

Exhibit O

Water Requirements

Biglow Canyon Wind Farm
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Prepared for



Portland General Electric Company

Prepared by



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Acronyms and Abbreviations

AC	alternating current
Amended Facility or Facility	Solar Components and Existing Biglow Canyon Wind Farm
BCWF or Existing Facility	Biglow Canyon Wind Farm
BESS	battery energy storage system
BIGL or Project Developer	BIGL bn, LLC
BMP	best management practice
Certificate Holder or PGE	Portland General Electric Company
Council or EFSC	Energy Facility Siting Council
ESCP	Erosion and Sediment Control Plan
Mgal	million gallons
MW	megawatt
NPDES	National Pollutant Discharge Elimination System
OAR	Oregon Administrative Rule
O&M	operations and maintenance
ORS	Oregon Revised Statute
RFA	Request for Amendment
Site Certificate	Site Certificate on Amendment 3
Solar Components	photovoltaic solar energy generation and battery storage

1.0 Introduction

The Portland General Electric Company (PGE or Certificate Holder) submits this Request for Amendment (RFA) 4 to the Site Certificate on Amendment 3, issued October 31, 2008 (Site Certificate) for the Biglow Canyon Wind Farm (BCWF or Existing Facility) to add photovoltaic solar energy generation and battery storage (Solar Components) to the operating BCWF in Sherman County, Oregon.

BCWF, owned and operated by PGE, is located within an approved site boundary comprising approximately 25,000 acres, approximately 2.5 miles northeast of the town of Wasco in Sherman County, Oregon. The BCWF operates under the Site Certificate from the Oregon Energy Facility Siting Council (Council or EFSC) as administered by the Oregon Department of Energy. BCWF currently consists of 217 wind turbines, with a maximum blade tip height of 445 feet, and a peak generating capacity of 450 megawatts (MW).

In RFA 4, PGE proposes to add up to 385 MW alternating current (AC) generating capacity from photovoltaic solar arrays and 375 MW in battery storage capacity. RFA 4 seeks to expand the BCWF site boundary to include the Solar Components in portions of the existing site boundary and in the proposed expanded site boundary (together, Solar Micrositing Area or RFA 4 Site Boundary¹).

The Solar Micrositing Area is approximately 3,980 acres and provides a conservative estimate of the maximum area needed for development, micrositing, and temporary disturbances from the Solar Components during construction, rather than the anticipated disturbance footprint. Solar Components will include solar arrays, inverters, battery energy storage system (BESS) facilities and their subcomponents (i.e., inverters), two collector substations, a total of approximately 3 miles of 230-kilovolt generation tie transmission line, medium voltage collector lines, operations and maintenance (O&M) structures, site access roads, internal roads, perimeter fencing, facility entry gates, and temporary laydown areas. The maximum generating capacity from the Solar Components will be 385 MW AC and construction may take place in phases.

PGE will own and operate the Solar Components as a part of the BCWF (together, Amended Facility or Facility), which, to date, have been developed by BIGL bn, LLC (BIGL or Project Developer). BIGL, in its capacity as the project developer, supports PGE in this RFA 4 and may construct and temporarily operate the Solar Components on behalf of PGE under a Build-Transfer Agreement.

Exhibit O provides information about anticipated water use during construction and operation of the Solar Components as required by Oregon Administrative Rules (OAR) 345-021-0010(1)(o) in support of RFA 4. Analysis in this exhibit incorporates and/or relies on reference information, analysis, and findings found in the Application for Site Certificate, previous RFAs, and Oregon Department of Energy Final Orders to demonstrate that the Facility, as modified by RFA 4,

¹ Note, as described in further in Section 4.1.1.2 of the RFA4 Division 27 document, the Solar Micrositing Area is the equivalent of the Solar Micrositing Area/RFA 4 Site Boundary.

continues to comply with applicable Site Certificate Conditions. OAR 345 Division 22 does not provide an approval standard specific to Exhibit O.

