



Oregon

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To: Oregon Energy Facility Siting Council

From: Duane Kilsdonk, Compliance Officer

Date: May 29, 2019

Subject: Klondike III Wind Project – Annual Monitoring for Wildlife Monitoring and Mitigation Plan (Condition 95)

Wildlife Monitoring and Mitigation Plan Overview

Klondike III Wind Project is a wind energy generation facility consisting of 176 wind turbines, with a peak generating capacity of 300 megawatts (MW). The facility is located in Sherman County, approximately 4 miles east of the town of Wasco and 5 miles south of the Columbia River. The Council issued a site certificate for the facility in 2006.

Condition 95 of the site certificate states that, “The certificate shall conduct wildlife monitoring as described in the Wildlife Monitoring and Mitigation Plan (WMMP) that is incorporated in the Final Order on the Application as Attachment A and as amended from time to time.”

The WMMP requires that the certificate holder implement short- and long-term wildlife monitoring during facility operation. Short-term wildlife monitoring requirements include a 2-year post construction Bird and Bat Fatality Monitoring Program and Avian Use Surveys; both of these wildlife monitoring activities were completed in 2010-12. On-going long-term wildlife monitoring requirements include:

- Long-Term Raptor Nesting Surveys (Every 5-years for operational life of facility; 2012, 2017, 2022, etc.)
- Wildlife Incident Response and Handling System (Ongoing)

Long-Term Raptor Nesting Surveys

Raptor nesting surveys are required to be completed for the life of the facility, on a 5-year cycle. Raptor nesting surveys were completed in 2017; the next raptor nesting survey will be completed in 2022. The objectives of raptor nesting surveys are to estimate the size of local breeding populations of tree or other above ground-nesting raptor species within a 2-mile radius of the facility, and to determine whether facility operation is contributing to a reduction in nesting activity or nesting success in local Special status species raptor populations. A summary of raptor nesting survey results to date is presented in Table 1 below.

Table 1: Long-Term Raptor Nesting Survey Results for Klondike III Wind Project

Species	2008		2012		2017		2022	
	0.5 m.	0.5 to 2.0 m.	0.5 m.	0.5 to 2.0 m.	0.5 m.	0.5 to 2.0 m.	0.5 m.	0.5 to 2.0 m.
Golden Eagle	0	1 (2)	0	2 (5)	0	1 (1)	-	-
Swainson's Hawk	3 (3)	3 (2)	1 (0)	0	1 (0)	2 (0)	-	-
Ferruginous Hawk	0	1 (1)	0	0	0	0	-	-
Red-tailed Hawk	2	3	10	7	2	5	-	-
Unidentified Buteo	0	1	0	0	0	0	-	-
Great Horned Owl	0	0	1	2	0	3	-	-
Barn Owl	0	0	0	2	0	0	-	-
Long-eared Owl	0	1	0	0	0	0	-	-
Total Raptors =	5	10	12	13	3	11	TBD	TBD

Based on the long-term raptor nesting surveys to date, the certificate holder's results demonstrate similar golden eagle territory occupancy and number of successful breeding attempts during 2008 and 2017. For tree-nesting raptors, the number of active and successful nests was similar in 2008 and 2017, but fewer in 2012. The certificate holder associates the results with changes and impacts near the facility including: the predominance of non-native habitat, an increase in the amount of human activity in the nesting season, increase in nesting by common ravens, harsh weather, low prey density, ongoing senescence and loss of suitable nest trees, and land use changes.

Wildlife Incident Response and Handling System

Monitoring activities during 2018 for this facility include the ongoing Wildlife Incident Response and Handling System, a program for responding to and handling avian and bat casualties found by personnel at the site during routine maintenance operations. In 2018, the certificate holder reported that individual carcasses for the following species were observed: horned lark, mallard, ring-neck pheasant, red-tailed hawk, and one unidentified. The certificate holder is obligated to notify USFWS and ODFW in the event that any federal or state endangered or threatened species are killed or injured onsite.

Public Comments on Wildlife Monitoring Results

Section 5 of the WMMP, Data Reporting, establishes an opportunity for the public to review and comment on monitoring results. Specifically the WMMP states, “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.”

The Department received the annual monitoring results for the facility on April 25, 2019. In accordance with the terms of the WMMP, the Department provides a copy of the 2018 monitoring results for the Klondike III Wind Project to the Council for review (attached) and posted a copy to the Department’s project website at: <http://www.oregon.gov/energy/facilities-safety/facilities/Pages/KWP.aspx> and has established 60-day timeframe to accept public comments.

Comments are due within 60-days of posting, or **July 29, 2019 at 5:00 p.m.** and may be submitted to Duane Kilsdonk at duane.kilsdonk@oregon.gov

Attachments: Wildlife Monitoring and Mitigation Plan (August 24, 2012)
2018 Wildlife Monitoring Report

Klondike III Wind Project: Wildlife Monitoring and Mitigation Plan

[REVISED AUGUST 24, 2012]

1 This plan describes wildlife monitoring that the certificate holder shall conduct during
2 operation of the Klondike III Wind Project (KWP).¹ The monitoring objectives are to determine
3 whether the facility causes significant fatalities of birds and bats and to determine whether the
4 facility results in a loss of habitat quality. The KWP facility consists of up to 208 wind turbines,
5 three non-guyed meteorological towers and other related or supporting facilities as described in
6 the site certificate. The certificate holder completed construction of 124 turbines authorized
7 under the Second Amended Site Certificate in October 2007.

