achieving this goal. In fact, the certificate holder has agreed to secure a 117-acre mitigation site, provided that mitigation acreage that exceeds the actual acreage of permanent and indirect impacts may be applied to any future mitigation requirements.

If the data from future Stateline transect surveys demonstrates a statistically significant displacement effect on grassland bird species that is greater than the displacement effect described in the *Stateline Wind Project Wildlife Monitoring Final Report, July 2001-December 2003*, then the certificate holder shall assume that the facility is having a greater displacement effect on grassland species than was assumed when the site certificate was issued and shall propose additional mitigation. The Department shall recommend appropriate mitigation to the Council, and the certificate holder shall implement mitigation as approved by the Council.

IV. Description of the Mitigation Site

The mitigation site is located to the northeast of the Biglow site, less than 0.5 miles from the John Day River and just more than 0.5 miles from the nearest wind turbine. The site contains an intermittent spring that forms a small tributary drainage immediately west of the Emigrant Springs tributary and watershed.

Thus, the mitigation site sits immediately adjacent to both the John Day River riparian corridor and the large Emigrant Springs watershed, which provides additional forage, thermal and security cover, and water. No road access exists to the site, which is relatively remote and infrequently disturbed by humans.

The site is predominantly steep-sloped with shallow rocky soils and has been both recently and historically grazed. Areas most degraded from livestock grazing include the deeper soiled areas, and the spring and associated riparian draw in the southern end of the mitigation site. Horizontal and vertical vegetative structure is largely depleted because of exposed slopes and livestock grazing impacts, and large patches of cereal rye have out-competed native species in some areas. However, the higher elevation western border consists of deeper silt loam soils, with the potential to provide a more diverse vegetative community.

Adjacent property to the west is cultivated and managed for wheat production. Adjacent property to the north and east is rangeland managed for livestock production. A four-strand barbed wire fence exists along the east boundary of the mitigation site. No fence exists along the crop field boundary to the east or along the north boundary; this area is grazed when fallow or electric fence is used during the planting and harvest period to exclude livestock. The area around the spring source and downstream lacks a vegetative buffer or a diverse vegetative community because of intensive grazing. Some

tall sagebrush cover exists near the stream area while cattails and aquatic succulents occur in the spring source area.

Given the current condition of the site and livestock practices, the entire mitigation site is generally characterized as Category 4 habitat, according to ODFW's Habitat Mitigation Standards.

V. Site Potential for Wildlife Habitat Enhancement

For mitigation, the applicant has proposed entering into a conservation easement or similar agreement with two landowners to enhance the mitigation site's existing grassland/ shrub-steppe and riparian habitat for the life of the Biglow facility. The mitigation site presents the opportunity to enhance grassland/ shrub-steppe quality and quantity that is limited in the area for wildlife. Properly managed, the mitigation site has the potential to provide more diverse grassland in greater quantity with greater horizontal and vertical structure. If enhanced with reseeding, deeper soiled areas would provide better nesting habitat for grassland bird species and provide higher quality forage for big game. Excluding livestock with fencing would provide better fall, winter and early spring rangeland for big game by allowing sandberg bluegrass, bluebunch wheatgrass, and various forbs to grow undisturbed in shallow-soiled slopes. Removal of cattle grazing should improve the habitat quality of the entire site, and especially the deeper soiled, spring and riparian areas. The site's steeper areas also will see some benefit from reduced grazing, especially during early spring green up. As well, livestock exclusion would enhance summer habitat for ground-nesting birds.

The mitigation site also has the potential to provide several different quality ecotones. Grassland patches in the lower-elevation eastern portion of the site may be of greater suitability to long-billed curlews because of closer proximity to the John Day River, where observations of this species breeding have been documented.

VI. Proposed Enhancement

To mitigate for the permanent loss of 11.25 acres of Category 3 and Category 4 habitat as a result of Biglow turbines, roads and other facilities, the site certificate holder will reseed 11.25 acres of deep-soiled Category 4 habitat within the mitigation site along the upper, more level slopes adjacent to cultivated areas. Reseeding is expected to enhance about 11.25 acres of deep-soiled Category 4 habitat to Category 2 and Category 3 grassland habitats.

To mitigate for the displacement effect, the site certificate holder will install fences to remove livestock grazing from the 117-acre mitigation site. In combination with other actions described below, fencing is expected to improve most of the portion of the mitigation site that is not reseeded (about 106 acres) from Category 4 to at least Category 3 habitat.

The acreages stated above for maximum permanent and indirect displacement habitat impacts (*i.e.*, 11.25 acres and 33 acres, respectively, or a total of less than 45 acres) are based on construction of the entire Biglow facility. If only a portion of the Biglow facility is constructed, the maximum permanent and indirect displacement habitat impacts are expected to be less than 45 acres based on the assumed impact model used at the Klondike III Wind Project. Nevertheless, as part of the first phase of construction, the certificate holder has proposed to secure the entire 117-acre mitigation site, install the guzzler, enhance the spring area, and have the fencing installed to exclude livestock on the entire mitigation site. However, if only a portion of the Biglow facility is constructed and full build-out does not occur, then any mitigation acreage that exceeds the actual acreage of permanent and indirect habitat impacts may be applied to any future mitigation requirements, as outlined in the Wildlife Mitigation and Monitoring Plan and as approved by the Department.

If approved by the Department, the certificate holder may use the mitigation site to mitigate for impacts identified by wildlife monitoring as outlined in the Wildlife Mitigation and Monitoring Plan. If the certificate holder constructs only a portion of the Biglow facility, and if the certificate holder commits to relinquish the right to construct the remainder of the facility, then, if approved by the Department, the certificate holder may apply any mitigation acreage that exceeds the actual acreage of permanent and displacement impacts to any future mitigation requirements as outlined in the Wildlife Mitigation and Monitoring Plan.

VII. Habitat Enhancement Methods

The goal of habitat enhancement is to improve the habitat quality of the mitigation site to achieve, over time, a Category 3 quality over most of the site and a mix of Category 2 and Category 3 on 11.25 reseeded acres. The site certificate holder will use the following five methods to enhance habitat quality and quantity on the site:

Reseeding

The site certificate holder shall prepare and seed about 11.25 acres within two defined areas located along the western edge of the mitigation site.

A. Seed Mixture: The site certificate holder developed a seed mixture in consultation with Mary Beth Smith at the local United States Department of Agriculture Natural Resources Conservation Service office based on anticipated high value to both big game and non-game wildlife and the historic vegetative climax community for the area (Table 1). Prior to seeding, the site certificate holder shall consult with the Department to determine if any mixture adjustments, either in species composition or ratio of seed quantity among species, would further benefit wildlife.

B. Seed Planting Methods: If enhancement efforts occur in the winter or spring, seeding should occur sometime in February through early April, after the average

last frost date. If enhancement efforts occur after the spring seeding window, seeding should occur sometime in October through November. Disturbed, unseeded ground may require chemical or mechanical weed control in May or June before weeds go to seed. In general, a weed-free seedbed should be prepared using conventional tillage equipment. Herbicide should be sprayed to control weedy and/or noxious species, following Oregon Department of Agriculture's (ODOA) guidelines. Summer fallowing may be required. Areas to be seeded shall be disked twice in early spring and spot-sprayed on the ground each time with an herbicide. The disked and sprayed areas must then be harrowed prior to seeding. A conventional seed drill must be used, except in areas where a rangeland drill is deemed more applicable, with a spacing less than 12 inches and at a depth of 1/8-1/4 inch. A packing type roller must be used to properly compact the soil over the planted seed. The prescribed seed mixture (Table 1) must be drilled at a rate of 12 pounds pure live seed per acre. If an area is to be fallowed to increase soil moisture content, then the same procedure must be followed, but without seeding. Seeding would then occur the following spring.

Table 1. Seed mixture to be used for reseeding deeper soiled areas of the mitigation site.

Common Name	**Scientific Name**	**Pounds/ Acre[1]**
Luna pubescent wheatgrass	*Thinopyrum intermedium*	1
Sherman big bluegrass	*Poa ampla*	1
Magnar basin wildrye	*Leymus cinereus*	1
Whitmar beardless wheatgrass	*Pseudoroegneria spicata* ssp. *Inermis*	2
Small burnett	*Sanguisorba minor*	0.5
Alfalfa	*Medicago sativa*	1
Sanfoin	*Psoralea onobrychis*	0.5
Sandberg bluegrass	*Poa secunda*	2
Idaho fescue	*Festuca idahoensis*	2
Basin big sagebrush	*Artemisia tridentata* ssp. *Tridentate*	1
TOTAL		12

Weed Control

Large patches of nuisance weed species have out-competed native species in some areas of the mitigation site. The site certificate holder shall conduct eradication or control of nuisance weed species with measures approved by the Department.

Livestock Control

The site certificate holder shall fence the entire unfenced portion of the mitigation site to control and remove cattle grazing on the mitigation site. About 9200 feet of new fence will be installed following ODFW livestock fence specifications. The existing fence (4-strand barbed wire) located on the eastern edge of the project area, and along a

[1] Pure live seed.

small 600 feet section running east/west along a portion of the northern border of the agricultural field, will continue in use to the extent it remains effective in keeping cattle out of the mitigation site.

Creation of a Water Source

The site certificate holder shall create a water source for wildlife use in the northern end of the project area where no water source now exists. The site certificate holder will build and install a 500-gallon capacity cistern or "guzzler" using a design approved by ODFW and the Department. The new source of water should increase wildlife density in the mitigation site.

Spring Enhancement

The site certificate holder shall plant appropriate native species of woody shrubs near the source of the intermittent spring in the southern part of the site. Browse protection shall be provided as long as necessary. Over time, the shrubs will provide cover for wildlife as well as protect soils around the spring source.

VIII. Habitat Mitigation Implementation

Prior to the commencement of construction, the site certificate holder shall complete a Department-approved detailed implementation plan to guide implementation of the enhancement efforts. The plan shall include maps and photographs at appropriate scale and detail that show the topography, vegetation, habitat and other site conditions of the mitigation site; the proposed locations of the primary actions required by the mitigation plan; a schedule showing when the primary actions required in the mitigation plan will occur; and a proposed monitoring plan including monitoring protocols, locations of monitoring stations, and a schedule of monitoring actions. The implementation plan will take into consideration the physical and biological features of the mitigation site such as slope, soil depth, and existing habitat conditions, the appropriate time of year to conduct actions, and the appropriate sequence of actions.

The certificate holder shall not begin enhancement efforts until the Department has reviewed and approved the implementation plan. Enhancement efforts must be complete by the end of construction of Biglow's first phase.