Although RFA 4 proposes changes to the Existing Facility, the Certificate Holder can still comply with all applicable Site Certificate Conditions previously adopted by the Council for compliance with respect to OAR 345-021-0010(1)(o). Site Certificate conditions applicable to water uses, sources, and amounts and that apply to the Solar Components (Council 2008) include:

- Condition 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.
- Condition 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.
- Condition 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 or from an 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.
- Condition 83: During operation of the facility, the certificate holder shall discharge sanitary wastewater generated at the O&M buildings 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. [Amendment #3]

The Certificate Holder proposes the following modifications to Site Certificate Conditions 75, 76, and 88:

- (75) *Condition 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 buildings and, provided the rate of extraction would not exceed 5,000 gallons per day, blade and solar panel-washing activities. The certificate holder shall not change the source of water for the facility's domestic use without prior Council approval. [Amendment #43]*
- (76) *Condition 76: During operation of the facility, the certificate holder and its contractors shall obtain all water required for blade and solar panel-washing activities from off-site sources previously permitted for such uses or from an 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.*
- (88) *Condition 88: During operation of the facility, the certificate holder may engage in solar panel and blade-washing activities but shall ensure that these activities do not cause runoff of washwater from the site or discharges to surface waters, storm sewers or dry wells. The certificate holder shall not use acids, bases or metal brighteners with the wash water. The certificate may use biodegradable, phosphate-free cleaners sparingly. [Amendment #42]*

2.0 Water Uses, Sources, and Amounts – OAR 345-021-0010(1)(o)(A)(B)

OAR 345-021-0010(1)(o) Information about anticipated water use during construction and operation of the proposed facility. The applicant must include:

OAR 345-021-0010(1)(o)(A) A description of the use of water during construction and operation of the proposed facility;

OAR 345-021-0010(1)(o)(B) A description of each source of water and the applicant's estimate of the amount of water the facility will need during construction and during operation from each source under annual average and worst-case conditions;

Response: Table O-1 summarizes the anticipated water use during construction and operation of the Solar Components, including the Existing Facility.

Table O-1. Anticipated Water Use for Construction and Operation

Use	Source	Amount	Final Disposition
Construction – Non-Potable Water (dust abatement, concrete, washing concrete trucks)	City of Wasco (or other permitted source(s)), existing on-site exempt well	81.04 million gallons (over 30-month construction period)	Primarily evaporation and infiltration for dust control
Construction – Potable Water and Sanitary Systems	Licensed potable water providers, bottled water	Negligible	Licensed waste management facility
Operation – Potable Water and Sanitary Systems	New or existing on-site exempt well, bottled water	Total ¹ : 948 gallons per day Existing BCWF: 660 gallons per day. ²	On-site septic system
Operation – Non-Potable Water (panel washing and Biglow fire pond ⁴)	City of Wasco, new or existing on-site exempt well, or combination of both	Total ³ : 981,756 gallons annually Existing Facility: 4,203 gallons annually ⁵	Evaporation and infiltration
<p>1. This total provides the sum of the potable water use amounts estimated for the Existing Facility (660 gallons per day) and anticipated use amounts for the addition of Solar Components (105,000 gallons annually and up to 288 gallons per day).</p> <p>2. There are approximately 33 people who utilize the BCWF operations and maintenance (O&M) buildings, a conservative usage rate of 20 gallons/day/person for typical daily usage from the on-site exempt well is assumed for the estimated daily total.</p> <p>3. This total provides the sum of the non-potable water use amounts estimated for the Existing Facility (4,203 gallons annually) and anticipated use amounts for the addition of Solar Components (977,553 gallons annually)</p> <p>4. The BCWF fire pond accumulates rainwater from fall to spring (approximately September to end of March). Starting in June the Certificate Holder begins adding water to the pond to compensate for evaporation. When the pond is filled a garden hose is attached to the on-site exempt well and used to fill the pond. In response to requests from the Oregon Department of Energy, PGE added a meter on the water hose in 2024; water use is logged and reported.</p> <p>5. This provides a conservative estimate in which the BCWF fire pond is filled an average of 467 gallons three times a month, for a total of 1,401 gallons for 3 months out of the year.</p>			