8 The certificate holder shall use experienced personnel to manage the monitoring required
9 under this plan and properly trained personnel to conduct the monitoring, subject to approval by
10 the Oregon Department of Energy (Department) as to professional qualifications. For all
11 components of this plan except PPM Energy's Klondike III Wind Project Wildlife Reporting and
12 Handling System, the certificate holder shall hire an independent third party (not employees of
13 the certificate holder) to perform monitoring tasks.

14 The Wildlife Monitoring and Mitigation Plan for the Klondike III Wind Project has the
15 following components:

16 1) Fatality monitoring program including:

- 17 a) Removal trials
- 18 b) Searcher efficiency trials
- 19 c) Fatality search protocol
- 20 d) Statistical analysis

21 2) Raptor nesting surveys

22 3) Avian use surveys

23 4) PPM Energy's Klondike III Wind Project Wildlife Reporting and Handling
24 System

25 Following is a discussion of the components of the monitoring plan, statistical analysis
26 methods for fatality data, data reporting and potential mitigation.

27 The selection of the mitigation actions that the certificate holder may be required to
28 implement under this plan should allow for flexibility in creating appropriate responses to
29 monitoring results that cannot be known in advance. If the Department determines that
30 mitigation is needed, the certificate holder shall propose appropriate mitigation actions to the
31 Department and shall carry out mitigation actions approved by the Department, subject to review
32 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.

Klondike III Wildlife Monitoring and Mitigation Plan

[REVISED AUGUST 24, 2012]

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 be centered on the turbine location and will have a radius equal to the maximum blade tip height of the turbine contained within the plot. "Maximum blade tip height" is the turbine hub-height plus one-half the rotor diameter. Square search plots will be of sufficient size to contain a circular search plot as described above. 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)

For the 124 turbines built as of October 2007, the certificate holder shall conduct fatality monitoring for two years (32 searches), beginning November 1, 2007. For turbines built after October 2007 (up to 84 turbines), the certificate holder shall conduct fatality monitoring for two years (32 searches) beginning one month after the start of commercial operation of those turbines.

Sample Size

The sample size for fatality monitoring is the number of turbines searched per monitoring year for each phase of construction. Phase 1 consists of turbines built as of October 2007; Phase 2 consists of turbines built after October 2007. During each monitoring year, the certificate

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1 holder shall search a minimum of one-third of the total number of turbines that are built in the
2 applicable phase.

3 As described in the site certificate, the certificate holder may choose to build the KWP
4 using turbine types in two size classes:

- 5 • Small: turbines having a rotor diameter of 82 meters or less
- 6 • Large: turbines having a rotor diameter greater than 82 meters

7 If the final design of the KWP includes both small and large turbines, the certificate
8 holder shall, at a minimum, sample one-third of the total number of turbines in each monitoring
9 year for each phase of construction. Before beginning fatality monitoring, the certificate holder
10 shall consult with an independent expert with experience in statistical analysis of avian fatality
11 data to determine whether it would be possible to sample a sufficient number of the KWP
12 turbines in each size class to allow a statistical comparison of fatality rates for all birds as a
13 group. The certificate holder shall submit the expert's written conclusions to the Department. If
14 sampling of one-third of the total number of all turbines per phase in each monitoring year would
15 provide a sufficient number of turbines in each size class to allow the comparison, the certificate
16 holder will sample the appropriate number of turbines from each class and conduct the analysis.
17 The certificate holder may choose to sample more than one-third of the total number of all
18 turbines in each monitoring year for each phase of construction to allow the comparison.

19 (b) Removal Trials

20 The objective of the removal trials is to estimate the length of time avian and bat
21 carcasses remain in the search area. Carcass removal studies will be conducted during each
22 season in the vicinity of the search plots. Estimates of carcass removal rates will be used to
23 adjust carcass counts for removal bias. "Carcass removal" is the disappearance of a carcass from
24 the search area due to predation, scavenging or other means such as farming activity. Removal
25 rates will be estimated by habitat and season.

26 The certificate holder shall conduct carcass removal trials within each of the seasons
27 defined above during the years in which fatality monitoring occurs. During the first year in
28 which fatality monitoring occurs, the certificate holder shall conduct one removal trial per season
29 (four removal trials per year). For each trial, at least 10 small bird carcasses and at least 10 large bird
30 carcasses will be distributed throughout the project area (approximately 80 trial carcasses per year).

31 Before beginning removal trials for the second year of fatality monitoring, the certificate
32 holder shall report the results of the first year removal trials to the Department and ODFW. In the
33 report, the certificate holder shall analyze whether four removal trials per year, as described
34 above, provides sufficient data to accurately estimate adjustment factors for carcass removal. The
35 number of removal trials for the second year of fatality monitoring may be adjusted up or down,
36 subject to the approval of the Department.

37 The "small bird" size class will use carcasses of house sparrows, starlings, commercially
38 available game bird chicks or legally obtained native birds to simulate passerines. The "large
39 bird" size class will use carcasses of raptors provided by agencies, commercially available adult
40 game birds or cryptically colored chickens to simulate raptors, game birds and waterfowl. If
41 fresh bat carcasses are available, they may also be used.

