Exhibit O

Water Requirements

Bakeoven Solar Project
November 2019

Prepared for

Avangrid Renewables, LLC

Prepared by

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Acronyms and Abbreviations

Applicant	Bakeoven Solar, LLC
Facility	Bakeoven Solar Project
gal	gallon
Mgal	million gallons
NPDES	National Pollutant Discharge Elimination System
O&M	operations and maintenance
OAR	Oregon Administrative Rule
ODEQ	Oregon Department of Environmental Quality
ORS	Oregon Revised Statutes

1.0 Introduction

Bakeoven Solar, LLC (Applicant) proposes to construct and operate a solar energy generation facility and related or supporting facilities in Wasco County, Oregon. This Exhibit O was prepared to meet the submittal requirements in Oregon Administrative Rule (OAR) 345-021-0010(1)(o).

2.0 Water Use

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

(A) A description of the use of water during construction and operation of the proposed facility.

2.1 Construction

Construction water use is estimated at approximately 58 million gallons (Mgal) (up to 233,200 gallons [gal] per day) over a 12-month construction period under annual average conditions. Water use will be for dust control throughout the construction site, road compaction, mixed into concrete for foundations, and provided for on-site worker drinking and sanitation use (Table O-1). 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 presented in the 1200-C Construction Stormwater National Pollutant Discharge Elimination System Permit (NPDES; see Attachment I-1 in Exhibit I).

Table O-1. Water Use During Construction

Construction Use	Quantity
Site dust control	56.3 million gallons (Mgal; average annual conditions)
	75 Mgal (worst-case conditions)
Road compaction	182,400 gallons (gal)
Concrete mixing	–
• Tracker post foundations	1.5 Mgal
• Inverter/transformer pad foundations	73,630 gal
• Battery pad foundations	67,200 to 134,434 gal
• Collector substation foundation	32,480 gal
• O&M building foundation	3,066 gal
Total water for concrete mixing	1.7 Mgal
Drinking water/sanitation	187,500 gal
Total	**58.3 Mgal (average) to 77.1 Mgal (worst-case)**

Of the total water for concrete mixing, most of it is if concrete foundations are used for all steel posts installed to support the solar array. To conservatively estimate the amount of water for solar foundations, it was assumed that 9.9 gal of water will be required to mix concrete per foundation post (150,300 posts total). This assumption likely overestimates water use because poles typically are driven or screwed in place without concrete, and concrete is only used where soil conditions require it (for example, very rocky conditions). For drinking and sanitation requirements, it is assumed that approximately 3 gal per day per person will be required for construction workers (250 average on-site workers).

Worst-case water use amounts will result from construction in particularly high temperature, dry weather conditions, which is estimated to require approximately one-third greater water use for dust control than in average conditions. Based on this assumption, a worst-case water estimate could increase the total construction water use total to approximately 77 (Mgal) over a 12-month period, therefore, the worst-case daily water demand will be an estimated 308,400 gal.

2.2 Operation

Once constructed, the Facility will have a limited need for water. Water will be used for drinking water at the O&M building and for solar panel washing. The battery storage system will not require water usage during operations. Total water consumption expected at the O&M building during operations is assumed to be approximately 30 gal per day, for a total of up to 7,500 gal per year.

The solar panels may require periodic washing to minimize the effects of dust and dirt on energy production (referred to as soiling). For the purpose of this analysis, it is conservatively assumed that the array panels will be washed twice a year. At an estimated 0.5 gal per module for a total of 951,900 modules, each wash will require 475,950 gal, for a rounded total of up to 1 Mgal per year. Each wash will require a minimum of 10 days to complete; therefore, daily water required will be up to 50,000 gal for panel washing. Advancements in robotic panel cleaning will likely dramatically reduce the water needs for solar panel washing. Therefore, the Applicant's estimate of 475,950 gal per wash likely overestimates the amount of water that will actually be used. Water applied for cleaning will not have added solvents or chemicals. Water usage frequency and consumption rates are based on standard commercial facility estimates.

3.0 Sources of Water

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.

3.1 Construction

The Applicant's third-party construction contractor will obtain construction water from the City of Maupin (under an existing municipal water right) and truck the water to the site or obtain water from local landowners with existing, upgraded existing or newly constructed well or wells permitted under a limited water use license. A total conservative water use of approximately 58 Mgal (average conditions) to 77 Mgal (worst-case conditions) will be required for dust control, road compaction, concrete mixing, and drinking water/sanitation uses as discussed above. However, the amount of water applied daily is highly dependent on weather and will vary between construction periods and duration. Construction needs for water will not exceed a maximum daily water usage of 308,400 gal. The City of Maupin has indicated they can provide sufficient water for Facility construction (Attachment O-1). In the case that any water is obtained from local landowners under a limited water use license, per Wasco County comments on the Notice of Intent the Applicant would verify this approach with the Wasco County water master for compliance with state law.

While water quantities have been conservatively estimated for purposes of analysis, due to the cost and time involved in transporting water by tank truck to the Facility, water used for dust suppression and road compaction will be applied at the minimum rate necessary to perform its function. Water used for concrete mixing will also be applied at the minimum mixing rate required to make concrete. As possible, water brought in from off-site will be stored in temporary water ponds or aboveground tanks developed on-site.