2.1 Construction

2.1.1 Water Uses and Amounts

Construction water use is estimated at a maximum of approximately 81 million gallons (Mgal; up to 88,719 gallons per day) over the phased construction of the Solar Components and under annual average conditions. This water will either be sourced from the City of Wasco water supplied via tanker trucks and may be supplemented by an on-site exempt well, provided such use of well water would not cause the rate of extraction to exceed 5,000 gallons in any one-day period. This analysis accounts for the conservative estimate of construction water use for full build-out of the Solar Components. Water during construction will be used for site dust control, road compaction, and concrete mixing for foundations (Table O-1).

- Site dust control.** The primary use of water during construction will be for dust control.² The analysis in Table O-1 assumes that water will be used to control dust generation throughout the construction site, in all disturbed areas including but not limited to access roads, foundation installations, and trenching for collector lines (Site Certificate Condition 34). Water for dust control and road compaction will be applied via tanker truck in a manner that avoids erosion and sediment discharge and is consistent with the best management practices (BMPs) presented in the NPDES 1200-C permit (Site Certificate Condition 26). Water use for dust control assumes work activities happening 6 days per week, during construction, for a total of approximately 73 Mgal during construction. Actual water use for dust control will vary, depending on the timing of construction and the season, construction activities, precipitation, soil conditions, temperature, and frequency of repeat disturbance. These factors are not controlled or easily estimated by the contractor.
- Road compaction.** Water for road construction assumes 25 gallons per lineal foot of road. The RFA4 Division 27 document identifies approximately 28.1 miles new access roads.³ Approximately 123,640 gal of water per month (3,709,200 gallons total) will be used for Solar Components service road construction, and earthwork compaction.
- Concrete mixing.** Concrete mixing for foundations will use a standard assumption of 39 gallons of water per cubic yard of concrete. Exhibit G identifies 87,210 cubic yards of concrete needed for foundations (BESS, inverters/transformers, substations, and O&M buildings and structures). No on-site batch plant is proposed as part of RFA 4. For the construction of foundations, the Certificate Holder anticipates buying concrete directly from licensed suppliers in the vicinity of the Solar Components. Thus, the water used for concrete

² Note that other dust suppressants besides water may be used as necessary during extreme drought conditions (synthetic polymer emulsions, chemical suppressants, organic glues, and wood fiber materials) depending on site conditions (to be applied by trained and certified vendors familiar with applicable environmental regulations including the federal Endangered Species Act, the Clean Water Act, the Salmon Recovery Act, and state and local regulations).

³ Note, water for both dust control and road compaction will be applied via tanker truck in a manner that avoids erosion and sediment discharge and is consistent with the best management practices that will be implemented by the 1200-C Construction Stormwater NPDES Permit described in Exhibit I.

mixing will be provided by the concrete suppliers from a lawful source. However, water for concrete production is included in this analysis to represent the maximum anticipated water needs for Solar Components construction. Approximately 3,401,190 gallons of water would be used for concrete mixing.

- **Equipment Washing.** Water will be used for washing concrete trucks after delivery of concrete loads (approximately 1,000,000 gallons). Concrete trucks and truck chutes will be washed down at each foundation site or at a centralized wash area to prevent the concrete from hardening within the chutes. Concrete wastewater will be handled using BMPs, which have been accepted by the Oregon Department of Environmental Quality. Concrete wash water will be put into a dedicated concrete washout area located at each foundation excavation.

While water quantities have been conservatively estimated for purposes of analysis, water used for dust suppression and road compaction will be applied at the minimum rate necessary to perform its function in an effort to conserve as much water as possible and make a sustainable use of the resource, and due to the cost and time involved in transporting water by tank truck to the Solar Components. The construction of the Solar Components will be phased and will allow maximum water use efficiency to limit water use to the extent practical. Daily water use will vary depending on site conditions and construction activities. Weather will affect the amount of water needed for dust control and for specific construction activities each day. Total water demand is estimated over the course of phased construction using a conservative 6-day work week. Substantial construction is expected to last 30 months; therefore, the Certificate Holder assumes that all construction water will be used in a 30-month timeframe.