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1 To avoid confusion with turbine-related fatalities, planted carcasses will not be placed in
2 fatality monitoring search plots. Planted carcasses will be placed in the vicinity of search plots
3 but not so near as to attract scavengers to the search plots. The planted carcasses will be located
4 randomly within the carcass removal trial plots.

5 Carcasses will be placed in a variety of postures to simulate a range of conditions. For
6 example, birds will be: 1) placed in an exposed posture (e.g., thrown over the shoulder), 2)
7 hidden to simulate a crippled bird (e.g., placed beneath a shrub or tuft of grass) and, 3) partially
8 hidden. Trial carcasses will be marked discreetly for recognition by searchers and other
9 personnel. Trial carcasses will be left at the location until the end of the carcass removal trial.

10 It is expected that carcasses will be checked as follows, although actual intervals may
11 vary. Carcasses will be checked for a period of 40 days to determine removal rates. They will be
12 checked approximately every day for the first 4 days, and then on day 7, day 10, day 14, day 20,
13 day 30 and day 40. This schedule may vary depending on weather and coordination with the
14 other survey work. At the end of the 40-day period, the trial carcasses and scattered feathers will
15 be removed.

16 (c) Searcher Efficiency Trials

17 The objective of searcher efficiency trials is to estimate the percentage of bird and bat
18 fatalities that searchers are able to find. The certificate holder shall conduct searcher efficiency
19 trials on the fatality monitoring search plots in both grassland/shrub-steppe and cultivated
20 agriculture habitat types. Searcher efficiency will be estimated by size class, habitat type and
21 season. A pooled estimate of searcher efficiency will be used to adjust carcass counts for
22 detection bias.

23 The certificate holder shall conduct searcher efficiency trials within each of the seasons
24 defined above during the years in which the fatality monitoring occurs. During each season of
25 the years in which fatality monitoring occurs, the certificate holder shall use approximately 25
26 carcasses for searcher efficiency trials (approximately 100 carcasses per year). The certificate
27 holder shall vary the number of trials per season and the number of carcasses per trial so that the
28 searchers will not know the total number of trial carcasses being used in any trial. The certificate
29 holder shall distribute trial carcasses in varied habitat in rough proportion to the habitat types
30 within the facility site. During each season, both small bird and large bird carcasses will be used
31 in approximately equal numbers. "Small bird" and "large bird" size classes and carcass selection
32 are as described above for the removal trials.

33 Before beginning searcher efficiency trials for the second year of fatality monitoring, the
34 certificate holder shall report the results of the first year efficiency trials to the Department and
35 ODFW. In the report, the certificate holder shall analyze whether the efficiency trials as described
36 above (using approximately 100 carcasses per year) provides sufficient data to accurately estimate
37 adjustment factors for carcass removal. The number of removal trials for the second year of fatality
38 monitoring may be adjusted up or down, subject to the approval of the Department.

39 Personnel conducting searches will not know in advance when trials are conducted; nor
40 will they know the location of the trial carcasses. If suitable trial carcasses are available, trials
41 during the fall season will include several small brown birds to simulate bat carcasses. Legally
42 obtained bat carcasses will be used if available.

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1 On the day of a standardized fatality monitoring search (described below) but before the
2 beginning of the search, efficiency trial carcasses will be placed at random locations within areas
3 to be searched. If scavengers appear attracted by placement of carcasses, the carcasses will be
4 distributed before dawn.

5 Efficiency trials will be spread over the entire season to incorporate effects of varying
6 weather and vegetation growth. Carcasses will be placed in a variety of postures to simulate a
7 range of conditions. For example, birds will be: 1) placed in an exposed posture (thrown over the
8 shoulder), 2) hidden to simulate a crippled bird and 3) partially hidden.

9 Each non-domestic carcass will be discreetly marked so that it can be identified as an
10 efficiency trial carcass after it is found. The number and location of the efficiency trial carcasses
11 found during the carcass search will be recorded. The number of efficiency trial carcasses
12 available for detection during each trial will be determined immediately after the trial by the
13 person responsible for distributing the carcasses.

14 If new searchers are brought into the search team, additional detection trials will be
15 conducted to ensure that detection rates incorporate searcher differences.

16 (d) Coordination with the Biglow Canyon Wind Farm

17 The proposed Biglow Canyon Wind Farm lies to the north of the Klondike III Wind
18 Power Project on similar terrain and habitat. If the Council approves site certificates for both
19 facilities and requires similar wildlife monitoring, coordination of removal trials and searcher
20 efficiency trials would be possible. Subject to the approval of both certificate holders and the
21 Department, the number of trials at each site and the number of trial carcasses used at each site
22 can be reduced by combining the removal data and efficiency data from both projects, if the
23 certificate holder can demonstrate that the calculation of fatality rates would continue to have
24 statistical validity for both facilities and that combining the data would not affect any other
25 requirements of the monitoring plans for either facility.

26 (e) Fatality Monitoring Search Protocol

27 The objective fatality monitoring is to estimate the number of bird and bat fatalities that
28 are attributable to facility operation. The goal of bird and bat fatality monitoring is to obtain a
29 precise estimate of the fatality rate and associated variances. The certificate holder shall conduct
30 fatality monitoring using standardized carcass searches.