IX. Monitoring

Qualifications

For all components of this plan the site certificate holder shall direct a qualified independent third party biological monitor, as approved by the Department, to perform monitoring tasks (the "investigator").

Reporting Schedule and Duration/Type of Monitoring

The site certificate holder shall provide an annual report discussing the investigator's findings and recommendations regarding habitat mitigation progress and success to the Department and ODFW. The site certificate holder shall include this report as part of the annual report on Biglow or as otherwise agreed between the site certificate holder and the Department. The site certificate holder shall monitor the mitigation site for the life of the Biglow facility.

For the reseeded sites, the investigator will monitor every year for the first five years after the first seeding or until the site is determined by the Department to be trending toward successful restoration. Thereafter, the investigator shall revisit the reseeded sites every five years for the life of the Biglow facility, and the certificate holder shall report the findings to the Department.

The investigator also shall monitor and perform maintenance as necessary:

- Once a year for the life of the project: The effectiveness of weed eradication and control efforts throughout the mitigation site;
- Minimum of once a year for the life of the project: and within one week of livestock turn-out on adjacent property: The effectiveness of fencing in excluding livestock from and allowing big game access to the mitigation site;
- Minimum of annual fall maintenance for the life of the project: The effectiveness of the new water source in providing water;
- Once a year for the life of the project: The effectiveness of enhancement actions for the spring area in providing improved cover for wildlife and reducing erosion near the spring source;
- Once a year for the life of the project: The overall condition of the mitigation site (including such things as the degree of erosion, the occurrence of potentially problematic weed concentrations and changes in habitat quality); and
- Once a year for the life of the project: The general level of wildlife use, especially grassland birds, within the mitigation site.

In addition, the inspector shall periodically categorize the entire mitigation site in terms of ODFW habitat categories. The certificate holder shall propose a schedule for monitoring to the Department after the Department has approved the implementation plan and shall conduct monitoring as approved by the Department.

Success Criteria

The enhancement goal for the displacement impact is met when:

- 95 percent of the mitigation site (excluding the 11.25 acre reseeded mitigation area for permanent impact) is Category 3 habitat or better;
- The remaining 5 percent does not pose a threat to maintaining habitat quality; and

- At least 70 percent of the mitigation site (excluding the 11.25 acre reseeded mitigation area for permanent impact) is grassland/shrub-steppe habitat.

Enhancement above or beyond these goals may be "credited" toward mitigation for other impacts, as outlined in the Wildlife Monitoring and Mitigation Plan, upon Department approval. Mitigation credit will be based on each successfully restored acre in excess of the mitigation acres required under the site certificate and Wildlife Monitoring and Mitigation Plan.

If mitigation and enhancement actions fail to meet the success criteria, the investigator shall recommend corrective measures for Department approval. The Department may require reseeding or other corrective measures for those areas and for those actions that do not meet the success criteria. Specific success criteria are as follows:

A. **Reseeded Sites:** A reseeded site is successfully revegetated when total canopy cover of all vegetation exceeds 30 percent and at least 25 percent of the ground surface is covered by desirable plant species. Desirable plant species are native species or desirable non-native species in the approved mitigation seed mix. After the above success criteria have been met (predominantly desirable vegetation has been established), the investigator shall verify, during subsequent visits, that the site continues to meet the success criteria for revegetation. In addition, the investigator, in consultation with ODFW, shall evaluate the percentage of the reseeded site that has been enhanced to Category 2 and Category 3 quality.

   If all or part of the habitat within the reseeded site falls below the revegetation or enhancement success criteria levels, the investigator shall recommend corrective measures. The Department may require reseeding or other corrective measures in those areas that do not meet the success criteria.

   The enhancement goal for the permanent impact is met when 70 percent of the 11.25 acre reseeded area is Category 2 habitat, the remaining 30 percent is Category 3 habitat, and undesirable plant species (weeds) and erosion are under control and do not pose concern. Enhancement above or beyond this goal may be "credited" toward mitigation for other impacts upon Department approval.

B. **Weed control site**s. Weed control is considered to be successful when weed species are eliminated or reduced to a level (based on considerations such as number, size and health of plants, and percent ground cover) that does not interfere with the goals of the mitigation plan. To meet success criteria, reseeding with seed approved by the Department may be necessary.

C. **Fencing**: Fencing is considered to be successful when the Department deems that it has been properly constructed per ODFW specifications, and it continues to be effective at excluding livestock from entering the mitigation site. This criterion includes existing fencing.

D. **New Water Source**: The new water source is considered to be successful when the Department deems that it has been properly constructed per ODFW specifications, and it continues to provide a reasonably reliable source of water for wildlife.

E. **Spring Area Enhancement**: Enhancement of the spring area is considered to be successful when appropriate native species of woody shrubs are planted, continue to grow, and provide cover for wildlife.

Success Criteria Rationale

The direct impact is about 11.25 acres. The proportion of the impact is about 70 percent Category 3 habitat and about 30 percent Category 4 habitat. To mitigate for this habitat loss requires enhancing and protecting for the life of the Biglow facility 11.25 acres within the mitigation site from current Category 4 grassland to a quality where 70 percent is Category 2 grassland and 30 percent is Category 3 grassland.

The calculated potential grassland bird displacement impact is estimated to be about 33 acres. The proportion of the impact is about 70 percent Category 3 habitat (about 23 acres) and about 30 percent Category 4 habitat (about 10 acres). To mitigate for the Category 3 component of this habitat loss requires enhancing about 23 acres of current Category 4 habitat to Category 3 grassland habitat. Mitigation for Category 3 habitat must be in-kind: Grassland habitat must be gained for grassland habitat that is lost. To mitigate for the Category 4 component requires enhancing about 10 acres from Category 4 to Category 3. However, mitigation for Category 4 habitat does not have to be in-kind.

The total size of the mitigation site is 117 acres. Mitigation for the footprint impact requires 11.25 acres, which leaves 105.5 acres in the habitat mitigation site. Mitigation for the displacement impact is about 33 acres.

X. Amendment of the Plan

This Habitat Mitigation Plan may be amended from time to time by agreement of the certificate holder and the Oregon Energy Facility Siting Council ("Council"). Such amendments may be made without amendment of the site certificate. The Council authorizes the Department to agree to amendments to this plan. The Department shall notify the Council of all amendments, and the Council retains the authority to approve, reject or modify any amendment of this plan agreed to by the Department.

SITE CERTIFICATE

FOR THE

BIGLOW CANYON WIND FARM

Issued by

Oregon Energy Facility Siting Council
625 Marion Street NE
Salem OR 97301-3742

June 30, 2006

BIGLOW CANYON WIND FARM
FINAL ORDER

TABLE OF CONTENTS

OREGON ENERGY FACILITY SITING COUNCIL
SITE CERTIFICATE FOR BIGLOW CANYON WIND FARM

I. INTRODUCTION

This site certificate for the Biglow Canyon Wind Farm ("Biglow" or the "facility") is issued and executed in the manner provided by ORS Chapter 469, by and between the State of Oregon ("State"), acting by and through its Energy Facility Siting Council (the "Council"), and Orion Sherman County Wind Farm LLC ("Orion" or "certificate holder"). This site certificate is a binding agreement between the State, acting by and through the Council, and Orion.

The findings of fact, reasoning and conclusions of law underlying the terms and conditions of this site certificate are set forth in the Council's Final Order in the Matter of the Application for a Site Certificate for the Biglow Canyon Wind Farm (the "final order"), which the Council granted and approved in final form on June 30, 2006, and which by this reference is incorporated herein.

In interpreting this site certificate, any ambiguity shall be clarified by reference to the following, in order of priority: (1) this site certificate; (2) the final order issued on June 30, 2006; (3) the record of the proceedings that led to the final order; and (4) the Site Certificate Application for the Biglow Canyon Wind Farm, which the Oregon Department of Energy (the "Department") filed on March 20, 2006.

The terms used in this site certificate shall have the same meaning as set forth in ORS 469.300 and OAR 345-001-0010, except where otherwise stated or where the context clearly indicates otherwise.

II. SITE CERTIFICATION

A. To the extent authorized by state law and subject to the conditions set forth herein, the State authorizes the certificate holder to construct, operate and retire a wind energy facility, together with certain related or supporting facilities, at the site in Sherman County, Oregon, as described in Section III of this site certificate. ORS 469.401(1)

B. This site certificate is effective until it is terminated under OAR 345-027-0110 or the rules in effect on the date that termination is sought or until the site certificate is revoked under ORS 469.440 and OAR 345-029-0100 or the statutes and rules in effect on the date that revocation is ordered. ORS 469.401(1)

C. This site certificate does not address, and is not binding with respect to, matters that were not addressed in the Council's final order. These matters include, but are not limited to: building code compliance, wage, hour and other labor regulations, local government fees and charges, and other design or operational issues that do not relate to siting the facility [ORS 469.401(4)] and permits issued under statutes and rules for which the decision on compliance has been delegated by the federal government to a state agency other than the Council. ORS 469.503(3)

D. Both the State and the certificate holder shall abide by local ordinances, state law, and the rules of the Council in effect on the date this site certificate is issued. In addition, upon a clear showing of a significant threat to public health, safety or the environment that requires application of later-adopted laws or rules, the Council may require compliance with such later-adopted laws or rules. ORS 469.401(2)

E. For a permit, license or other approval addressed in and governed by this site certificate, the certificate holder shall comply with applicable state and federal laws adopted in the future to the extent that such compliance is required under the respective state agency statutes and rules. ORS 469.401(2)

F. Subject to the conditions herein, this site certificate binds the State and all counties, cities and political subdivisions in Oregon as to the approval of the site and the construction, operation and retirement of the facility as to matters that are addressed in and governed by this site certificate. ORS 469.401(3)

G. Each affected state agency, county, city and political subdivision in Oregon with authority to issue a permit, license or other approval addressed in or governed by this site certificate shall, upon submission of the proper application and payment of the proper fees, but without hearings or other proceedings, issue such permit, license or other approval subject only to conditions set forth in this site certificate. ORS 469.401(3)

H. After issuance of this site certificate, each state agency or local government agency that issues a permit, license or other approval for the facility shall continue to exercise enforcement authority over such permit, license or other approval. ORS 469.401(3)

I. After issuance of this site certificate, the Council shall have continuing authority over the site and may inspect, or direct the Department to inspect, or request another state agency or local government to inspect, the site at any time in order to ensure that the facility is being operated consistently with the terms and conditions of this site certificate. ORS 469.430

III. DESCRIPTIONS

A. THE FACILITY

In the site certificate application, the certificate holder requested the flexibility, within defined 500-foot-wide turbine corridors, to defer the final selection of turbine vendor, turbine size, number of turbines to be installed, and precise turbine layout until after the issuance of a site certificate and prior to commencement of construction. In the site certificate application, the certificate holder defined the range of possible turbine vendors, sizes and numbers. In the site certificate application, the certificate holder also defined two alternative transmission line options, two alternative substation locations, and three alternative O&M facility locations. Subject to specific conditions, this site certificate grants that flexibility.

