O.1 INTRODUCTION

Troutdale Energy Center, LLC (Applicant) proposes to permit the construction and operation of a natural gas–fired power plant at the Port of Portland-owned Troutdale Reynolds Industrial Park (TRIP) located in the City of Troutdale, Oregon.

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

Response: Information about anticipated water use during construction and operation of the Facility is provided below.

O.2 WATER USE

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

Response:

O.2.1 Construction

Construction water use is estimated at approximately 15.2 million gallons over a 24-month construction period. The following aspects of Facility construction account for the majority of water usage during construction:

- **Hydrostatic pressure testing.** Approximately 5.1 million gallons of water will be used during the 50 to 60 hydrostatic pressure tests conducted on process piping components, and fuel oil tanks. There will be some re-use of testing water, but to be conservative, re-use was excluded from this calculation.

- **Dust suppression.** Approximately 9.6 million gallons of water will be used for dust suppression during construction of the Facility. This water will be applied in a manner that avoids sediment and erosion and is consistent with the BMPs presented in the National Pollutant Discharge Elimination System (NPDES) 1200-C permit (see Attachment I-1 in Exhibit I). The quantity and frequency of water used for dust suppression will be highly dependent on site and seasonal conditions. Generally, the quantity of water used for dust suppression will be 10,000 to 20,000 gallons per day (gpd), when warranted. To conservatively estimate the amount of water used for dust suppression, it was assumed that 20,000 gallons of water would be used daily for 20 days out of each of the 24 months of Facility construction.

- **Concrete.** Approximately 0.5 million gallons of water will be incorporated in the 18,400 cubic yards of concrete needed to construct the Facility. Concrete will be trucked to the site from a commercial concrete plant.

O.2.2 Operations

Operational water use is estimated to range from 3.0 to 5.5 million gallons per day (mgd). The conceptual Water Mass Balance Diagrams (provided in Attachment O-1) present the water usage under various operational cases. The intent of these mass balance diagrams is to present a range of expected flow rates for various steady-state operational cases. These diagrams provide a bracket, or range, of expected flow rates that could be encountered during operations. Given the complexities associated with operations of the Facility, it is likely that the flow rates at each of the nodes presented on the diagrams may vary when compared with actual flow rates during operations. The majority of water usage during operations will be for cooling the two separate power blocks (the combined-cycle power plant and the simple-cycle power plant). The operational cases take into account the fuel that will be used, power augmentation options, and outside weather conditions. Case 29 assumes cold weather conditions, fuel oil use, and no power
augmentation. Case 34 assumes warm weather conditions, fuel oil use, and no power augmentation. Case 6 assumes warm weather conditions, natural gas use, and no power augmentation. Case 13 assumes warm weather conditions, natural gas use, and power augmentation. The estimated water usage from each operational case is shown in Table O-1.

<table>
<thead>
<tr>
<th>TABLE O-1 Water Inputs during Operations (in Gallons per Day rounded to the nearest 1,000)*</th>
<th>Case 29</th>
<th>Case 34</th>
<th>Case 6</th>
<th>Case 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>WPCF Effluent</td>
<td>2,399,000</td>
<td>2,400,000</td>
<td>2,400,000</td>
<td>2,400,000</td>
</tr>
<tr>
<td>Port of Portland Well Water</td>
<td>634,000</td>
<td>1,930,000</td>
<td>2,154,000</td>
<td>3,123,000</td>
</tr>
<tr>
<td>Total</td>
<td>3,033,000</td>
<td>4,330,000</td>
<td>4,555,000</td>
<td>5,524,000</td>
</tr>
</tbody>
</table>

* Water inputs contained in this table assume that approximately 2.4 mgd of water will be obtained from the City WPCF. Actual WPCF effluent flow rates will vary.

During Facility operation, the compressor section of the CTG will be periodically water-washed to remove any fouling of the compressor blades to maintain CTG efficiency. This water washing will occur when the CTG is not in operation, and the water from this wash process will be collected in a holding tank. The wash water will contain the detergent used to aid in cleaning and any substances washed from the compressor blades. The quantity of the wastewater generated will be 500 gallons per CTG washing event. The wash water waste is typically high in metals and will be trucked offsite for processing and disposal at an approved facility. Therefore, no adverse impacts will occur to other service providers in the analysis area.

Potable water will be supplied to the Facility from the existing City of Troutdale potable water system. A connection to this system will be made on the southwest corner of the site near NW Swigert Way. The Facility is expected to use approximately 6 gallons per minute (8,640 gpd) of potable water.

O.3 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.