31 The certificate holder shall use a worst-case analysis to resolve any uncertainty in the
32 results and to determine whether the data indicate that additional mitigation should be
33 considered. The Department may require additional, targeted monitoring if the data indicate the
34 potential for significant impacts that cannot be addressed by worst-case analysis and appropriate
35 mitigation. On an annual basis, the certificate holder shall report an estimate of fatalities in seven
36 categories: 1) all birds, 2) small birds, 3) large birds, 4) raptors, 5) grassland birds, 6) nocturnal
37 migrants, 7) State Sensitive Species listed under OAR 635-100-0040 and 8) bats. If there is
38 sufficient sampling of large and small turbines, the certificate holder shall compare the fatality
39 rates in the “all birds” category for each of the turbine size classes. The certificate holder shall
40 calculate fatality rates using the statistical methods described in Sections (a) and (f).

41 The certificate holder shall estimate the number of avian and bat fatalities attributable to
42 operation of the facility based on the number of avian and bat fatalities found at the facility site.
43 All carcasses located within areas surveyed, regardless of species, will be recorded and, if

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1 possible, a cause of death determined based on blind necropsy results. If a different cause of
2 death is not apparent, the fatality will be attributed to facility operation. The total number of
3 avian and bat carcasses will be estimated by adjusting for removal and searcher efficiency bias.

4 Personnel trained in proper search techniques (“the searchers”) will conduct the carcass
5 searches by walking parallel transects within the search plots.² Transects will be initially set at 6
6 meters apart in the area to be searched. A searcher will walk at a rate of approximately 45 to 60
7 meters per minute along each transect searching both sides out to three meters for casualties.
8 Search area and speed may be adjusted by habitat type after evaluation of the first searcher
9 efficiency trial. The searchers will record the condition of each carcass found, using the
10 following condition categories:

- 11 ▪ Intact – a carcass that is completely intact, is not badly decomposed and shows no
12 sign of being fed upon by a predator or scavenger
- 13 ▪ Scavenged – an entire carcass that shows signs of being fed upon by a predator or
14 scavenger, or portions of a carcass in one location (e.g., wings, skeletal remains,
15 legs, pieces of skin, etc.)
- 16 ▪ Feather Spot – 10 or more feathers at one location indicating predation or
17 scavenging or 2 or more primary feathers

18 All carcasses (avian and bat) found during the standardized carcass searches will be
19 photographed, recorded and labeled with a unique number. Each carcass will be bagged and
20 frozen for future reference and possible necropsy. A copy of the data sheet for each carcass will
21 be kept with the carcass at all times. For each carcass found, searchers will record species, sex
22 and age when possible, date and time collected, location, condition (e.g., intact, scavenged,
23 feather spot) and any comments that may indicate cause of death. Searchers will photograph each
24 carcass as found and will map the find on a detailed map of the search area showing the location
25 of the wind turbines and associated facilities. The certificate holder shall coordinate collection of
26 state endangered, threatened or protected species with ODFW. The certificate holder shall
27 coordinate collection of federal endangered, threatened or protected species with the U.S. Fish
28 and Wildlife Service (USFWS). The certificate holder shall obtain appropriate collection permits
29 from ODFW and USFWS.

30 The searchers might discover carcasses incidental to formal carcass searches (e.g., while
31 driving within the project area). For each incidentally discovered carcass, the searcher shall
32 identify, photograph, record data and collect the carcass as would be done for carcasses within
33 the formal search sample during scheduled searches. If the incidentally discovered carcass is
34 found within a formal search plot, the fatality data will be included in the calculation of fatality
35 rates. If the incidentally discovered carcass is found outside a formal search plot, the data will be
36 reported separately. The certificate holder shall coordinate collection of incidentally discovered
37 state endangered, threatened or protected species with ODFW. The certificate holder shall
38 coordinate collection of incidentally discovered federal endangered, threatened or protected
39 species with the USFWS.

40 Any injured native birds found on the facility site will be carefully captured by a trained
41 project biologist or technician and transported to Jean Cypher (wildlife rehabilitator) in The

² Where search plots are adjacent, the search area may be rectangular.

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1 Dalles, the Blue Mountain Wildlife Rehabilitation Center in Pendleton or the Audubon Bird Care
2 Center in Portland in a timely fashion. The certificate holder shall pay costs, if any, charged for
3 time and expenses related to care and rehabilitation of injured native birds found on the site,
4 unless the cause of injury is clearly demonstrated to be unrelated to the facility operations.

5 (f) Statistical Methods for Fatality Estimates

6 The certificate holder shall estimate the total number of wind facility-related fatalities for
7 each phase of construction based on:

- 8 (1) The observed number of carcasses found during standardized searches during the
9 two monitoring years (for the applicable phase) for which the cause of death is
10 attributed to the facility.³
- 11 (2) Searcher efficiency expressed as the proportion of planted carcasses found by
12 searchers.
- 13 (3) Removal rates expressed as the estimated average probability a carcass is expected
14 to remain in the study area and be available for detection by the searchers during
15 the entire survey period.