3.2 Operation

During operation, a new exempt well will be located near the O&M building. The well will provide no more than 5,000 gal per day for use at the O&M building. If a well is installed and used for construction water under a limited water use license, this well may also be used during Facility operation. The Applicant contacted the Oregon Water Resources Department (pers. comm., December 6, 2018) and received confirmation that the limited water use license may continue to be used during the operational phase.

Water for solar panel washing under will either be obtained from the City under an existing municipal water right, or from an existing or newly constructed well or wells permitted under an existing or new water right. The City of Maupin has water capacity to supply the up to 50,000 gal of water per day, up to 1 Mgal annually, for periodic solar array washing (Attachment O-1).

A 10,000-gal tank may be kept on site to supplement water for firefighting and panel washing purposes. The tank will be filled initially at the time of construction and then maintained with water from the on-site exempt well.

4.0 Wastewater and Water Loss

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.

4.1 Construction

Water use for dust control and concrete production will result in water loss primarily through evaporation from wetted road 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 Facility 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 Facility site boundary, primarily through evaporation and infiltration.

Construction-related stormwater runoff will be managed according to an NPDES 1200-C permit and the Applicant will follow Oregon Department of Environmental Quality (ODEQ) rules governing construction stormwater runoff. Most of the area within the site boundary is vegetated, which will serve as a buffer to promote infiltration and minimize erosion. Likewise, the Applicant will follow ODEQ rules regarding the disposal of sanitary wastewater and use of portable toilets.

4.2 Operations

Minimal wastewater or water loss will be generated during operations. 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 building with a total capacity up to 7,500 gal. During periodic washing of solar panels (approximately twice per year), washwater will evaporate or infiltrate into the ground.. Water from this activity will not be discharged into wetlands, streams, or waterways. As indicated above, battery storage will not generate wastewater during operations. Stormwater will also infiltrate into the ground.

5.0 No Groundwater/Surface Water Permit or Water Right Transfer

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.

The Facility does not need any groundwater permits, water rights, or surface water permits. As discussed above, water for construction will either be obtained from the City of Maupin under an existing municipal water right or provided from local landowners with an existing, upgraded existing, or newly constructed well or wells permitted under a limited water use license. In the case of a limited water use license, the Applicant would verify this approach with the Wasco County water master for compliance with state law. A limited water use license would be issued by the Oregon Water Resources Department to the landowner or to the Applicant's construction contractor. At the completion of construction activities, the well may continue to be used by the landowner for pre-existing uses; may be abandoned; or may be used for exempt groundwater purposes pursuant to Oregon Revised Statute (ORS) 537.545.

Operations water use will be minimal and most use will qualify as exempt under ORS 537.545(1)(f), which allows certain industrial or commercial uses of up to 5,000 gal per day. Exempt industrial water uses include drinking, flushing toilets, using sinks, and other general industrial uses. The Applicant expects to rely on an exempt well allowed under ORS 537.545 to provide water to the O&M building.

During operations, an anticipated 1 Mgal per year of water will be used to wash the solar panels and maintain the overall efficiency of the panels. Washwater for periodic solar panel washing will be obtained from the City of Maupin or from an existing or newly constructed well or wells. If water is obtained from the City, no permit or transfer is required because the City's existing municipal water rights allow use for industrial purposes such as the Facility (OAR 690-300-0010(29)). If water is obtained from either an existing or newly constructed well(s), the maximum daily withdrawal will be less than 5,000 gal per day, as an exempt use for industrial purposes. As necessary, the Applicant may purchase water from landowner(s) with an existing water right that meets the intended use pursuant to ORS 537.545.

6.0 Mitigation Measures

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

Solar energy facilities have minimal water requirements. Because construction and operation of the Facility will not create any significant impacts on water resources, no mitigation measures are proposed.

7.0 Conclusions

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

8.0 Submittal Requirements and Approval Standards

8.1 Submittal Requirements

Table O-2. Submittal Requirements Matrix

Requirement	Location
OAR 345-021-0010(1)(o) Information about anticipated water use during construction and operation of the proposed facility. The applicant shall include:	–
(A) A description of the use of water during construction and operation of the proposed facility.	Section 2.0
(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.	Section 3.0
(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.	Section 4.0
(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.	N/A
(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.	Section 5.0
(F) If the proposed facility would need a groundwater permit, a surface water permit or a water right transfer, information to support a determination by the Council that the Water Resources Department should issue the permit or transfer of a water use, including information in the form required by the Water Resources Department under OAR chapter 690, divisions 310 and 380.	N/A
(G) A description of proposed actions to mitigate the adverse impacts of water use on affected resources.	Section 6.0

8.2 Approval Standards

OAR 345 Division 22 does not provide an approval standard specific to Exhibit O.

Attachment O-1. Record of Correspondence with the City of Maupin

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CITY OF MAUPIN

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May 30, 2019

To Whom It May Concern,

The City of Maupin has been in contact with TetraTech in regards to the Bakeoven Solar Project. The City has previously provided an assurance of ability to provide water to the Bakeoven Solar Project during its construction phase.

TetraTech has requested further commitment from Maupin of its ability to provide additional water to the project on a long-term basis. The City is currently engaged in factfinding and scheduling meetings with TetraTech to obtain additional clarification and identification of parameters.

As previously indicated, Maupin's water right permit number is S18591.

The City of Maupin looks forward to working toward attainable solutions to the needs of this project. Please contact us with any further questions or concerns relative to this project.

Sincerely,

Lynn Ewing, Mayor

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