1. Major Structures. The Biglow Canyon Wind Farm will consist of up to 225 wind turbines with an aggregate nominal nameplate generating capacity of 337.5 megawatts (MW) of electricity or 150 wind turbines with an aggregate nominal nameplate generating capacity of 450 MW. The average electric generating capacity will be about 112.5 to 150 MW. Turbines will be mounted on tubular steel towers ranging in height from 265 to 280 feet at the hub with an overall height of from 400 to 445 feet including the turbine blades. The turbines will be erected within up to 30 corridors and spaced to optimize the facility's output. The facility will be located on private farmland that Orion has leased from the affected landowners.

2. Related or Supporting Facilities. The facility includes the following related or supporting facilities:

   a. Power Collection System. Each wind turbine will generate power at about 600 volts. The transformer sitting at the base of each wind turbine unit will increase the voltage to 34.5 kilovolts (kV). From the transformer, power will be transmitted to a central substation by means of electric cables. Most of the cables will be buried three feet or more below the surface in trenches about 3 feet wide. In areas where collector cables from several turbine strings follow the same alignment, *e.g.*, on approach to the substation, multiple sets of cables may be installed within a single trench. If the facility is fully developed, there will be about 468,000 feet (88.6 miles) of 3-wire collector cables. Generally, these cables will be above, below or adjacent to the fiber optic cables comprising the supervisory control and data acquisition system.

      In some locations, the collector cables may be constructed above ground on pole or tower structures. Aboveground structures would allow the collector cables to span terrain, such as canyons, native grasslands, wetlands, and intermittent streams, thereby reducing adverse environmental impacts, or to span cultivated areas, thereby reducing adverse impacts to farming operations. Poles or towers supporting aboveground segments of the power collection system will be about 23 to 28 feet tall. Pending final site design, the certificate holder states that the length of the aboveground segments of the power collection system will be up to but not exceeding 15 miles.

   b. Substations and Interconnection System. Under one of its transmission alternatives, the certificate holder would construct a new substation in the southern section of the facility site. The substation site would be a graveled, fenced area of up to 6 acres with transformers, switching equipment and a parking area. Transformers would be non-polychlorinated biphenyl (PCB) oil-filled types. The transmission line would be about 3 miles long and would interconnect with the Bonneville Power Administration (BPA) system at the existing Klondike Schoolhouse Substation.

Under its second transmission alternative, the certificate holder would construct a new substation near the center of the facility site. The substation site would be a graveled, fenced area of up to 6 acres with transformers, switching equipment and a parking area. Transformers would be non-PCB oil-filled types. The transmission line would be about 7 miles long and would interconnect with an electric transformer or switching facility to be installed at BPA's John Day Substation or Switchyard for delivery of electricity to BPA's high-voltage transmission system.

c. Meteorological Towers. The certificate holder will will place up to 10 meteorological towers throughout the facility site to collect wind resource data. The towers would be up to 279 feet tall.

d. Operations and Maintenance Building. The site of the operations and maintenance building will comprise about 5 acres. The O&M building will occupy about 5,000 square feet and will include office and workshop areas, control room, kitchen, bathroom, shower, utility sink, and other typical facilities. Water for the bathroom, shower and kitchen will be obtained from an onsite well constructed by a licensed contractor in accordance with local and state requirements. Water use will not be expected to exceed 1,000 gallons per day. Domestic wastewater generated at the O&M facility will drain into an onsite septic system. A graveled parking area for employees, visitors and equipment will be located adjacent to the O&M facility.

The certificate holder proposed three alternative locations for the O&M facility: (1) adjacent to the substation to be located in the southern section of the facility site in the event Biglow is interconnected to the BPA transmission system by means of the Klondike Schoolhouse Substation; (2) adjacent to the substation to be located near the center of the facility site in the event Biglow is interconnected to the BPA transmission system by means of the John Day Substation; or (3) at the site of an existing house located at 97327 Emigrant Lane, Wasco, Oregon.

e. Control System. The certificate holder will install a supervisory control and data acquisition (SCADA) system to assist with the remote operation of the wind turbines, to collect data from each wind turbine, and to archive wind and performance data from various sources. The SCADA system will be linked by means of fiber optic cables or other means of communication to a central computer in the O&M facility.

f. Access Roads. The certificate holder will construct about 40.5 miles of new roads to provide access to the wind turbine strings, together with turnaround areas at the end of each wind turbine string. The roads will be

about 28 feet wide and will be composed of crushed gravel. In addition, the certificate holder will improve about 0.7 mile of existing roads by providing an all-weather surface and, in some cases, widening the roads to accommodate construction vehicles.

g. Temporary Laydown and Staging Areas. Depending on whether it proceeds with the 150-turbine or 225-turbine configuration, the certificate holder will use a total of 186 or 261 laydown and staging areas to stage construction and store supplies and equipment during construction of the facility. The certificate holder will develop one 18,500 square-foot laydown area at the site of each wind turbine, a one-acre laydown area for each wind turbine string, and six additional 5-acre laydown areas at various locations throughout the facility site. The laydown areas will have a crushed gravel surface and will be returned to their pre-construction condition following completion of construction of the facility.

B. LOCATION OF THE FACILITY

The facility is located about 2.5 miles northeast of Wasco in Townships 1 and 2 North, Ranges 17 and 18 East, Willamette Meridian, Sherman County, Oregon.

IV. SPECIFIC FACILITY CONDITIONS

The conditions listed in this section include conditions based on representations in the site certificate application and supporting record. The Council deems these representations to be binding commitments made by the applicant. These conditions are required under OAR 345-027-0020(10).

This section includes other specific facility conditions the Council finds necessary to ensure compliance with the siting standards of OAR Chapter 345, Divisions 22 and 24, and to protect the public health and safety.

A. ORGANIZATIONAL EXPERTISE, OAR 345-022-0010

(1) Before beginning construction of the facility, the certificate holder shall notify the Department of the identity and qualifications of the engineering, procurement and construction (EPC) contractor(s) for specific portions of the work. The certificate holder shall select EPC contractors that have substantial experience in the design and construction of similar facilities. The certificate holder shall report to the Department any change of major construction contractors.

(2) The certificate holder shall contractually require all construction contractors and subcontractors involved in the construction of the facility to comply with all applicable laws and regulations and with the terms and conditions of the site certificate. Such contractual provisions shall not operate to relieve the certificate holder of responsibility under the site certificate.

(3) During construction of the facility, the certificate holder shall have an on-site assistant construction manager who is qualified in environmental compliance to ensure compliance with all construction-related site certificate conditions. During operation, the certificate holder shall have a project manager who is qualified in environmental compliance to ensure compliance with all ongoing site certificate conditions. The certificate holder shall notify the Department of the name, telephone number, fax number and e-mail address of these managers and shall keep the Department informed of any change in this information.

(4) Within 72 hours after discovery of conditions or circumstances that may violate the terms or conditions of the site certificate, the certificate holder shall report the conditions or circumstances to the Department.

B. RETIREMENT AND FINANCIAL ASSURANCE, OAR 345-022-0050

(5) If the certificate holder elects to build the facility in a single phase using only GE 1.5-MW turbines, GE 3.0-MW turbines or a combination of these two GE turbines, before beginning construction of the facility and after considering all micrositing factors, the certificate holder shall provide to the Department a detailed map of the proposed facility showing the final locations where facility components are proposed to be built within the 500-foot-wide corridors shown on Revised Figures C-2 and C-2A of the ASC Supplement.

(6) If the certificate holder proposes to build the facility in more than one phase using only GE 1.5-MW turbines, GE 3.0-MW turbines or a combination of these two GE turbines, before beginning construction of any phase of the facility and after considering all micrositing factors, the certificate holder shall provide to the Department a detailed map of that phase of the facility showing the final locations where facility components are proposed to be built within the 500-foot-wide corridors shown on Revised Figures C-2 and C-2A of the ASC Supplement, shall identify on this map the facilities that would constitute that phase of construction, and shall provide documentation defining the quantities of each of the following components that would constitute that phase of construction: GE 1.5-MW turbines, GE 3.0-MW turbines, pad transformers, meteorological towers, substation, O&M facility, miles of 230-kV or 500-kV transmission line, miles of aboveground 34.5-kV collector system, miles of access road, acres of turnarounds and access road intersections, and acres of temporary laydown area.

(7) If the certificate holder elects to build the facility in a single phase using any turbines other than the GE 1.5-MW turbines or GE 3.0-MW turbines, before beginning construction of the facility and after considering all micrositing factors, the certificate holder shall provide to the Department a detailed map of the proposed facility showing the final locations where facility components are proposed to be built within the 500-foot-wide corridors shown on Revised Figures C-2 and C-2A of the ASC Supplement. The certificate holder shall include with

this map documentation defining quantities of each of the following components that would constitute the complete facility: turbines, pad transformers, meteorological towers, substation, O&M facility, miles of 230-kV or 500-kV transmission line, miles of aboveground 34.5-kV collector system, miles of access road, acres of turnarounds and access road intersections, and acres of temporary laydown area. For each turbine, the certificate shall define the turbine manufacturer, turbine capacity, weight of steel, height of tower, sweep of blade, and size of concrete foundation.

(8) If the certificate holder elects to build the facility in more than one phase using any turbines other than the GE 1.5-MW turbines or GE 3.0-MW turbines, before beginning construction of any phase of the facility and after considering all micrositing factors, the certificate holder shall provide to the Department a detailed map of that phase of the facility showing the final locations where facility components are proposed to be built within the 500-foot-wide corridors shown on Revised Figures C-2 and C-2A of the ASC Supplement, shall identify on this map the facilities that would constitute that phase of construction, and shall provide documentation defining the quantities of each of the following components that would constitute that phase of construction: turbines, pad transformers, meteorological towers, substation, O&M facility, miles of 230-kV or 500-kV transmission line, miles of aboveground 34.5-kV collector system, miles of access road, acres of turnarounds and access road intersections, and acres of temporary laydown area. For each turbine, the certificate shall define the turbine manufacturer, turbine capacity, weight of steel, height of tower, sweep of blade, and size of concrete foundation.