Drinking water, sanitation, and fire prevention represents a minor water use. Fire prevention will involve stationing a water truck at the job site to keep the ground and vegetation moist at work areas during extreme fire risk conditions.

2.1.2 Water Sources

The Certificate Holder or the Certificate Holder's third-party construction contractor will obtain construction water from the City of Wasco (or another permitted source[s]) through the municipality's existing water rights and truck the water to the site. The Certificate Holder may also source some water from an on-site exempt well provided such use of well water would not cause the rate of extraction to exceed 5,000 gallons in any one-day period; purchased bottled water may also be used during construction as a potable water source. In total, up to 81 Mgal will be used during the construction of the Solar Components, at approximately 91,733 gallons per day (Table O-1) assuming a 6-day work week.

2.2 Operation

2.2.1 Water Uses and Amounts

Once constructed, the Solar Components will have a limited need for water. Non-potable water will continue to be used for blade washing and will also be used for solar panel washing; potable water will be used at the O&M buildings for drinking, flushing toilets, and using sinks. The BESS will not require water usage during operations.

Total water use during operations will not exceed approximately 1,037,553 gallons annually, including up to 105,000 gallons per year of potable water for drinking and sanitary and up to 977,553 gallons per year of non-potable water for panel washing.

Total potable water consumption expected at the Solar Component O&M building during operations will be approximately 58 gallons per day per employee, with up to seven full-time employees. Potable water use at the Solar Component O&M buildings will not exceed 105,000 gallons annually (assumes up to 15,000 gallons annually per employee at full build out), or up to 288 gallons per day. Personnel at the O&M building are not expected to exceed seven full-time employees upon buildout of both Northern and Southern Solar Micrositing Areas.

Typical daily usage at the existing BCWF O&M building during operations is assumed to be approximately 660 gallons from the existing exempt well. The maximum daily water usage at the BCWF O&M buildings is 1,312 gallons and includes the average 652 gallons necessary to fill the BCWF fire pond.

The sum of anticipated maximum daily water usage at the Solar Component O&M buildings (288 gallons) and the Existing BCWF O&M buildings (up to 1,312 gallons), is 1,600 gallons, well below the 5,000 gallons per day exempt well threshold.

The solar panels may seldom require periodic washing to minimize the effects of dust and dirt on energy production (referred to as soiling) depending on weather conditions. Specifically, panel washing may be required during drought conditions due to potential dust impacts. For this analysis, it is conservatively assumed that the array panels will be washed twice a year at a total estimated 977,553 gallons. Therefore, the Certificate Holder's estimate of 488,777 gallons per wash likely overestimates the amount of water that will be used. Water will be applied via tanker truck for cleaning and will not have added solvents or chemicals. Water usage frequency and consumption rates are based on standard commercial facility estimates.

Assumptions of total water use for panel washing and consumption at the Solar Component O&M buildings result in an average daily consumption during operations of approximately 2,842 gallons.

2.2.2 Water Sources

During operation of the Solar Components, the Certificate Holder and its contractors shall obtain all water required solar panel-washing activities from off-site sources previously permitted for such uses or from a new or existing 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; purchased bottled water may also be used during operations as a potable water source.

During operation, the Solar Components will require water use in the O&M buildings. Water will be provided by a new or existing on-site well. The sum of anticipated maximum daily water usage at the Solar Component O&M buildings and the Existing BCWF O&M buildings is below the 5,000 gallons per day exempt well threshold. This is considered an exempt use, which would not require a new water right to be obtained under Oregon Revised Statutes (ORS) 537.545. The Certificate Holder anticipates that a new exempt well would be drilled for the purpose of supplying water to the O&M building. The kitchen, toilets, and shower will drain into a county-approved on-site septic system. In addition, solar modules will be washed up to two times per year, with water procured from the City of Wasco and/or from an on-site exempt well.