16 Definition of Variables

17 The following variables are used in the equations below:

18	c_i	the number of carcasses detected at plot i for the study period of interest (e.g., one
19		year) for which the cause of death is either unknown or is attributed to the facility
20	n	the number of search plots
21	k	the number of turbines searched (includes the turbines centered within each
22		search plot and a proportion of the number of turbines adjacent to search plots to
23		account for the effect of adjacent turbines on the 90-meter search plot buffer area)
24	\bar{c}	the average number of carcasses observed per turbine per year
25	s	the number of carcasses used in removal trials
26	s_c	the number of carcasses in removal trials that remain in the study area after 40
27		days
28	se	standard error (square of the sample variance of the mean)
29	t_i	the time (days) a carcass remains in the study area before it is removed
30	\bar{t}	the average time (days) a carcass remains in the study area before it is removed
31	d	the total number of carcasses placed in searcher efficiency trials
32	p	the estimated proportion of detectable carcasses found by searchers
33	I	the average interval between searches in days
34	$\hat{\pi}$	the estimated probability that a carcass is both available to be found during a
35		search and is found

³ If a different cause of death is not apparent, the fatality will be attributed to facility operation.

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1 m_t the estimated annual average number of fatalities per turbine per year, adjusted
2 for removal and observer detection bias

3 C nameplate energy output of turbine in megawatts (MW)

4 Observed Number of Carcasses

5 The estimated average number of carcasses (\bar{c}) observed per turbine per year is:

$$6 \quad \bar{c} = \frac{\sum_{i=1}^n c_i}{k}. \quad (1)$$

7 Estimation of Carcass Removal

8 Estimates of carcass removal are used to adjust carcass counts for removal bias. Mean carcass
9 removal time (\bar{t}) is the average length of time a carcass remains at the site before it is removed:

$$10 \quad \bar{t} = \frac{\sum_{i=1}^s t_i}{s - s_c}. \quad (2)$$

11 This estimator is the maximum likelihood estimator assuming the removal times follow an
12 exponential distribution and there is right-censoring of data. Any trial carcasses still remaining at
13 40 days are collected, yielding censored observations at 40 days. If all trial carcasses are
14 removed before the end of the trial, then s_c is 0, and \bar{t} is just the arithmetic average of the
15 removal times. Removal rates will be estimated by carcass size (small and large) and season.

16 Estimation of Observer Detection Rates

17 Observer detection rates (i.e., searcher efficiency rates) are expressed as p , the proportion
18 of trial carcasses that are detected by searchers. Observer detection rates will be estimated by
19 carcass size and season.

20 Estimation of Facility-Related Fatality Rates

21 The estimated per turbine annual fatality rate (m_t) is calculated by:

$$22 \quad m_t = \frac{c}{\hat{\pi}}, \quad (3)$$

23 where $\hat{\pi}$ includes adjustments for both carcass removal (from scavenging and other means) and
24 observer detection bias assuming that the carcass removal times t_i follow an exponential
25 distribution. Under these assumptions, this detection probability is estimated by:

$$26 \quad \hat{\pi} = \frac{t \cdot p}{I} \cdot \left[\frac{\exp\left(\frac{I}{\bar{t}}\right) - 1}{\exp\left(\frac{I}{\bar{t}}\right) - 1 + p} \right]. \quad (4)$$

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1 The estimated per MW annual fatality rate (m) is calculated by:

$$2 \quad m = \frac{m_t}{C} \quad (5)$$

3 For each phase of construction, the certificate holder shall calculate fatality estimates for:
 4 (1) all birds, (2) small birds, (3) large birds, (4) raptors, (5) grassland birds, (6) nocturnal
 5 migrants 7) State Sensitive Species listed under OAR 635-100-0040 and 8) bats. If there is
 6 sufficient sampling of large and small turbines, the certificate holder shall compare the fatality
 7 rates in the “all birds” category for each of the turbine size classes. The final reported estimates
 8 of m , associated standard errors and 90% confidence intervals will be calculated using
 9 bootstrapping (Manly 1997). Bootstrapping is a computer simulation technique that is useful for
 10 calculating point estimates, variances and confidence intervals for complicated test statistics. For
 11 each iteration of the bootstrap, the plots will be sampled with replacement, trial carcasses will be
 12 sampled with replacement and \bar{c} , \bar{t} , p , $\hat{\pi}$ and m will be calculated. A total of 5,000 bootstrap
 13 iterations will be used. The reported estimates will be the means of the 5,000 bootstrap estimates.
 14 The standard deviation of the bootstrap estimates is the estimated standard error. The lower 5th
 15 and upper 95th percentiles of the 5000 bootstrap estimates are estimates of the lower limit and
 16 upper limit of 90% confidence intervals.

17 Nocturnal Migrant and Bat Fatalities

18 Differences in observed nocturnal migrant and bat fatality rates for lit turbines, unlit
 19 turbines that are adjacent to lit turbines and unlit turbines that are not adjacent to lit turbines will
 20 be compared graphically and statistically.

21 (g) Mitigation

22 Mitigation may be appropriate if fatality rates exceed a “threshold of concern.” For the
 23 purpose of determining whether a threshold has been exceeded, the certificate holder shall
 24 calculate the average annual fatality rates for species groups for each phase of construction after
 25 two years of monitoring. Based on current knowledge of the species that are likely to use the
 26 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

27 If the data show that a threshold of concern for a species group has been exceeded, the
 28 certificate holder shall implement additional mitigation if the Department determines that
 29 mitigation is appropriate based on analysis of the data, consultation with ODFW and

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1 consideration of any other significant information available at the time. In addition, mitigation
2 may be appropriate if the Department determines that fatality rates for individual avian or bat
3 species (especially State Sensitive Species) are higher than expected and at a level of biological
4 concern. If mitigation is appropriate, the certificate holder, in consultation with the Department
5 and ODFW, shall propose mitigation measures designed to benefit the affected species. The
6 certificate holder shall implement mitigation as approved by the Council. The Department may
7 recommend additional, targeted data collection if the need for mitigation is unclear based on the
8 information available at the time. The certificate holder shall implement such data collection as
9 approved by the Council.