(9) If the certificate holder elects to build the facility in a single phase using only GE 1.5-MW turbines, GE 3.0-MW turbines or a combination of these two GE turbines, before beginning construction of the facility the certificate holder shall submit to the State of Oregon through the Council a bond or letter of credit in the amount of $6.208 million (in 2005 dollars) naming the State of Oregon, acting by and through the Council as beneficiary or payee. If the certificate holder elects to build the facility in a single phase using any turbines other than the GE 1.5-MW or GE 3.0-MW turbines or if the certificate holder elects to build the facility in more than one phase using any combination of turbines, before beginning construction of any phase of the facility, the certificate holder shall submit to the State of Oregon through the Council a bond or letter of credit naming the State of Oregon, acting by and through the Council, as beneficiary or payee in the amount (in 2005 dollars) determined by the Department as the gross cost of demolition and site restoration minus the carbon steel scrap value plus the one-percent performance bond amount, ten-percent administration and project management costs and twenty-percent future developments contingency applicable to the proposed phase of construction, together with any previous phases of construction. If the certificate holder elects to build the facility in more than one phase using only GE 1.5-MW turbines, GE 3.0-MW turbines or a combination of the two GE turbines, the Department will establish the amount of the bond or

letter of credit by applying the unit costs described in Table 5 of the Council's final order on the site certificate application (incorporated herein by this reference) to the number of units identified by the certificate holder and verified by the Department as applicable to the proposed phase and any previous phases of construction and adding to that subtotal the one-percent performance bond amount, ten-percent administration and project management costs and twenty-percent future developments contingency. If the certificate holder elects to build the facility using any turbines other than the GE 1.5-MW turbines or GE 3.0-MW turbines, for each phase of construction the Department will establish the amount of the bond or letter of credit by using its Facility Retirement Cost Estimating Guide to estimate the gross cost of demolition and site restoration minus the carbon steel scrap value plus the one-percent performance bond amount, ten-percent administration and project management costs and twenty-percent future developments contingency.

(a) The certificate holder shall adjust the amount of the bond or letter of credit annually, using the following calculation:

(i) Adjust the gross cost (in 2005 dollars) to present value, using the U.S. Gross Domestic Product Implicit Price Deflator, Chain-Weight, as published in the Oregon Department of Administrative Services' *Oregon Economic and Revenue Forecast* or by any successor agency (the "Index"). If at any time the Index is no longer published, the Council shall select a comparable calculation to adjust 2005 dollars to present value.

(ii) Adjust the estimated carbon steel scrap value by an index factor derived from the Producer Price Index values, not seasonally adjusted, reported by the U.S. Department of Labor, Bureau of Labor Statistics, "Commodities: Metals and Metal Products: Carbon Steel Scrap" (Series ID: WPU101211). Using the average monthly index value for the 12 months ending with December of the year preceding the year in which the adjustment is made as the numerator and the average monthly index value for the 12 months ending with December 2005 (277.2) as the demoninator, multiply the estimated scrap value of $149 per net ton (in 2005 dollars) by the resulting factor. If at any time the Producer Price Index Values are no longer published, the Council shall select a comparable calculation to adjust the estimated scrap value.

(iii) Multiply the adjusted carbon steel scrap value (ii) per net ton by the number of tons of carbon steel scrap applicable to the phase or phases of construction to which the letter of credit applies and subtract the resulting value from the adjusted gross cost (i).

(iv) Add 1 percent of the subtotal (iii) for the adjusted performance bond amount, 10 percent of the subtotal (iii) for the adjusted administration and project management costs, and 20 percent of the subtotal (iii) for the adjusted future developments contingency.

(v) Add the subtotal (iii) to the sum of the percentages (iv) and round the resulting total to the nearest $1,000 to determine the adjusted financial assurance amount for the reporting year.

(b) The certificate holder shall use a form of bond or letter of credit approved by the Council.

(c) The certificate holder shall use an issuer of the bond or letter of credit approved by the Council.

(d) The certificate holder shall describe the status of the bond or letter of credit in the annual report submitted to the Council under Condition (122).

(e) The bond or letter of credit shall not be subject to revocation or reduction before retirement of the facility.

(10) If the certificate holder elects to use a bond to meet the requirements of Condition (9), the certificate holder shall ensure that the surety is obligated to comply with the requirements of applicable statutes, Council rules and this site certificate when the surety exercises any legal or contractual right it may have to assume construction, operation or retirement of the facility. The certificate holder shall also ensure that the surety is obligated to notify the Council that it is exercising such rights and to obtain any Council approvals required by applicable statutes, Council rules and this site certificate before the surety commences any activity to complete construction, operate or retire the facility.

(11) The certificate holder shall begin construction of the facility within three years after the effective date of the site certificate. Under OAR 345-015-0085(9), a site certificate is effective upon execution by the Council Chair and the applicant. The Council may grant an extension of the deadline to begin construction in accordance with OAR 345-027-0030 or any successor rule in effect at the time the request for extension is submitted.

(12) The certificate holder shall complete construction of the facility within five years after the effective date of the site certificate. Construction is complete when: (1) the facility is substantially complete as defined by the certificate holder's construction contract documents; (2) acceptance testing has been satisfactorily completed; and (3) the energy facility is ready to begin continuous operation consistent with the site certificate. The certificate holder shall promptly notify the Department of the date of completion of construction. The Council may grant an extension of the deadline for completing construction in accordance with OAR 345-027-0030 or any successor rule in effect at the time the request for extension is submitted.

(13) The certificate holder shall construct a facility substantially as described in the site certificate.

(14) Notwithstanding OAR 345-027-0050(2), an amendment of the site certificate is required if the proposed change would increase the electrical generation capacity of the facility and would increase the number of wind turbines or the dimensions of existing wind turbines.

(15) The certificate holder shall obtain all necessary state and local permits or approvals required for construction, operation and retirement of the facility or ensure that its contractors obtain necessary state and local permits or approvals.

(16) Before beginning construction, the certificate holder shall notify the Department in advance of any work on the site that does not meet the definition of "construction" in OAR 345-001-0010 or ORS 469.300 and shall provide to the Department a description of the work and evidence that its value is less than $250,000.

C. LAND USE, OAR 345-022-0030

(17) The certificate holder shall construct the public road improvements described in the site certificate application to meet or exceed road standards for the road classifications in the County's Transportation System Plan and Zoning Ordinance because roads will require a more substantial section to bear the weight of the vehicles and turbine components than would usually be constructed by the County.

(18) The certificate holder shall ensure that no equipment or machinery is parked or stored on any county road except while in use.

(19) The site certificate holder shall design and construct private access roads to minimize the division of existing farm units.

(20) The certificate holder shall not locate any aboveground facility structure (including wind turbines, O&M building, substations, and meteorological towers, but not including aboveground transmission and collector lines and junction boxes) within 30 feet from any property line or within 50 feet from the right-of-way of any arterial or major collector road or street and shall not allow any architectural feature, as described in Sherman County Zoning Ordinance Section 4.2, to project into these required setbacks by more than 2 feet.

(21) The certificate holder shall locate access roads and temporary construction laydown and staging areas to minimize disturbance with farming practices and, wherever feasible, shall place turbines and transmission interconnection lines along the margins of cultivated areas to reduce the potential for conflict with farm operations. The certificate holder shall place aboveground transmission and collector lines and junction boxes along property lines and public road rights-of-way to the extent practicable.

(22) During operation of the facility, the certificate holder, in cooperation with landowners, shall avoid impact on cultivated land to the extent reasonably possible when performing facility repair and maintenance activities.

(23) Where necessary and feasible, the certificate holder shall provide access across construction trenches to fields within the facility site and otherwise provide adequate and timely access to properties during critical periods in the farming cycle, such as harvest.

(24) Before beginning construction of the facility, the certificate holder shall record a Farm Management Easement covering the properties on which the certificate holder locates wind power generation facilities. The certificate holder shall record the easements in the real property records of Sherman County and shall file a copy of the recorded easement with the Sherman County Planning Director.

(25) The certificate holder shall remove from Special Farm Assessment the portions of parcels on which facilities are located and shall pay all property taxes due and payable after the Special Farm Assessment is removed from such properties.

D. SOIL PROTECTION, OAR 345-022-0022

(26) The certificate holder shall conduct all construction work in compliance with an Erosion and Sediment Control Plan (ESCP) satisfactory to the Oregon Department of Environmental Quality and as required under the National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge General Permit #1200-C. The certificate holder shall include in the ESCP any procedures necessary to meet local erosion and sediment control requirements and storm water management requirements.

(27) During construction of the facility, the certificate holder shall limit truck traffic to designated existing and improved road surfaces to avoid soil compaction, to the extent possible.

(28) The certificate holder shall cover turbine pad areas with gravel or other non-erosive material immediately following exposure during construction and shall maintain the pad area covering during operation of the facility.

(29) During construction of the facility, the certificate holder shall restore areas that are temporarily disturbed in accordance with the methods, monitoring procedures and success criteria described in the Revegetation Plan that is incorporated in this order as Attachment B and as that Revegetation Plan may be amended from time to time. During operation of the facility, the certificate holder shall restore areas that are temporarily disturbed during facility maintenance or repairs according to the same methods and monitoring procedures.

(30) During operation of the facility, the certificate holder shall routinely inspect and maintain all roads, pads and trenched areas and, as necessary, maintain or repair erosion control measures.

(31) During construction of the underground collector system, the certificate holder shall open the smallest necessary sections of trench during each day of construction and backfill the trenches as soon as is practical after power lines have been set in the trenches.

(32) During construction of the facility, the certificate holder shall strip and stockpile soil from laydown areas only during the time of year when rainfall is lowest, minimizing erosion from precipitation.

(33) During construction of the facility, the certificate holder shall use straw bales or similar containment features to protect soil stockpiles from erosion, as needed.

(34) During construction of the facility, the certificate holder shall keep wind-borne erosion to a minimum by using water trucks for dust suppression, as necessary.

(35) During construction of the facility, the certificate holder shall restore staging locations by bringing them back to their original contours, covering them with topsoil, and revegetating or preparing them for planting of wheat or barley or use as range land.

E. PROTECTED AREAS, OAR 345-022-0040

(36) Without Department approval, the certificate holder shall not move any turbines within its micrositing corridors such that a worst-case visual impact beyond that stated in the ASC and ASC Supplement would occur for the John Day Wildlife Refuge, the John Day Federal Wild and Scenic River, or the John Day State Scenic Waterway (Parrish Creek to Tumwater Falls).

F. SCENIC AND AESTHETIC VALUES, OAR 345-022-0080

[No conditions]

G. RECREATION, OAR 345-022-0100

[No conditions]

H. PUBLIC HEALTH AND SAFETY STANDARDS FOR WIND ENERGY FACILITIES, OAR 345-024-0010

(37) During construction, operation or retirement of the facility, the certificate holder shall notify the Department within 72 hours of any accidents that may result in public health and safety concerns, including mechanical failures on the site associated with construction or operation of the facility.