Response: During construction, the Facility will purchase water from the City of Troutdale. The City of Troutdale has sufficient domestic water capacity to supply to the Facility during construction (Attachment O-2).

During Facility operation, water supply will come from two sources. The first source of water consists of reclaimed water derived from the effluent of the City of Troutdale’s Water Pollution Control Facility (WPCF), located approximately 0.3 mile southeast of the Facility site. The balance of the required water will consist of groundwater purchased from the Port of Portland.

O.3.1 City of Troutdale Domestic Water

During construction of the Facility, water will be supplied from the City of Troutdale’s domestic supply. As discussed in Attachment O-2, the City operates a municipal domestic water system, which is supplied by seven active wells. The domestic water system has sufficient capacity to meet the demands of water usage during construction of the Facility.

O.3.2 City of Troutdale WPCF

Reclaimed water from the City of Troutdale’s WPCF will be used during Facility operation. The City of Troutdale will supply an average flowrate of approximately 1.3 mgd of reclaimed water. The WPCF anticipates that there will be sufficient effluent to provide this quantity of reclaimed water (Attachment O-2). The City will apply to Oregon Department of Environmental Quality (DEQ) to amend
the NPDES permit associated with the WPCF to allow for the discharge of the reclaimed water to the Facility. The City of Troutdale will provide the Facility with an average of 1.3 mgd of reclaimed water, which is the minimum dependable rate, as the City's water availability is variable (Attachment O-2).

O.3.3 Port of Portland Groundwater Wells

The Port of Portland has the capacity and willingness to sell water to the Facility (Attachment O-3). The Port is proposing to construct new groundwater wells, utilizing its existing water rights to provide groundwater to the Facility during operations. During construction and permitting of the groundwater wells, the Port will transfer the existing water rights to the new wells. The Port has adequate existing water rights to supply up to 4.1 mgd, which would be required under the maximum operating scenario during Facility operations.

O.3.4 Conclusion

The City of Troutdale has sufficient capacity within its domestic water system to provide the Facility with the anticipated water required during construction activities. During Facility operations, the combination of WPCF effluent and groundwater from wells installed by the Port of Portland will be able to provide water to the Facility in excess of the estimated peak demand of 5.5 mgd (3,800 gpm).

O.4 WATER LOSSES

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 avenues for water loss or output from the Facility under four different operational scenarios are shown in Table O-2.

<table>
<thead>
<tr>
<th>Avenue</th>
<th>Case 29</th>
<th>Case 34</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Simple</td>
<td>Combined</td>
</tr>
<tr>
<td>Steam Loss</td>
<td>--</td>
<td>4,000</td>
</tr>
<tr>
<td>Tower Drift</td>
<td>1,000</td>
<td>7,000</td>
</tr>
<tr>
<td>Tower Evaporation</td>
<td>677,000</td>
<td>1,064,000</td>
</tr>
<tr>
<td>Demin Users</td>
<td>164,000</td>
<td>340,000</td>
</tr>
<tr>
<td>Outfall 1c</td>
<td>289,000</td>
<td>476,000</td>
</tr>
<tr>
<td>Flash Steam Loss</td>
<td>--</td>
<td>13,000</td>
</tr>
<tr>
<td>Sanitary Waste Treatmentb</td>
<td>1,000</td>
<td>1,000</td>
</tr>
</tbody>
</table>
### TABLE O-2
Avenues for Water Loss or Output (Gallons per day rounded to the nearest 1,000)

<table>
<thead>
<tr>
<th>Avenue</th>
<th>Case 6</th>
<th></th>
<th>Case 13</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Simple Cycle</td>
<td>Combined Cycle</td>
<td>Total</td>
<td>Simple Cycle</td>
</tr>
<tr>
<td>Steam Loss</td>
<td>--</td>
<td>4,000</td>
<td>4,000</td>
<td>--</td>
</tr>
<tr>
<td>Tower Drift</td>
<td>1,000</td>
<td>7,000</td>
<td>8,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Tower Evaporation</td>
<td>677,000</td>
<td>2,637,000</td>
<td>3,314,000</td>
<td>677,000</td>
</tr>
<tr>
<td>Demin Users</td>
<td>140,000</td>
<td>0</td>
<td>140,000</td>
<td>140,000</td>
</tr>
<tr>
<td>Outfall 1c</td>
<td>266,000</td>
<td>805,000</td>
<td>1,071,000</td>
<td>266,000</td>
</tr>
<tr>
<td>Flash Steam Loss</td>
<td>--</td>
<td>17,000</td>
<td>17,000</td>
<td>--</td>
</tr>
<tr>
<td>Sanitary Waste Treatmentb</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
</tbody>
</table>

a Refer to Attachment O-1, Conceptual Water Mass Balance Diagrams.