10 Mitigation should be designed to benefit the affected species group. Mitigation may
11 include, but is not limited to, protection of nesting habitat for the affected group of native species
12 through a conservation easement or similar agreement. Tracts of land that are intact and
13 functional for wildlife are preferable to degraded habitat areas. Preference should be given to
14 protection of land that would otherwise be subject to development or use that would diminish the
15 wildlife value of the land. In addition, mitigation measures might include: enhancement of the
16 protected tract by weed removal and control; increasing the diversity of native grasses and forbs;
17 planting sagebrush or other shrubs; constructing and maintaining artificial nest structures for
18 raptors; improving wildfire response; and local research that will aid in understanding more
19 about the species and conservation needs. In considering whether additional mitigation is
20 appropriate for bat fatalities, the Department will take into account the mitigation that the
21 certificate holder has already implemented under Condition 96 of the site certificate (a
22 contribution of \$10,000 per year for three years, beginning in the first year of operation, to fund
23 research toward better understanding wind facility impacts to bats and to develop mitigation
24 solutions).

25 **2. Raptor Nest Surveys**

26 The objectives of raptor nest surveys are to estimate the size of the local breeding
27 populations of tree or other above-ground-nesting raptor species in the vicinity of the facility and
28 to determine whether operation of the facility results in a reduction of nesting activity or nesting
29 success in the local populations of the following raptor species: Swainson's hawk, golden eagle
30 and ferruginous hawk.

31 (a) Survey Protocol

32 For the species listed above, aerial and ground surveys will be used to gather **nest success**
33 data on active nests, nests with young and young fledged. The certificate holder will share the
34 data with state and federal biologists. The certificate holder will conduct two years of post-
35 construction raptor nest surveys. One year of surveys will be done in 2008. The second year of
36 surveys will be done in 2012.

37 During each monitoring year, the certificate holder will conduct a minimum of one
38 helicopter survey in late May or early June and additional surveys as described in this section.
39 All nests discovered during pre-construction surveys and any nests discovered during post-
40 construction surveys, whether active or inactive, will be given identification numbers. Nest
41 locations will be recorded on U.S. Geological Survey 7.5-minute quadrangle maps. Global
42 positioning system coordinates will be recorded for each nest. Locations of inactive nests will be
43 recorded as they may become occupied during future years.

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1 The certificate holder shall conduct the aerial surveys within the Klondike III site and a
2 2-mile buffer around the turbines to determine nest occupancy. Determining nest *occupancy* will
3 likely require two helicopter visits to each nest. For occupied nests, the certificate holder shall
4 determine nesting outcomes by a minimum of one ground visit to determine species, number of
5 young and nesting status. For Swainson’s hawks and ferruginous hawks, “nesting success”
6 means that at least one young has successfully fledged (left the nest at the appropriate age). For
7 golden eagles, “nesting success” means that at least one young (whether in the nest or out) has
8 attained an age of 51 or more days. “Nesting failure” is presumed in any case in which a
9 breeding attempt does not proceed to the point of “nesting success” as defined above.⁴ Nests that
10 cannot be monitored due to the landowner denying access will be checked from a distance where
11 feasible.

12 (b) Mitigation

13 The certificate holder shall analyze the raptor nesting data collected after two monitoring
14 years to determine whether a reduction in either nesting success or nest use has occurred in the
15 vicinity of the Klondike III facility. If the analysis indicates a reduction in nesting success by
16 Swainson’s hawk, golden eagle or ferruginous hawk within 2 miles of the facility, then the
17 certificate holder shall propose appropriate mitigation and shall implement mitigation as
18 approved by the Council. At a minimum, if the analysis shows that any of these species has
19 abandoned a nest territory within ½ mile of the facility or has not fledged any young over the
20 two-year period within a ½ mile of the facility, the certificate holder shall assume the
21 abandonment or unsuccessful fledging is the result of the facility unless another cause can be
22 demonstrated convincingly.

23 Given the very low buteo nesting densities in the area, statistical power to detect a
24 relationship between distance from a wind turbine and nesting parameters (e.g., number of
25 fledglings per reproductive pair) will be very low. Therefore, impacts may have to be judged
26 based on trends in the data, results from other wind energy facility monitoring studies and
27 literature on what is known regarding the populations in the region.

28 If the analysis shows that mitigation is appropriate, the certificate holder shall propose
29 mitigation for the affected species in consultation with the Department and ODFW. Mitigation
30 should be designed to benefit the affected species or contribute to overall scientific knowledge
31 and understanding what stimulates nest abandonment. Mitigation may be designed to proceed in
32 phases over several years. It may include, but is not limited to, additional raptor nest monitoring,
33 protection of natural nest sites from human disturbance or cattle activity (preferably within two
34 miles of the facility) or participation in research projects designed to improve scientific
35 understanding of the needs of the affected species.