(38) Before beginning construction of any phase of the facility, the certificate holder shall submit a Notice of Proposed Construction or Alteration to the Federal Aviation Administration (FAA) identifying the proposed final locations of the turbines and related or supporting facilities for that phase of the facility. The certificate holder shall notify the Department of the FAA's response as soon as it has been received.

(39) The certificate holder shall enclose the facility substation with appropriate fencing and locked gates to protect the public from electrical hazards.

(40) The certificate holder shall not locate turbine towers within 450 feet of any residence. The certificate holder shall not locate turbine towers within 450 feet of any public road, unless the certificate holder demonstrates to the Department's satisfaction that a lesser setback is consistent with the protection of public health and safety..

(41) The certificate holder shall construct turbine towers that are smooth steel structures with no exterior ladders or access to the turbine blades and shall install locked access doors accessible only to authorized personnel.

(42) During construction of the facility, the certificate holder shall follow manufacturers' recommended handling instructions and procedures to prevent damage to towers or blades that could lead to failure.

(43) During operation of the facility, the certificate holder shall have an operational safety-monitoring program and shall inspect turbine blades on a regular basis for signs of wear. The certificate holder shall repair turbine blades as necessary to protect public safety.

(44) During operation of the facility, the certificate holder shall install and maintain self-monitoring devices on each turbine, connected to a fault annunciation panel or supervisory control and data acquisition (SCADA) system at the O&M facility, to alert operators to potential dangerous conditions, and the certificate holder shall remedy any dangerous conditions immediately.

(45) During construction of the facility, the certificate holder shall install generator step-up transformers at the base of each turbine tower in locked cabinets designed to protect the public from electrical hazards and to avoid creation of artificial habitat for raptor prey.

(46) During construction of the facility, the certificate holder shall require that all on-site construction contractors develop and implement a site health and safety plan that informs on-site workers and others what to do in case of an emergency and that includes the locations of fire extinguishers and nearby hospitals, important telephone numbers, and first aid techniques.

(47) During operation of the facility, the certificate holder shall develop and implement a site health and safety plan that informs on-site employees and others what to do in case of an emergency and that includes the locations of fire extinguishers and nearby hospitals, important telephone numbers, and first aid techniques.

I. SITING STANDARDS FOR WIND ENERGY FACILITIES, OAR 345-024-0015

(48) The certificate holder shall construct turbines on concrete foundations and shall cover the ground within a minimum 10-foot radius with non-flammable material. The certificate holder shall maintain the non-flammable pad area covering throughout operation of the facility.

(49) During construction and operation of the facility, the certificate holder shall implement a plan to control the introduction and spread of noxious weeds. The certificate holder shall develop the weed control plan in consultation with the Sherman County Weed Control District and the Department.

(50) During construction of the facility, to reduce the visual impact of the facility, the certificate holder shall:

(a) Paint turbine towers, nacelles, rotors, meteorological towers, and cabinets containing pad-mounted equipment with a low-reflectivity, neutral gray, white, off-white or earth tone finish to reduce contrast with the surrounding background.

(b) Apply a low-reflectivity finish to the exterior of the O&M building and substation equipment to control their visual integration into the surrounding background.

(c) With the exception of the turbine manufacturer's logo that may appear on turbine nacelles, not allow any advertising to be used on any part of the facility or on any signs posted at the facility.

(d) Use only those signs required by law or for facility safety or security, except that the certificate holder may erect a sign near the O&M facility or substation to identify the wind energy facility.

(51) The certificate holder shall design and construct the O&M building to be generally consistent with the character of similar buildings used by commercial farmers or ranchers in the area and shall paint the building in a neutral color to blend with the surrounding background.

(52) The certificate holder shall not use exterior nighttime lighting except:

(a) The minimum turbine tower lighting required by the Federal Aviation Administration.

(b) Security lighting at the O&M building and substation, provided that such lighting is shielded or directed downward to reduce glare.

(c) Minimum lighting necessary for repairs or emergencies.

J. SITING STANDARDS FOR TRANSMISSION LINES, OAR 345-024-0090

(53) The certificate holder shall design the transmission lines so that alternating current electric fields shall not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public.

(54) The certificate holder shall design the transmission lines so that induced voltages resulting from the transmission lines are as low as reasonably achievable.

K. THREATENED AND ENDANGERED SPECIES, OAR 345-022-0070

(55) Before beginning construction of the facility, the certificate holder shall deliver to the Department surveys for threatened and endangered plant and wildlife species in newly affected areas as identified in the ASC Supplement.

(56) If construction of the facility begins after 2006, the certificate holder shall review the ONHIC and USFWS databases and consult with an expert designated by ODFW on an annual basis before beginning construction to determine whether nesting bald eagles or peregrine falcons have been documented to occur within two miles of the facility. The certificate holder shall report the results of the database review and consultation to the Department and to ODFW and, if there have been new documentations of nesting bald eagles or peregrine falcons within two miles of the facility, the certificate holder shall implement appropriate measures to protect the species from adverse impact, as approved by the Department and ODFW.

(57) The certificate holder shall implement measures to mitigate impacts to sensitive wildlife habitat during construction including, but not limited to, the following:

(a) Preparing maps to show sensitive areas, such as nesting or denning areas for sensitive wildlife species, that are off limits to construction personnel.

(b) Ensuring that a qualified person instructs construction personnel to be aware of wildlife in the area and to take precautions to avoid injuring or destroying wildlife or significant wildlife habitat.

(c) Avoiding unnecessary road construction, temporary disturbance and vehicle use.

L. FISH AND WILDLIFE HABITAT, OAR 345-022-0060

(58) The certificate holder shall design and construct all aboveground transmission line support structures following the practices suggested by the Avian Powerline Interaction Committee (APLIC 1996, referenced in the site certificate application, p. P-33) and shall install anti-perching devices on transmission pole tops and cross arms where the poles are located within one-half mile of any wind turbine.

(59) The certificate holder may construct turbines and other facility components within the 500-foot corridors shown on Figures P-1 through P-10 of the site certificate application and March 2006 supplement, subject to the following requirements addressing potential habitat impact:

(a) The certificate holder shall not construct any facility components within areas of Category 1 or Category 2 habitat and shall avoid temporary disturbance of Category 1 or Category 2 habitat.

(b) The certificate holder shall design and construct facility components that are the minimum size needed for safe operation of the energy facility.

(c) To the extent possible, the certificate holder shall construct facility components in the locations shown on Figure C-2 of the March 2006 site certificate application supplement.

(60) During construction, the certificate holder shall protect the area within a 1300-foot buffer around any active nests of the following species during the sensitive period, as provided in this condition:

Species	Sensitive Period	Early Release Date
Swainson's hawk	April 1 to August 15	May 31
Golden eagle	February 1 to August 31	May 31
Ferruginous hawk	March 15 to August 15	May 31
Burrowing owl	April 1 to August 15	July 15

The 1300-foot buffer may be reduced, with Department approval, if there is an adequate physical barrier between the nest site and the construction impacts such that a 1300-foot buffer proves to be excessive.

During the year in which construction of any phase occurs, the certificate holder shall use a protocol approved by the Oregon Department of Fish and Wildlife (ODFW) to determine whether there are any active nests of these species within a half-mile of any areas that would be disturbed during construction. If a nest is occupied by any of these species after the beginning of the sensitive period, the certificate holder shall not engage in high-impact construction activities (activities that involve blasting, grading or other major ground disturbance) or allow high levels of construction traffic within 1300 feet of the nest site, or such lesser

distance as may be approved by the Department in the event there is an adequate physical barrier between the nest site and the construction impacts.

In addition, the certificate holder shall flag the boundaries of the 1300-foot buffer area, or such lesser distance as may be approved by the Department in the event there is an adequate physical barrier between the nest site and the construction impacts, and shall instruct construction personnel to avoid any unnecessary activity within the buffer area. The certificate holder shall direct a qualified independent third-party biological monitor, as approved by the Department, to observe the active nest sites during the sensitive period for signs of disturbance and to notify the Department of any non-compliance with this condition. If the monitor observes nest site abandonment or other adverse impact to nesting activity, the certificate holder shall implement appropriate mitigation, in consultation with ODFW and subject to the approval of the Department, unless the adverse impact is clearly shown to have a cause other than construction activity. The certificate holder may begin or resume high impact construction activities before the ending day of the sensitive period if any known nest site is not occupied by the early release date. If a nest site is occupied, then the certificate holder may begin or resume high-impact construction before the ending day of the sensitive period with the approval of ODFW, after the young are fledged. The certificate holder shall use a protocol approved by ODFW to determine when the young are fledged (the young are independent of the core nest site).

(61) The certificate holder shall conduct wildlife monitoring and mitigation in accordance with the Wildlife Monitoring and Mitigation Plan that is incorporated in the order as Attachment A and as may be amended from time to time.

(62) The certificate holder shall restore areas that are temporarily disturbed during construction in accordance with the methods, monitoring procedures and success criteria set forth in the Revegetation Plan that is incorporated in the order as Attachment B and as may be amended from time to time.

(63) Before beginning construction of the facility, the certificate holder shall acquire the legal right to create, maintain and protect a habitat mitigation area for the life of the facility by means of an outright purchase, conservation easement or similar conveyance and shall provide a copy of the documentation to the Department. Within the habitat mitigation area, the certificate holder shall improve the habitat quality in accordance with the Habitat Mitigation Plan that is incorporated in the order as Attachment C and as may be amended from time to time.

(64) For the life of the project, the certificate holder shall provide to the appropriate staff of the Confederated Tribes of the Warm Springs Reservation of Oregon the same annual mitigation and monitoring reports it submits to the Department.

(65) For the life of the project, the certificate holder shall consult annually with the appropriate staff of the Confederated Tribes of the Warm Springs Reservation of Oregon to discuss noxious weed or other issues that may arise from the close proximity of the facility site and tribal lands. The certificate holder shall provide a summary of that consultation in the annual report it provides to the Department.

M. STRUCTURAL STANDARD, OAR 345-022-0020

(66) Before beginning construction of the facility, the certificate holder shall conduct a site-specific geotechnical investigation and shall report its findings to the Oregon Department of Geology & Mineral Industries (DOGAMI). The certificate holder shall conduct the geotechnical investigation after consultation with DOGAMI and in accordance with the Oregon Board of Geologists Examiners guidelines entitled: Guidelines for Engineering Geology Reports and Site-Specific Seismic Hazard Report.

(67) The certificate holder shall design and construct the facility in accordance with requirements set forth by the State of Oregon's Building Code Division and any other applicable codes and design procedures.

