
EXHIBIT DD

SPECIFIC STANDARDS FOR WIND FACILITIES

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Introduction

Exhibit DD addresses specific wind energy facility standards in OAR 345-021-0010(1)(dd) and provides information sufficient about the Facility to support EFSC findings as required by OAR 345-024-0010 and OAR 345-024-0015.

DD.1 Wind Energy Facilities

OAR 345-021-0010(1)(dd) *If the proposed facility is a facility for which the Council has adopted specific standards, information about the facility providing evidence to support findings by the Council as required by the following rules:*

OAR 345-021-0010(1)(dd)(A) *For wind energy facilities, OAR 345-024-0010 and -0015.*

RESPONSE

Section DD.1.1 includes a discussion of OAR 345-024-0010 and Section DD.1.2 a discussion of OAR 345-024-0015.

DD.1.1 Public Health and Safety Standards for Wind Energy Facilities

OAR 345-024-0010 *To issue a site certificate for a proposed wind energy facility, the Council must find that the applicant:*

DD.1.1.1 Restrict Public Access

OAR 345-024-0010(1) *Can design, construct and operate the facility to exclude members of the public from close proximity to the turbine blades and electrical equipment.*

RESPONSE

Facility components will be located on private lands, where public access is not permitted without prior consent of the landowner. Access to construction areas from public roads will be delineated and marked with “no trespassing” signs. A primary construction access will be established where authorized site workers and visitors will be allowed to enter the construction site after having received prerequisite safety training.

During operations, each tower will have a locked entry door and an internally-mounted ladder and safety platforms leading up to the nacelle housing, thereby preventing unauthorized individuals from climbing the tower. GSU transformers will be located within locked cabinets at each turbine tower base or within the turbine.

The O&M building area will be secured with fencing and gated access. The electrical collector substation areas, and associated electrical equipment, will be surrounded by an 8-foot-high chain-link fence topped with barbed wire. The Applicant will also provide gated access roads, where appropriate, to prevent unauthorized access.

Aboveground electrical collector and generator lead lines will be constructed with conductor clearance that will meet National Electrical Safety Code (NESC) and state requirements. Underground electrical collector cables will be buried a minimum of 3 ft underground to provide sufficient separation from public and landowner activity. In accordance with proposed Condition 51, which is listed in Section DD.4, sufficient setbacks

will be met to protect public safety, health, and welfare. Turbine towers will be located with minimum safety setbacks from residences, public roads, and Facility site boundaries.

DD.1.1.2 Prevent Structural Failure

OAR 345-024-0010(2) *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.*

RESPONSE

As described in Exhibit D, Table D1, First Wind Holdings, LLC has a number of assets that are operational, or currently under construction (and planned to be operational by 2012). First Wind Holdings, LLC's O&M philosophy places a high value on hands-on operational control, helping assure that its wind farms are well-run and safe, consistent with utility operating practices. No regulatory citations have been issued to the Applicant in association with construction or operational safety.

Commercially available turbine towers and blades utilize state-of-the-art design, fabrication, and assembly methods to ensure structural integrity during their transport to the site, erection, commissioning, and throughout their entire service life. Turbine components will be selected to ensure suitability for the specific wind resource at the Facility site, and will include the necessary features to ensure their safe operations under the site specific climatic conditions. The Applicant and its representatives will follow the manufacturers' recommended handling instructions and procedures during shipping and erection to prevent damage to towers or blades that could lead to failure.

The turbines will likewise be closely monitored during operations to ensure compliance with manufacturers specifications. As per standard industry practice, the turbines are typically maintained by the manufacturer for the first 3 to 5 years after installation. Therefore, in addition to the Applicant's on-site staff who oversee the Facility O&M, the turbine manufacturer will also have an on-site staff during the warranty period, preventing failure of the tower or blades. The wind turbines will meet international design and manufacturing safety standards for tower, blade, and generator design, and be certified by a professional engineer. Safety and emergency systems are incorporated into the design of the turbines to ensure safe and reliable operation. The turbines will include several inherent safety features that provide increased fire protection and reduce the possibility of health and safety risks. Turbines will be shut down at manufacturer's recommended maximum wind speeds to avoid structural damage. Turbines will be equipped to remotely switch off, as necessary. Routine maintenance and inspections will be conducted according to industry standard practices and manufacturer recommendations.