36 (c) Long-term Raptor Nest Monitoring and Mitigation Plan

37 In addition to the two years of post-construction raptor nest surveys described in
38 paragraph (a), the certificate holder shall conduct long-term raptor nest surveys at five-year
39 intervals for the life of the facility. The certificate holder shall conduct the first long-term raptor
40 nest survey in 2017. In conducting long-term surveys, the certificate holder shall follow the same

⁴ Qualified observers shall determine nesting outcomes using survey methods generally consistent with U.S. Fish and Wildlife Service guidance (Pagel, J.E., D.M. Whittington, and G.T. Allen. 2010. *Interim golden eagle technical guidance: inventory and monitoring protocols; and other recommendations in support of eagle management and permit issuance*).

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1 survey protocol that is described above in paragraph (a) unless the certificate holder proposes an
2 alternative protocol that is approved by the Department. In developing an alternative protocol,
3 the certificate holder shall consult with ODFW and may collaborate with the certificate holder
4 for any other wind energy facility.

5 The certificate holder shall analyze the long-term survey data as described above in
6 paragraph (b). If the analysis shows that mitigation is appropriate, the certificate holder shall
7 propose mitigation for the affected species in consultation with the Department and ODFW as
8 described in paragraph (b) and shall implement mitigation as approved by the Council. Any
9 reduction in nesting success could be due to operation of the KWP, operation of another wind
10 facility in the vicinity or some other cause. The reduction shall be attributed to the KWP if the
11 wind turbine closest to the affected nest site is a KWP turbine unless the certificate holder
12 demonstrates, and the Department agrees, that the reduction was due to a different cause.

3. Avian Use Surveys

14 During each fatality monitoring search, observers will record birds detected in a ten-
15 minute period at approximately one-third of the turbines within the fatality monitoring sample
16 using standard variable circular plot point count survey methods. The purpose of observing and
17 recording avian use while conducting the fatality monitoring is to identify additional species that
18 may not have been listed in the original baseline survey report. In addition, avian use surveys
19 provide a basis to evaluate, in general terms, whether the species with the highest fatality
20 numbers are also the most common species at the site.

4. PPM Energy's Klondike III Wind Project Wildlife Reporting and Handling System

22 PPM Energy's Klondike III Wind Project Wildlife Reporting and Handling System
23 (WRHS) is a monitoring program to search for and handle avian and bat casualties found by
24 maintenance personnel during construction and operation of the facility. A similar system is in
25 place for Klondike I and II. Construction and maintenance personnel will be trained in the
26 methods. This monitoring program includes the initial response, the handling and the reporting
27 of bird and bat carcasses discovered incidental to construction and maintenance operations
28 ("incidental finds").

29 All carcasses discovered by maintenance personnel will be photographed and recorded. If
30 maintenance personnel discover incidental finds at turbines that are not within search plots for
31 the fatality monitoring searches, the data will be reported separately from fatality monitoring
32 data. For such incidental finds, the maintenance personnel will notify a project biologist. The
33 project biologist must be a qualified independent professional biologist who is not an employee
34 of the certificate holder. The project biologist (or the project biologist's experienced wildlife
35 technician) will collect the carcass or will instruct maintenance personnel to have an on-site
36 carcass handling permittee collect the carcass. The certificate holder's on-site carcass handling
37 permittee must be a person who is listed on state and federal scientific or salvage collection
38 permits and who is available to process (collect) the find on the day it is discovered. The find
39 must be processed on the same day as it is discovered.

40 If maintenance personnel discover carcasses within search plots, the data will be included
41 in the calculation of fatality rates. The maintenance personnel will notify a project biologist. The
42 project biologist will collect the carcass or will instruct maintenance personnel to have an on-site
43 carcass handling permittee collect the carcass. As stated above, the on-site permittee must be

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1 available to process the find on the day it is discovered. The certificate holder shall coordinate
2 collection of state endangered, threatened or protected species with ODFW. The certificate
3 holder shall coordinate collection of federal endangered, threatened or protected species with the
4 USFWS.

5. Data Reporting

6 The certificate holder will report the monitoring data and analysis to the Department.
7 Monitoring data include fatality data, raptor nest survey data, avian use point counts and data on
8 incidental finds by fatality searchers and KWP personnel. The report may be included in the
9 annual report required under OAR 345-026-0080 or may be submitted as a separate document at
10 the same time the annual report is submitted. In addition, the certificate holder shall provide to
11 the Department any data or record generated in carrying out this monitoring plan upon request by
12 the Department.

13 The certificate holder shall notify USFWS and ODFW immediately in the event that any
14 federal or state endangered or threatened species are killed or injured on the facility site.

15 The public will have an opportunity to receive information about monitoring results and
16 to offer comment. Within 30 days after receiving the annual report of monitoring results, the
17 Department will make the report available to the public on its website and will specify a time in
18 which the public may submit comments to the Department.⁵

6. Amendment of the Plan

19 This Wildlife Monitoring and Mitigation Plan may be amended from time to time by
20 agreement of the certificate holder and the Council. Such amendments may be made without
21 amendment of the site certificate. The Council authorizes the Department to agree to
22 amendments to this plan and to mitigation actions that may be required under this plan. The
23 Department shall notify the Council of all amendments and mitigation actions, and the Council
24 retains the authority to approve, reject or modify any amendment of this plan or mitigation action
25 agreed to by the Department.
26

⁵ 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.