(68) The certificate holder shall design, engineer and construct the facility to avoid dangers to human safety presented by non-seismic hazards. As used in this condition, "non-seismic hazards" include settlement, landslides, flooding and erosion.

N. HISTORIC, CULTURAL AND ARCHAEOLOGICAL RESOURCES, OAR 345-022-0090

(69) Before beginning construction of any phase of the facility, the certificate holder shall provide to the Department a map showing the final design locations of all components of that phase of the facility and areas that would be temporarily disturbed during construction and also showing the areas surveyed by CH2M Hill in preparing the Cultural Resources Survey for Biglow Canyon Wind Farm included in the site certificate application as Attachment S-1. The certificate holder shall hire qualified personnel to conduct field investigation of all areas of permanent or temporary disturbance that CH2M Hill did not previously survey and shall provide to the Department a written report of the field investigation. If any significant historic, cultural or archaeological resources are found during the field investigation, the certificate holder shall ensure that construction and operation of the facility will have no impact on the resources. The certificate holder shall instruct all construction personnel to avoid areas where the resources were found and shall implement other appropriate measures to protect the resources.

(70) The certificate holder shall ensure that a qualified person instructs construction personnel in the identification of cultural resources.

(71) The certificate holder shall ensure that a qualified archaeologist is present on site during any ground-disturbing activities, including grading and graveling; or, the certificate holder shall implement an alternate monitoring procedure, including a testing strategy, as agreed to in consultation with the Department, SHPO, and the tribes.

(72) The certificate holder shall ensure that construction personnel cease all ground-disturbing activities in the immediate area if any archaeological or cultural resources are found during construction of the facility until a qualified archaeologist can evaluate the significance of the find. The certificate holder shall notify the Department and the State Historic Preservation Office (SHPO) of the find. If the archaeologist determines that the resource is significant, the certificate holder shall make recommendations to the Council for mitigation, including avoidance or data recovery, in consultation with the Department, SHPO, and other appropriate parties. The certificate holder shall not restart work in the affected area until the certificate holder has demonstrated to the Department that it has complied with the archaeological permit requirements administered by SHPO.

(73) The certificate holder shall ensure that construction personnel proceed carefully in the vicinity of the mapped alignment of the Oregon Trail. If any intact physical evidence of the trail is discovered, the certificate holder shall avoid any disturbance to the intact segments, by redesign, re-engineering or restricting the area of construction activity. The certificate holder shall promptly notify the Department and SHPO of the discovery. The certificate holder shall consult with the Department and with SHPO to determine appropriate mitigation measures.

O. PUBLIC SERVICES, OAR 345-022-0110

(74) During construction of the facility, the certificate holder and its contractors shall obtain all water required for construction activities from off-site sources previously permitted for such uses.

(75) Before beginning operation of the facility, the certificate holder shall have in operation a well suitable for delivering water, not exceeding 5,000 gallons per day, for domestic use at the facility's O&M building and, provided the rate of extraction would not exceed 5,000 gallons per day, blade-washing activities. The certificate holder shall not change the source of water for the facility's domestic use without prior Council approval.

(76) During operation of the facility, the certificate holder and its contractors shall obtain all water required for blade-washing activities from off-site sources previously permitted for such uses or from the on-site well, provided such use of well water would not cause the rate of extraction to exceed 5,000 gallons in any one-day period.

(77) Before beginning construction of the facility, the certificate holder shall develop a system for monitoring state highways and local roads that would serve as transporter routes for delivering equipment to the facility site for degradation, *e.g.*, major potholes, so that safe travel paths may be maintained. The monitoring system shall include site inspection and photographic cataloguing of existing road conditions so that pre-construction conditions can be compared with conditions after construction has been completed. Orion shall coordinate monitoring methods and preferred mitigation efforts with Sherman County Public Works and the Oregon Department of Transportation.

(78) After completing construction of the facility, the certificate holder shall restore state highways and county roads affected by facility construction activities to at least their pre-construction conditions, to the satisfaction of Sherman County Public Works and the Oregon Department of Transportation.

(79) During construction of the facility, the certificate holder shall implement the following measures to reduce traffic delays on county roads serving as transporter routes for delivery of equipment to the facility site:

(a) Provide notice to adjacent landowners when construction takes place to help minimize access disruptions;

(b) Provide proper road signage and warnings of "Equipment on Road," "Truck Access," or "Road Crossings;"

(c) Implement traffic diversion equipment, such as advance signage and pilot cars, whenever possible when slow or oversized loads are being hauled;

(d) Encourage carpooling for the construction workforce to reduce traffic volume;

(e) Employ flaggers, as necessary, to direct traffic when large equipment is entering or exiting public roads to minimize risk of accidents; and

(f) Maintain at least one travel lane at all times so that roadways will not be closed to traffic as a result of construction vehicles entering or exiting public roads.

P. WASTE MINIMIZATION, OAR 345-022-0120

(80) The certificate holder shall use hazardous materials in a manner that protects public health, safety and the environment and shall comply with applicable local, state and federal environmental laws and regulations.

(81) If a spill or release of hazardous materials occurs during construction or operation of the facility, the certificate holder shall notify the Department within 72 hours

and shall clean up the spill or release and dispose of any contaminated soil or other materials according to applicable regulations. The certificate holder shall ensure that spill kits containing items such as absorbent pads are located on equipment and storage facilities to respond to accidental spills and shall instruct employees handling hazardous materials in the proper handling, storage and cleanup of these materials.

(82) During construction of the facility, the certificate holder shall provide portable toilets for on-site sewage handling and shall ensure that the portable toilets are pumped and cleaned regularly by a licensed contractor that is qualified to pump and clean portable toilet facilities.

(83) During operation of the facility, the certificate holder shall discharge sanitary wastewater generated at the O&M building to a licensed on-site septic system in compliance with county permit requirements. The certificate holder shall design the septic system with a capacity that is less than 2,500 gallons per day.

(84) During construction of the facility, the certificate holder shall implement a waste management plan that includes but is not limited to the following measures:

(a) Training employees to minimize and recycle solid waste;

(b) Minimizing the generation of wastes from construction through detailed estimating of materials needs and through efficient construction practices;

(c) Recycling steel and other metal scrap;

(d) Recycling wood waste;

(e) Recycling packaging wastes, such as paper and cardboard;

(f) Collecting non-recyclable waste for transport to a landfill by a licensed waste hauler; and

(g) Segregating all hazardous wastes, such as used oil, oily rags and oil-absorbent materials, mercury-containing lights and lead-acid and nickel-cadmium batteries for disposal by a licensed firm specializing in the proper recycling or disposal of hazardous wastes.

(85) The certificate holder may dispose of waste concrete on site with the permission of the landowner and in accordance with OAR 340-093-0080 and other applicable regulations. The certificate holder shall dispose of waste concrete on site by placing the material in an excavated hole, covering the concrete with at least 3 feet of topsoil, and grading the area to match existing contours. If the waste concrete is not disposed of on site, the certificate holder shall arrange for proper disposal in a licensed landfill.

(86) During construction of the facility, the certificate holder shall ensure that the wash down of concrete trucks occurs only at a contractor-owned batch plant or at tower foundation locations. If such wash down occurs at tower foundation locations, then the certificate holder shall ensure that wash down wastewater does not run off the construction site into otherwise undisturbed areas and that the wastewater is disposed of on backfill piles and buried underground with the backfill over the tower foundation.

(87) During operation of the facility, the certificate holder shall implement a waste management plan that includes but is not limited to the following measures:

(a) Training employees to minimize and recycle solid waste;

(b) Recycling paper products, metals, glass and plastics;

(c) Collecting non-recyclable waste for transport to a landfill by a licensed waste hauler; and

(d) Segregating all hazardous wastes, such as used oil, oily rags and oil-absorbent materials, mercury-containing lights and lead-acid and nickel-cadmium batteries for disposal by a licensed firm specializing in the proper recycling or disposal of hazardous wastes.

(88) During operation of the facility, the certificate holder shall engage in blade-washing activities only in accordance with the appropriate Wastewater General Permit #1700 issued by the Oregon Department of Environmental Quality and all applicable regulations.

Q. NOISE CONTROL REGULATIONS, OAR 340-035-0035

(89) To reduce noise impacts at nearby residential areas, the certificate holder shall:

(a) Confine the noisiest operation of heavy construction equipment to the daylight hours;

(b) Require contractors to install and maintain exhaust mufflers on all combustion engine-powered equipment; and

(c) Establish a complaint response system at the construction manager's office to address noise complaints.

(90) If the GE 1.5-MW turbines (for which the certificate holder states the maximum sound power level warranted by the manufacturer is 104 dBA) or the GE 3.0-MW turbines (provided the certificate holder is able to demonstrate, by means of the manufacturer's warranty or other means acceptable to the Department, that the

maximum sound power level of the GE 3.0-MW turbine is 106 dBA) will be used at the facility, before beginning construction, the certificate holder shall present information demonstrating to the satisfaction of the Department that each of the following requirements have been met at all 25 properties identified as noise sensitive properties in the site certificate application:

(a) For any noise sensitive property listed in Table 12 where the predicted maximum hourly L_{50} noise level caused by the facility would equal or exceed 50 dBA, the certificate holder shall identify the final design locations of all turbines to be built and perform a noise analysis demonstrating, in accordance with OAR 340-035-0035(1)(b)(B)(iii)(IV), that the total hourly L_{50} noise level generated by the facility would not exceed 50 dBA at the appropriate measurement point. The certificate holder shall perform the noise analysis using the CADNA/A by DataKustik GmbH of Munich, Germany, and shall assume the following input parameters:

- The maximum sound power level warranted by the manufacturer or confirmed by other means acceptable to the Department
- The exact locations of the proposed turbines
- The environmental factors included in the original noise analysis, *i.e.*, the temperature, relative humidity, barrier effects and ground effects used in the original analysis. If the certificate holder has cause to believe the environmental factors included in the original noise analysis are no longer valid for a particular receiver, the certificate holder shall perform the noise analysis for that receiver using both the environmental factors included in the original noise analysis and the environmental factors the certificate holder now believes to be applicable to that receiver.

(b) Where the hourly L_{50} noise levels caused by the facility would exceed 36 dBA but not exceed 50 dBA at any noise sensitive property listed in Table 12, the certificate holder has obtained a legally effective easement or real covenant pursuant to which the owner of the property authorizes the certificate holder's operation of the facility to increase ambient statistical noise levels L_{10} and L_{50} by more than 10 dBA at the appropriate measurement point. A legally effective easement or real covenant shall: (i) include a legal description of the burdened property (the noise sensitive property); (ii) be recorded in the real property records of the county; (iii) expressly benefit the certificate holder; (iv) expressly run with the land and bind all future owners, lessees or holders of any interest in the burdened property; and (v) not be subject to revocation without the certificate holder's written approval.