Safety, health, and protection of the environment are an integral part of all operations. The Applicant's Environmental, Health and Safety (EHS) Plan, Policies and Procedures apply to all service operation and includes requirements, general safety practices, responsibilities and management guidelines, and a site-specific EHS policy. During operation, the on-site Site Operations Manager is responsible for service area safety and will implement the EHS procedures. Additionally, all employees are required to comply with the Applicant's corporate policy, health, safety, and environmental practices. Implementation of the EHS policy requires the following:

- Effective management to ensure compliance with all applicable governmental regulations,
- Providing health, safety, and environmental planning prior to and during work assignments which is designed to anticipate and minimize hazards or incidents,
- Providing health, safety, and environmental training and instruction for assigned work, and
- Making available necessary safety equipment and materials, providing training in its care and use, and ensuring its use when required by workplace conditions.

Based on the information included in this section, the Applicant has demonstrated that the Facility will be designed, constructed, and operated to preclude structural failure and protect public safety. Adequate safety devices, testing procedures, and company safety policies will be implemented to ensure safe Facility construction and operation.

DD.1.2 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 can design and construct the facility to reduce cumulative adverse environmental effects in the vicinity by practicable measures including, but not limited to, the following:*

DD.1.2.1 Access Roads

OAR 345-024-0015(1) *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.*

RESPONSE

As described in Exhibit U, transporter routes to and from the Facility site during construction and operation will include interstate, state, and county roads. The Applicant proposes to use existing roads to access the Facility site to the extent practicable, to reduce adverse environmental impacts and Facility construction costs. As described in Exhibits J and P, the Applicant has sited roads to avoid or minimize impacts to wetlands, other waters of the state, and fish and wildlife habitat. During construction of the Facility, improvements may occur on some existing, public roads. In areas where existing roads do not provide access to wind turbine locations, and along the length of turbine strings, new gravel Facility access roads will be constructed. Some existing public roads will require widening and surface improvements, as necessary. Approximately 56.9 miles of new Facility access roads and 6.4 miles of temporary crane paths will be constructed and approximately 16.7 miles of existing, public roads will require widening and surface improvements (see Exhibit C, Figures C2 and C3 and Table C1).

DD.1.2.2 Transmission Lines

OAR 345-024-0015(2) *Using underground transmission lines and combining transmission routes.*

RESPONSE

The electrical collection system will collect and transfer turbine generated energy to up to 3 electrical collector substations. The electrical collector substations will be located within the Facility site boundary so as to minimize the overall length of the electrical collector cables. The indicative layout presented in this ASC maximizes the use of the underground electrical collection system, and minimizes the extent of disturbance by collocating collection facilities with other disturbance where possible. In some areas, overhead collection will be required to avoid sensitive resources, or in the event ground characteristics prevent successful placement and operations of collection lines. Up to 151.8 miles of collector cable will be buried underground and up to 45.5 miles of 34.5-kV collector line will be strung overhead on pole structures.

A new overhead 230-kV generator lead line will connect the Facility to BPA's proposed Diamond Butte substation along the Ash-Marion 500-kV line or PGE's proposed Cedar Spring substation (see Exhibit C, Figures C2 and C3). Up to 22.5 miles of overhead 230-kV generator lead line will run from the Facility's southern, central, and northern electrical collector substations to the interconnection point with the proposed BPA Diamond Butte substation or PGE Cedar Spring substation.

As described in Exhibits J and P, the proposed corridors for the collector and generator lead lines have been designed to avoid or minimize impacts to wetlands, other waters of the state, and fish and wildlife habitat. The collector and generator lead line routes are limited by the need to carry electricity directly from the turbines to interconnect with the proposed BPA Diamond Butte substation or PGE Cedar Spring substation and topography.

DD.1.2.3 Substations

OAR 345-024-0015(3) *Connecting the facility to existing substations, or if new substations are needed, minimizing the number of new substations.*

RESPONSE

The Applicant proposes to construct up to 3 electrical collector substations, as shown in Exhibit C, Figures C2 and C3. The overhead 230-kV generator lead line will run from the Facility's the southern, central, and northern electrical collector substations to the proposed BPA Diamond Butte substation or PGE Cedar Spring substation.