3.0 Water Losses – OAR 345-021-0010(1)(o)(C)

OAR 345-021-0010(1)(o)(C) A description of each avenue of water loss or output from the facility site for the uses described in (A), the applicant's estimate of the amount of water in each avenue under annual average and worst-case conditions and the final disposition of all wastewater;

Response: The Certificate Holder provides below a description of water loss or output associated with construction and operation of the Solar Components below in compliance with OAR 345-021-0010(1)(o)(C)

3.1 Construction

Water use for dust control and concrete production will result in water loss primarily through evaporation and infiltration from wetted construction surfaces and from curing concrete. No water used on the site will be discharged into wetlands, streams, and other waterways. Due to the dry conditions at the Solar Components and the relatively low rates of water use and application, it is expected that any excess water used during construction will be lost within or near the Amended Site Boundary, primarily through evaporation and infiltration.

Stormwater runoff from construction activities will be managed in compliance with an NPDES 1200-C permit, adhering to the Oregon Department of Environmental Quality regulations for construction stormwater management. Additionally, the Certificate Holder will comply with Oregon Department of Environmental Quality guidelines for the disposal of sanitary wastewater and the use of portable toilets.

3.2 Operations

Minimal water loss will occur during operations of the Solar Components. Wastewater from domestic and incidental uses at the O&M building will be discharged to a county-approved septic system located near the O&M buildings. During periodic washing of solar panels (approximately

twice per year), wash water will evaporate or infiltrate into the ground. Water from this activity will not be discharged into wetlands, streams, or waterways.

4.0 Thermal Power Plants – OAR 345-021-0010(1)(o)(D)

OAR 345-021-0010(1)(o)(D) For thermal power plants, a water balance diagram, including the source of cooling water and the estimated consumptive use of cooling water during operation, based on annual average conditions;

Response: The Solar Components are not a thermal power plant. Thus, OAR 345-021-0010(1)(o)(D) is not applicable.

5.0 Permits – OAR 345-021-0010(1)(o)(E) and (F)

OAR 345-021-0010(1)(o)(E) If the proposed facility would not need a groundwater permit, a surface water permit or a water right transfer, an explanation of why no such permit or transfer is required for the construction and operation of the proposed facility;

Response: Construction water will be obtained from the City of Wasco (or other permitted source[s]) under an existing municipal water right and may be supplemented by water from on-site exempt well, provided such use of well water would not cause the rate of extraction to exceed 5,000 gallons in any one-day period; bottled water may also be purchased during both construction and operations as a potable water source. With respect to operations, the Certificate Holder anticipates relying on a new or existing exempt groundwater well (under ORS 537.545). In total, all operational water usage from any or all exempt groundwater wells for the Existing Facility and Solar Components would not exceed 5,000 gallons per day. Exempt water uses for operations purposes include drinking, flushing toilets, using sinks, and other general industrial uses, as well as washing solar panels up to two times per year. Water will be used for panel washing, using water from City of Wasco under an existing municipal water right and/or water from a new or existing on-site exempt well, provided such use of well water would not cause the rate of extraction to exceed 5,000 gallons in any one-day period.

Because the Solar Components do not need any groundwater permits, water rights, or surface water permits currently, OAR 345-021-0010(1)(o)(F) is not applicable.

6.0 Mitigation Measures – OAR 345-021-0010(1)(o)(G)

OAR 345-021-0010(1)(o)(G) A description of proposed actions to mitigate the adverse impacts of water use on affected resources.

Response: No adverse impacts are expected to result from the Solar Components' water use during construction or operation; therefore, no mitigation measures are proposed.

7.0 Conclusions

The information provided in this exhibit demonstrates that construction and operation of the Solar Components will not result in significant adverse impacts to water resources. Therefore, the Certificate Holder has satisfied the requirements of OAR 345-021-0010(1)(o).

8.0 References

Council (Energy Facility Siting Council). 2008. Third Amended Site Certificate for the Biglow Canyon Wind Farm. October 1, 2008. https://www.oregon.gov/energy/facilities-safety/facilities/Facilities%20library/BCW_site_certificate_amend_3_103108.pdf.

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