(c) If, for any noise sensitive property listed in Table 12 where the hourly L_{50} noise levels caused by the facility would exceed 36 dBA but not exceed 50 dBA, the certificate holder has not obtained a legally effective easement or

real covenant as described in (b) above, the certificate holder shall identify the final design locations of all turbines to be built and perform a noise analysis demonstrating, in accordance with OAR 340-035-0035(1)(b)(B)(iii)(IV), that the total noise generated by the facility would meet the ambient noise degradation test at the appropriate measurement point on those noise sensitive properties. The certificate holder shall perform the noise analysis using the CADNA/A by DataKustik GmbH of Munich, Germany, and shall assume the following input parameters:

- The maximum sound power level warranted by the manufacturer or confirmed by other means acceptable to the Department
- The exact locations of the proposed turbines
- The environmental factors included in the original noise analysis, *i.e.*, the temperature, relative humidity, barrier effects and ground effects used in the original analysis. If the certificate holder has cause to believe the environmental factors included in the original noise analysis are no longer valid for a particular receiver, the certificate holder shall perform the noise analysis for that receiver using both the environmental factors included in the original noise analysis and the environmental factors the certificate holder now believes to be applicable to that receiver.

(91) If turbines other than the GE 1.5-MW turbines (for which the certificate holder states the maximum sound power level warranted by the manufacturer is 104 dBA) or the GE 3.0-MW turbines (for which the certificate holder has assumed a maximum sound power level of 106 dBA) will be used at the facility, before beginning construction of the facility the certificate holder shall identify the final design locations of all turbines to be built, perform a complete new noise analysis for all turbines, and generate a new table listing each noise sensitive property, as defined in OAR 340-035-0015(3), and the predicted maximum hourly L_{50} noise level at each noise sensitive property. The certificate holder shall perform the noise analysis using the CADNA/A by DataKustik GmbH of Munich, Germany, and shall assume the following input parameters:

- The maximum sound power level warranted by the manufacturer or confirmed by other means acceptable to the Department
- The exact locations of the proposed turbines
- The environmental factors included in the original noise analysis, *i.e.*, the temperature, relative humidity, barrier effects and ground effects used in the original analysis. If the certificate holder has cause to believe the environmental factors included in the original noise analysis are no longer valid for a particular receiver, the certificate holder shall perform the noise analysis for that receiver using both the environmental factors included in the original noise analysis and the environmental factors the certificate holder now believes to be applicable to that receiver.

After generating the new table identifying noise sensitive properties and the predicted maximum hourly L_{50} noise level at each noise sensitive property, the

certificate holder shall meet Conditions (90)(a), (90)(b) and (90)(c) with respect to the noise sensitive properties identified in that table.

R. REMOVAL-FILL LAW

[No conditions]

S. GROUND WATER ACT

[No conditions]

T. PUBLIC HEALTH AND SAFETY

(92) During operation of the facility, the certificate holder shall maintain built-in fire prevention measures in each turbine that would shut down the turbine automatically before mechanical problems create excess heat or sparks.

(93) During construction and operation of the facility, the certificate holder shall develop and implement fire management plans in consultation with local fire control authorities to minimize the risk of fire and to respond appropriately to any fires that occur on the facility site. In developing the fire management plans, the certificate holder should take into account the dry nature of the region and should address risks on a seasonal basis.

(94) During construction and operation of the facility, the certificate holder shall ensure that each on-site company vehicle contains a fire extinguisher, water spray can, shovel, emergency response procedures book, and two-way radio for immediate communication with the O&M facility.

(95) During construction of the facility, the certificate holder shall clear vegetation from a laydown area adjacent to each wind turbine where welding, cutting, grinding, or other flame- or spark-producing operations are likely to occur.

(96) Upon beginning operation of the facility, the certificate holder shall provide to all local fire departments maps of the facility site. During operation of the facility, the certificate holder shall provide to all local fire departments the names and telephone numbers of facility personnel available to respond on a 24-hour basis in case of an emergency on the facility site.

(97) During operation of the facility, the certificate holder shall ensure that all on-site employees receive annual fire prevention and response training by qualified instructors or members of the local fire department and that all employees are instructed to keep vehicles on roads and off dry grassland, except when off-road operation is required for emergency purposes.

(98) During operation of the facility, the certificate holder shall ensure that water-carrying trailers ("water buffaloes") are maintained at strategic locations around the facility site and that a water buffalo is always present at a job site where there

is substantial risk of fire. Each water buffalo shall be equipped with one-inch hoses, have a capacity of 500 gallons of water, and be equipped with a 5-horsepower pump with a pumping rate of 60 gallons per minute. Each water buffalo shall be capable of being towed by on-site service vehicles or pickup trucks.

(99) The certificate holder shall take reasonable steps to reduce or manage exposure to electromagnetic fields (EMF), consistent with Council findings presented in the "Report of EMF Committee to the Energy Facility Siting Council," March 30, 1993, and subsequent findings. Effective on the date of this site certificate, the certificate holder shall provide information to the public, upon request, about EMF levels associated with the energy facility and related transmission lines.

(100) At least 30 days before beginning preparation of detailed design and specifications for the electrical transmission lines, the certificate holder shall consult with the Oregon Public Utility Commission staff to ensure that its designs and specifications are consistent with applicable codes and standards.

V. CONDITIONS REQUIRED BY COUNCIL RULES

This section lists conditions specifically required by OAR 345-027-0020 (Mandatory Conditions in Site Certificates), OAR 345-027-0028 (Monitoring Conditions), and OAR Chapter 345, Division 26 (Construction and Operation Rules for Facilities). All references to the Office of Energy or Office shall be construed to refer to the Department of Energy. These conditions should be read together with the specific facility conditions included in Section IV to ensure compliance with the siting standards of OAR Chapter 345, Divisions 22 and 24, and to protect the public health and safety. The certificate holder shall comply with all site certificate conditions.

The Council recognizes that many specific tasks related to the design, construction, operation and retirement of the facility will be undertaken by the certificate holder's agents or contractors. Nevertheless, the certificate holder is responsible for ensuring compliance with all provisions of the site certificate.

(101) OAR 345-027-0020(1): The Council shall not change the conditions of the site certificate except as provided for in OAR Chapter 345, Division 27.

(102) OAR 345-027-0020(2): Except as provided in OAR 345-027-0023(6), before beginning construction, the certificate holder shall submit to the Office of Energy a legal description of the site.

(103) OAR 345-027-0020(3): The certificate holder shall design, construct, operate and retire the facility:

(a) Substantially as described in the site certificate;

(b) In compliance with the requirements of ORS Chapter 469, applicable Council rules, and applicable state and local laws, rules and ordinances in effect at the time the site certificate is issued; and

(c) In compliance with all applicable permit requirements of other state agencies.

(104) OAR 345-027-0020(4): The certificate holder shall begin and complete construction of the facility by the dates specified in the site certificate.

(105) OAR 345-027-0020(5): Except as necessary for the initial survey or as otherwise allowed for transmission lines or pipelines under this section, the certificate holder shall not begin construction, as defined in OAR 345-001-0010, or create a clearing on any part of the site until the certificate holder has construction rights on all parts of the site. For the purpose of this rule, "construction rights" means the legal right to engage in construction activities. For transmission lines or pipelines, if the certificate holder does not have construction rights on all parts of the site, the certificate holder may nevertheless begin construction, as defined in OAR 345-001-0010, or create a clearing on a part of the site if:

(a) The certificate holder has construction rights on that part of the site; and

(b) The certificate holder would construct and operate part of the facility on that part of the site even if a change in the planned route of the transmission line or pipeline occurs during the certificate holder's negotiations to acquire construction rights on another part of the site.

(106) OAR 345-027-0020(6): If the Council requires mitigation based on an affirmative finding under any standards of Division 22 or Division 24 of this chapter, the certificate holder shall consult with affected state agencies and local governments designated by the Council and shall develop specific mitigation plans consistent with Council findings under the relevant standards. The certificate holder must submit the mitigation plans to the Office and receive Office approval before beginning construction or, as appropriate, operation of the facility.

(107) OAR 345-027-0020(7): The certificate holder shall prevent the development of any conditions on the site that would preclude restoration of the site to a useful, non-hazardous condition to the extent that prevention of such site conditions is within the control of the certificate holder.

(108) OAR 345-027-0020(8): Before beginning construction of the facility, the certificate holder shall submit to the State of Oregon, through the Council, a bond or letter of credit, satisfactory to the Council, in an amount specified in the site certificate to restore the site to a useful, non-hazardous condition. The certificate holder shall maintain a bond or letter of credit in effect at all times until the

facility has been retired. The Council may specify different amounts for the bond or letter of credit during construction and during operation of the facility.

(109) OAR 345-027-0020(9): The certificate holder shall retire the facility if the certificate holder permanently ceases construction or operation of the facility. The certificate holder shall retire the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0110. The certificate holder shall pay the actual cost to restore the site to a useful, non-hazardous condition at the time of retirement, notwithstanding the Council's approval in the site certificate of an estimated amount required to restore the site.

(110) OAR 345-027-0020(10): The Council shall include as conditions in the site certificate all representations in the site certificate application and supporting record the Council deems to be binding commitments made by the applicant.

(111) OAR 345-027-0020(11): Upon completion of construction, the certificate holder shall restore vegetation to the extent practicable and shall landscape portions of the site disturbed by construction in a manner compatible with the surroundings and proposed use. Upon completion of construction, the certificate holder shall dispose of all temporary structures not required for facility operation and all timber, brush, refuse and flammable or combustible material resulting from clearing of land and construction of the facility.

(112) OAR 345-027-0020(12): The certificate holder shall design, engineer and construct the facility to avoid dangers to human safety presented by seismic hazards affecting the site that are expected to result from all maximum probable seismic events. As used in this rule "seismic hazard" includes ground shaking, landslide, liquefaction, lateral spreading, tsunami inundation, fault displacement and subsidence.

(113) OAR 345-027-0020(13): The certificate holder shall notify the Office, the State Building Codes Division and the Department of Geology and Mineral Industries promptly if site investigations or trenching reveal that conditions in the foundation rocks differ significantly from those described in the application for a site certificate. After the Office receives the notice, the Council may require the certificate holder to consult with the Department of Geology and Mineral Industries and the Building Codes Division and to propose mitigation actions.

(114) OAR 345-027-0020(14): The certificate holder shall notify the Office, the State Building Codes Division and the Department of Geology and Mineral Industries promptly if shear zones, artesian aquifers, deformations or clastic dikes are found at or in the vicinity of the site.