DD.1.2.4 Raptor and Wildlife Protection

OAR 345-024-0015(4) *Designing the facility to reduce the risk of injury to raptors or other vulnerable wildlife in areas near turbines or electrical equipment.*

RESPONSE

Facility overhead electrical collector and generator lead lines will be designed to minimize raptor injury by following the most current APLIC suggested practices for avian protection on power lines. As described in Exhibits P and Q, the Facility has been designed to avoid or minimize impacts to wildlife habitat. Impacts that cannot be avoided or minimized will be addressed through mitigation measures in compliance with ODFW habitat mitigation guidelines.

DD.1.2.5 Visual Features

OAR 345-024-0015(5) *Designing the components of the facility to minimize adverse visual features.*

RESPONSE

As discussed in Exhibit R, the Facility has been designed to minimize adverse visual features. Due to the area topography and line of sight, turbines and generator lead line structures will be visible from limited locations. However, in comparison to early models, larger and more efficient models of wind turbines will be used at the Facility, which are more widely spaced and rotate at lower rpms. The FAA requires that turbines be equipped with lighting to minimize aviation risks. These lights will be visible from certain areas. The number of turbines with lights and the lighting pattern will be determined upon consultation with the FAA.

The Facility layout was developed to site Facility components in areas that are in active agricultural use to avoid and minimize loss of natural or ornamental vegetation to the greatest extent possible. In addition, the Applicant proposes to mitigate loss of vegetation, where necessary. Construction and operation of the Facility will not alter the existing landscape in a manner that will result in adverse impacts. For these reasons, significant potential adverse impacts as a result of vegetation removal are not expected.

To minimize visual impacts, the Applicant will incorporate BMPs into the Facility design:

- Most of the collector systems will be buried underground; however, where this is not feasible, portions may be carried overhead.
- Sensors and switches will be used to keep Facility lights off when not required.
- Mitigation for impacts to aviation safety resulting from Facility structures will be determined through consultation with the FAA during the micrositing process. The minimum amount of lighting will be used to comply with FAA requirements. Facility lights typically used to meet FAA requirements will, to some extent, be shielded from ground level view due to a constrained (3 to 5 degree) vertical beam.
- Lighting fixtures, except those required by the FAA for safety purposes, will be shielded, hooded, and oriented toward the ground so that direct rays of light do not shine onto neighboring properties or serve as a source of light pollution.
- The Applicant will choose anti-reflective paint colors for turbine towers and blades that are a neutral non-obtrusive color such as white, off-white, or gray. Colors will reduce glare of the wind turbines, but will be required to meet the FAA's daytime lighting and marking standards. The O&M building will be painted earth-tone colors that are similar to colors in the nearby landscape (browns, beiges, or grays are preferable).
- There will be no signs posted that are visible from any public road, other than the manufacturer's or installer's identification, appropriate warning signs, or owner identification on a wind generator, tower, building, or other structure.

Additionally, proposed Conditions 68, 69, and 70, which are listed in Section DD.4, will be incorporated to minimize visual impacts.

These Facility measures ensure that the Facility has been designed to minimize adverse visual features.

DD.1.2.6 Lighting

OAR 345-024-0015(6) *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 Aviation.*

RESPONSE

Turbines will be lighted in accordance with FAA regulations. In addition, security lighting at the O&M building will be limited to the minimum necessary for safety and security purposes, shielded, hooded, and oriented toward the ground to reduce glare and light pollution. Additionally, sensors and switches will be used to keep Facility lights off when not required. During construction and nighttime repairs, lighting will be limited to the minimum necessary, shielded, hooded, and oriented downward or toward the work area.

DD.2 Gas Facilities

OAR 345-021-0010(1)(dd)(B) *For surface facilities related to underground gas storage reservoirs, OAR 345-024-0030, including information required by OAR 345-021-0020.*

RESPONSE

OAR 345-021-0010(1)(dd)(B) is not applicable because the Facility does not propose underground gas storage reservoirs.

DD.3 Transmission Lines under Council Jurisdiction

OAR 345-021-0010(1)(dd)(C) *For any transmission line under Council jurisdiction, OAR 345-024-0090.*

DD.3.1 Alternating Current Electric Fields

OAR 345-024-0090 *To issue a site certificate for a facility that includes any 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;

RESPONSE

The electric field strength at the centerline and the edge of the disturbance corridor for the proposed 230-kV generator lead line is shown in Exhibit AA, Table AA-1. This table demonstrates that the electric field modeled is less than 9 kV per m in areas accessible to the public. This table also demonstrates that in all cases examined, the electric field strengths at 1 m above the ground surface in areas accessible to the public is less than the 9 kV per m standard set forth in OAR 345-024-0090(1).