Klondike Wind Power III LLC

an Oregon limited liability corporation
1125 NW Couch, Suite 700
Portland, Oregon 97209

April 25, 2019

Duane Kilsdonk
Senior Compliance Officer
Oregon Department of Energy
550 Capitol St. NE
Salem, OR 97301

Reference: OAR 345-026-0080

Subject: Site Certificate Condition 22, Reporting Requirements – Annual Progress Report for 2018 Operating Year

Dear Mr. Kilsdonk:

Pursuant to Site Certificate Condition 22, Avangrid Renewables, LLC (AR) is submitting this letter, along with supporting material, to satisfy the general reporting obligations for facilities under construction or in operation and provide updates to provisions of the site certificate as applicable.

(a) Facility Status-Condition 22 (b) (i):

Klondike III did not suffer any unusual events in 2018 and maintained normal operations.

(b) Reliability and Efficiency of Power Production-Condition 22 (b) (ii):

Provided separately under confidential cover.

(c) Fuel Use-Condition 22 (b) (iii):

Not Applicable. Klondike III is wind power facility not a thermal plant.

(d) Status of Surety Information-Condition 22 (b) (iv):

Surety Site Certificate Bond (Bond # K08571156) issued by Westchester Fire Insurance Company. The term of this Bond began on 12/1/2012 and is continuous in nature until cancelled. This Bond originally provided assurance in the sum of \$10,300,000.00 (\$10.3 M) and this assurance was increased to \$11.245M effective 1/2/18 (see attached: Klondike 3 Bond K08571156 Continuation Certificate 1-2-2018 to 1-2-2019 and Klondike 3 Bond K08571156 Increase Rider Effective 1-2-2018).

(e) Monitoring Report-Condition 22 (c) (v):

Operational monitoring for the facility includes the Revegetation Plan (Condition 81), Weed Control Plan (Condition 89), WMMP (Condition 95), and Habitat Mitigation Plan (Condition 97).

Condition 81: Revegetation

Monitoring of non-crop revegetation areas occurred in 2010, 2011, and 2012.

Based on 2011 monitoring, it was determined that vegetation density and species composition at the project was trending to success. See 2017 annual report for summary of agency determinations on success criteria. Consequently, revegetation area monitoring was transitioned to a 5-year monitoring frequency beginning in 2018.

2018

Monitoring in 2018 confirmed that revegetation areas continue to meet desired conditions. Monitoring report was provided to ODOE in October 2018 and is also enclosed with this annual report. The next monitoring period is 2023.

Condition 89: Weed Control

Project continues to comply with Final Order. A Weed Control Plan (Condition 11) was implemented as part of the condition requirement. To satisfy the condition, a contract with Sherman County Weed control was established and is ongoing.

Condition 95: Wildlife Monitoring

Post construction fatality monitoring and avian use surveys, per Section 1 and Section 3 of the WMMP, are complete. See 2011 annual report for results. Post construction raptor nest surveys, per Section 2 of the WMMP, occurred in 2012 and 2014. The first long-term raptor nest survey, per Section 2(c) of the WMMP, occurred in 2017. The next long-term raptor nest survey is scheduled for 2022.

2018

No wildlife monitoring occurred in 2018; however, AR clarified the results of the 2017 raptor nest survey in a letter to ODOE dated September 10, 2018.

Wildlife Reporting and Handling System

Individual carcasses of the following species were observed in 2018: horned lark, mallard, ring-neck pheasant, and red tailed hawk. In addition, one unidentified carcasses was observed.

Condition 97: Habitat Mitigation Area

AR completed vegetation monitoring of the HMA annually between 2010 and 2012. Based on the 2012 monitoring results, ODFW and ODFW agreed to transition to a 5-year monitoring period beginning in 2018. Photo monitoring occurred in 2014 and 2015 to document success of weed control treatments. See 2017 annual report for summary of agency determination on monitoring timelines.

2018

Monitoring indicates that HMA contains approximately 20 acres of grasslands that exhibits comparable abundance and species cover of the Category 2 reference site. The acreages exceed Klondike III's mitigation requirement of 13 acres. HMA monitoring report was provided to ODOE in October 2018 and is also enclosed with this annual report. The next monitoring of the HMA is scheduled for 2023.

(f) Compliance Report-Condition 22 (b) (vi):

Klondike III had no instances of noncompliance in 2018.

(g) Facility Modification Report-Condition 22 (b) (vii):

Avangrid Renewables implemented the retrofitting of overhead lines at the Klondike wind projects with additional protective materials to achieve avian-safe configurations that conform or exceed the current Avian Power Line Interaction Committee (APLIC) guidelines.

(h) Non-Generating Facility Carbon Dioxide Emissions-Condition 22 (b)(viii)

Not applicable. Klondike III is not a non-generating facility that emits carbon dioxide.

If you have any further questions or require additional information, please contact me at 503-423-2012.

Yours sincerely,



Darren Cavanaugh
Asset Manager, Klondike III LLC

Enclosed:

- KWP - Annual Report General Information Update
- Klondike III_Compliance Matrix_2018-FINAL
- Klondike 3 Bond K08571156 Continuation Certificate 1-2-2018 to 1-2-2019
- Klondike 3 Bond K08571156 Increase Rider Effective 1-2-2018
- Klondike III_2018 CRP-grassland Reveg Monitoring Report
- Klondike III_2018_HMA_Monitoring Report

Provided Separately:

- Klondike III EFSC Annual Report-Reliability and Efficiency of Power Production Data-
Confidential