(115) OAR 345-027-0020(15): Before any transfer of ownership of the facility or ownership of the site certificate holder, the certificate holder shall inform the

Office of the proposed new owners. The requirements of OAR 345-027-0100 apply to any transfer of ownership that requires a transfer of the site certificate.

(116) OAR 345-027-0020(16): If the Council finds that the certificate holder has permanently ceased construction or operation of the facility without retiring the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0110, the Council shall notify the certificate holder and request that the certificate holder submit a proposed final retirement plan to the Office within a reasonable time not to exceed 90 days. If the certificate holder does not submit a proposed final retirement plan by the specified date, the Council may direct the Office to prepare a proposed a final retirement plan for the Council's approval. Upon the Council's approval of the final retirement plan, the Council may draw on the bond or letter of credit described in section (8) to restore the site to a useful, non-hazardous condition according to the final retirement plan, in addition to any penalties the Council may impose under OAR Chapter 345, Division 29. If the amount of the bond or letter of credit is insufficient to pay the actual cost of retirement, the certificate holder shall pay any additional cost necessary to restore the site to a useful, non-hazardous condition. After completion of site restoration, the Council shall issue an order to terminate the site certificate if the Council finds that the facility has been retired according to the approved final retirement plan.

(117) OAR 345-027-0023(4): If the energy facility or related or supporting facility is a transmission line, the certificate holder shall restore the reception of radio and television at residences and commercial establishments in the primary reception area to the level present prior to operations of the transmission line, at no cost to residents experiencing interference resulting from the transmission line.

(118) OAR 345-027-0023(5): If the facility includes any high voltage transmission line under Council jurisdiction:

(a) The certificate holder shall design, construct and operate the transmission line in accordance with the requirements of the National Electrical Safety Code (American National Standards Institute, Section C2, 1997 Edition); and

(b) The certificate holder shall develop and implement a program that provides reasonable assurance that all fences, gates, cattle guards, trailers, or other objects or structures of a permanent nature that could become inadvertently charged with electricity are grounded or bonded throughout the life of the line.

(119) OAR 345-027-0023(6): If the proposed energy facility is a pipeline or a transmission line or has, as a related or supporting facility, a pipeline or transmission line, the Council shall specify an approved corridor in the site certificate and shall allow the certificate holder to construct the pipeline or

transmission line anywhere within the corridor, subject to the conditions of the site certificate. If the applicant has analyzed more than one corridor in its application for a site certificate, the Council may, subject to the Council's standards, approve more than one corridor. Before beginning operation of the facility, the certificate holder shall submit to the Office a legal description of the permanent right-of-way where the applicant has built the pipeline or transmission line within an approved corridor. The site of the pipeline or transmission line subject to the site certificate is the area within the permanent right-of-way.

(120) OAR 345-027-0028: The following general monitoring conditions apply:

(a) The certificate holder shall consult with affected state agencies, local governments and tribes and shall develop specific monitoring programs for impacts to resources protected by the standards of divisions 22 and 24 of this chapter and resources addressed by applicable statutes, administrative rules and local ordinances. The certificate holder must submit the monitoring programs to the Office of Energy and receive Office approval before beginning construction or, as appropriate, operation of the facility.

(b) The certificate holder shall implement the approved monitoring programs described in section (a) and monitoring programs required by permitting agencies and local governments.

(c) For each monitoring program described in sections (a) and (b), the certificate holder shall have quality assurance measures approved by the Office before beginning construction or, as appropriate, before beginning commercial operation.

(d) If the certificate holder becomes aware of a significant environmental change or impact attributable to the facility, the certificate holder shall, as soon as possible, submit a written report to the Office describing the impact on the facility and any affected site certificate conditions.

(121) OAR 345-026-0048: Following receipt of the site certificate, the certificate holder shall implement a plan that verifies compliance with all site certificate terms and conditions and applicable statutes and rules. As a part of the compliance plan, to verify compliance with the requirement to begin construction by the date specified in the site certificate, the certificate holder shall report promptly to the Office of Energy when construction begins. Construction is defined in OAR 345-001-0010. In reporting the beginning of construction, the certificate holder shall describe all work on the site performed before beginning construction, including work performed before the Council issued the site certificate, and shall state the cost of that work. For the purpose of this exhibit, "work on the site" means any work within a site or corridor, other than surveying, exploration or other activities to define or characterize the site or corridor. The certificate holder shall document

the compliance plan and maintain it for inspection by the Department or the Council.

(122) OAR 345-026-0080: The certificate holder shall report according to the following requirements:

(a) General reporting obligation for non-nuclear facilities under construction or operating:

(i) Within six months after beginning construction, and every six months thereafter during construction of the energy facility and related or supporting facilities, the certificate holder shall submit a semiannual construction progress report to the Council. In each construction progress report, the certificate holder shall describe any significant changes to major milestones for construction. The certificate holder shall include such information related to construction as specified in the site certificate. When the reporting date coincides, the certificate holder may include the construction progress report within the annual report described in this rule;

(ii) The certificate holder shall, within 120 days after the end of each calendar year after beginning construction, submit an annual report to the Council addressing the subjects listed in this rule. The Council secretary and the certificate holder may, by mutual agreement, change the reporting date.

(iii) To the extent that information required by this rule is contained in reports the certificate holder submits to other state, federal or local agencies, the certificate holder may submit excerpts from such other reports to satisfy this rule. The Council reserves the right to request full copies of such excerpted reports.

(b) In the annual report, the certificate holder shall include the following information for the calendar year preceding the date of the report:

(i) Facility Status: An overview of site conditions, the status of facilities under construction, and a summary of the operating experience of facilities that are in operation. In this section of the annual report, the certificate holder shall describe any unusual events, such as earthquakes, extraordinary windstorms, major accidents or the like that occurred during the year and that had a significant adverse impact on the facility;

(ii) Reliability and Efficiency of Power Production: For electric power plants,

(A) The plant availability and capacity factors for the reporting year. If equipment failures or plant breakdowns had a significant impact on those factors, the certificate holder shall describe them and its plans to minimize or eliminate their recurrence;

(B) The efficiency with which the power plant converts fuel into electric energy. If the fuel chargeable to power heat rate was evaluated when the facility was sited, the certificate holder shall calculate efficiency using the same formula and assumptions, but using actual data; and

(C) The facility's annual hours of operation by fuel type and, every five years after beginning operation, a summary of the annual hours of operation by fuel type as described in OAR 345-024-0590(5);

(iii) Status of Surety Information: Documentation demonstrating that bonds or letters of credit as described in the site certificate are in full force and effect and will remain in full force and effect for the term of the next reporting period;

(iv) Industry Trends: A discussion of any significant industry trends that may affect the operations of the facility;

(v) Monitoring Report: A list and description of all significant monitoring and mitigation activities performed during the previous year in accordance with site certificate terms and conditions, a summary of the results of those activities, and a discussion of any significant changes to any monitoring or mitigation program, including the reason for any such changes;

(vi) Compliance Report: A description of all instances of noncompliance with a site certificate condition. For ease of review, the certificate holder shall, in this section of the report, use numbered subparagraphs corresponding to the applicable sections of the site certificate;

(vii) Facility Modification Report: A summary of changes to the facility that the certificate holder has determined do not require a site certificate amendment in accordance with OAR 345-027-0050; and

(viii) Nongenerating Facility Carbon Dioxide Emissions: For nongenerating facilities that emit carbon dioxide, a report of the annual fuel use by fuel type and annual hours of operation of the carbon dioxide emitting equipment as described in OAR 345-024-0630(4).

(123) OAR 345-026-0100: The certificate holder shall promptly notify the Office of Energy of any changes in major milestones for construction, decommissioning, operation or retirement schedules. Major milestones are those identified by the certificate holder in its construction, retirement or decommissioning plan.

(124) OAR 345-026-0105: The certificate holder and the Office of Energy shall exchange copies of all correspondence or summaries of correspondence related to compliance with statutes, rules and local ordinances on which the Council determined compliance, except for material withheld from public disclosure under state or federal law or under Council rules. The certificate holder may submit abstracts of reports in place of full reports; however, the certificate holder shall

provide full copies of abstracted reports and any summarized correspondence at the request of the Office of Energy.

(125) OAR 345-026-0170: The certificate holder shall notify the Office of Energy within 72 hours of any occurrence involving the facility if:

(a) There is an attempt by anyone to interfere with its safe operation;

(b) A natural event such as an earthquake, flood, tsunami or tornado, or a human-caused event such as a fire or explosion affects or threatens to affect the public health and safety or the environment; or

(c) There is any fatal injury at the facility.

VI. SUCCESSORS AND ASSIGNS

To transfer this site certificate, or any portion thereof, or to assign or dispose of it in any other manner, directly or indirectly, the certificate holder shall comply with OAR 345-027-0100.

VII. SEVERABILITY AND CONSTRUCTION

If any provision of this agreement and certificate is declared by a court to be illegal or in conflict with any law, the validity of the remaining terms and conditions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the agreement and certificate did not contain the particular provision held to be invalid. In the event of a conflict between the conditions contained in this site certificate and the Council's final order, the conditions contained in this site certificate shall control.

VIII. GOVERNING LAW AND FORUM

This site certificate shall be governed by the laws of the State of Oregon. Any litigation or arbitration arising out of this agreement shall be conducted in an appropriate forum in Oregon.

IX. EXECUTION

This site certificate may be executed in counterparts and will become effective upon receipt by the Oregon Department of Energy of a facsimile transmission of the signature page of this site certificate with the signatures of the Chair of the Energy Facility Siting Council and the notarized signature of the person duly authorized to sign on behalf of Orion Sherman County Wind Farm LLC. Such facsimile signature pages shall be replaced as soon as reasonably possible, but no longer than 30 days after receipt by the Oregon Department of Energy of the facsimile signature pages, with signature pages containing original signatures of the authorized signers.

IN WITNESS WHEREOF, this site certificate has been executed by the State of Oregon, acting by and through its Energy Facility Siting Council, and by Orion Sherman County Wind Farm LLC.

ENERGY FACILITY SITING COUNCIL

By: _____
Hans Neukomm, Chair

Date: _____

ORION SHERMAN COUNTY WIND FARM LLC

By: _____

Print: _____

Date: _____

STATE OF _____)
) ss.
County of _____)

I, _____, certify that I am duly authorized to sign this site certificate on behalf of Orion Sherman County Wind Farm LLC.

Dated this _____ day of _____, 2006

_____

Subscribed and sworn to before me this _____ day of _____, 2006

_____

Notary Public for _____

My commission expires: _____