DD.3.2 Induced Voltage and Current

(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.

RESPONSE

The electric fields produced by transmission lines can potentially induce current or voltage in nearby conductive objects. The induction effect varies with the strength of the electromagnetic field and the distance over which the conductive feature is parallel to the transmission line. Induced voltages can potentially be hazardous when present in metallic objects, such as fences, that can come in contact with people or animals. Any induced voltage effects that are discovered or anticipated can be remedied by grounding the affected feature.

Induced currents are not hazardous to people, but can be a concern for communication lines and pipelines that parallel transmission lines. Communication signals can be affected by an induced current, and pipeline cathodic corrosion can be affected by induced current. Therefore, induced currents can be a concern for communication lines and pipelines that closely parallel high-voltage transmission lines. The Applicant is not aware of any metallic communication lines or metal pipelines that parallel the 230-kV generator lead line for any distance that will cause concern.

DD.4 Proposed Site Certificate Conditions

Similar to the conditions proposed by previously-approved wind energy facilities in the vicinity of the Facility, the Applicant proposes the following conditions:

Condition 51

The certificate holder shall construct all Facility components in compliance with the following setback requirements:

- (a) All Facility components must be at least 3,520 feet from the property line of properties zoned residential use or designated in the Gilliam County Comprehensive Plan as residential.*
- (b) Where (a) does not apply, the certificate holder shall maintain a minimum distance of 110 percent of maximum blade tip height, measured from the centerline of the turbine tower to the nearest edge of any public road right-of-way. The certificate holder shall assume a minimum right-of-way width of 60 feet.*
- (c) Where (a) does not apply, the certificate holder shall maintain a minimum distance of 1,320 feet, measured from the centerline of the turbine tower to the center of the nearest residence existing at the time of tower construction.*
- (d) Where (a) does not apply, the certificate holder shall maintain a minimum distance of 110 percent of maximum blade tip height, measured from the centerline of the turbine tower to the nearest boundary of the certificate holder's lease area.*

- (e) The certificate holder shall maintain a minimum distance of 250 feet measured from the center line of each turbine tower to the nearest edge of any railroad right-of-way or electrical substation.*
- (f) The certificate holder shall maintain a minimum distance of 250 feet measured from the center line of each met tower to the nearest edge of any public road right-of-way or railroad right-of-way, the nearest boundary of the certificate holder's lease area, or the nearest electrical substation.*
- (g) The certificate holder shall maintain a minimum distance of 50 feet measured from the Facility O&M building to the nearest edge of any public road right-of-way or railroad right-of-way or the nearest boundary of the certificate holder's lease area.*
- (h) The certificate holder shall maintain a minimum distance of 50 feet measured from any substation to the nearest edge of any public road right-of-way or railroad right-of-way or the nearest boundary of the certificate holder's electrical substation easement or, if there is no easement, the nearest boundary of the certificate holder's lease area.*

Condition 68

To reduce the visual impact of the Facility, the certificate holder shall:

- (a) Mount nacelles on smooth, steel structures, painted uniformly in a low-reflectivity, neutral white color.*
- (b) Paint the substation structures in a low-reflectivity neutral color to blend with the surrounding landscape.*
- (c) Not allow any advertising to be used on any part of the Facility.*
- (d) Use only those signs required for Facility safety, required by law, or otherwise required by the site certificate, except that the certificate holder may erect a sign near the O&M building to identify the Facility, paint turbine numbers on each tower, and allow unobtrusive manufacturers' logos on turbine nacelles.*
- (e) Maintain any signs allowed under this condition in good repair.*

Condition 69

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 low-reflectivity, neutral color to blend with the surrounding landscape.

Condition 70

The certificate holder shall not use exterior nighttime lighting except:

- (a) The minimum turbine tower lighting required or recommended by the FAA.*
- (b) Security lighting at the O&M building and substations, provided that such lighting is motion-sensor-activated and shielded or downward-directed to reduce glare.*
- (c) Minimum lighting necessary for repairs or emergencies.*

(d) Minimum lighting necessary for construction directed to illuminate the work area and shielded or downward-directed to reduce glare.