b Assumes 25 gpd per worker

c Outfall 1 will be a new 8-inch-diameter pipe that will ultimately discharge into the City of Troutdale’s WPCF effluent pipe into the Sandy River

As shown in Attachment O-2, all process wastewater will evaporate, or will be discharged offsite through a newly constructed underground 8-inch-diameter pipeline routed back toward the WPCF and connected to the existing WPCF 24-inch effluent pipe on the WPCF property. The wastewater will then flow through the existing 24-inch pipe and discharge at the WPCF’s existing outfall on the Sandy River.

Sanitary wastewater will be discharged into the City of Troutdale’s sanitary sewer system. Exhibit V, Waste Minimization, includes a discussion of the handling of sanitary wastewater.

### O.5 WATER BALANCE DIAGRAM

**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:** Attachment O-1 presents eight Conceptual Water Mass Balance Diagrams (two diagrams for each operational case), which outline the source of cooling water, and the estimated consumptive use of process waters during operation of the for each power block associated with the Facility. The mass balance diagrams present the water inputs, water losses (presented in Table O-2), major cooling process components, and the discharge water through Outfall 1. The estimated flow rates in gallons per minute are presented at each potential loss or exit from the cooling systems.

### O.6 PERMITS OR TRANSFERS REQUIRED

**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 why no such permit or transfer is required for the construction and operation of the proposed facility.

**Response:** As stated in Section O.2, during Facility construction water will be purchased from the City of Troutdale, supplied from the City of Troutdale’s domestic water supply system. During Facility operations, water will be purchased from both the City of Troutdale’s WPCF and the Port of Portland. The combination of both systems will enable the Facility to have sufficient water to meet all of its water needs.
The Facility does not need a groundwater permit, a surface water permit, or a water right transfer for use of these water sources, as the Applicant will purchase water from sources that already have the permits and water rights to the sources of the water.

**OAR 345-021-0010(1)(o)(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.*

**Response** The proposed wells that will supply water for operation of the Facility will not require new water rights. The well owner (the Port of Portland) has sufficient water rights to provide water to the Facility during operations. The Port of Portland will transfer existing water rights to a new point of diversion (the new wells), which are located within the same property as the original point of diversion.

**O.7 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.*

**Response:** Treatment measures will be taken to ensure that the discharge of wastewater will be in compliance with the Facility’s NPDES permit. The precise treatment method for the Facility’s wastewater stream cannot be determined at this phase of the project development process due to limited plant makeup water data and discharge permit requirements. However, all wastewater treatment systems are designed to reduce suspended solids and in some cases dissolved solids. The equipment utilized typically includes one or more of the following processes which are anticipated to be incorporated during Facility operation:

- Clarification (may include pH adjustment by lime or caustic feed and other chemical addition for metals removal)
- Manganese greensand filtration
- Micro- or ultra-filtration
- Reverse osmosis
- Ion exchange

The tower blowdown water will be discharged at a temperature that complies with the Applicant’s Individual NPDES Wastewater Permit for process water discharge and routed to the Facility’s discharge pipe, which will connect to the Troutdale WPCF outfall. A heat exchanger unit will be used at the Facility to reduce the wastewater temperature so that no added heat load is contributed to the discharge from the WPCF outfall to the Sandy River. With the treatment measures in place, no adverse impacts are anticipated to the affected water resources.

**O.8 SUMMARY**

The information provided in this Exhibit demonstrates that Facility construction and operation will not result in significant adverse impacts to water resources. Therefore, the Applicant has satisfied the requirements of OAR 345-021-0010(1)(o).
ATTACHMENT 0-1

Conceptual Mass Balance Diagrams
Case 34 - Simple Cycle

Kiewit - Dev Partners (Troutdale, OR)
PFD - SC w/RO CASE 34

Corporate Office
12270 43rd Street NE
St. Michael, MN 55376

10/16/2012 Rev: 0b By: Kent K. Herbst

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*The intended use is for capital equipment design and performance prediction.
Evidence of the City of Troutdale’s Ability to Provide Water Service
February 10, 2012

Robert C. Howard  
Development Partners Group  
11 Martine Avenue, 9th Fl  
White Plains, NY 10606

Subject: Water Availability

Dear Mr. Howard:

This letter is intended to confirm the availability of water for the proposed Troutdale Energy Center ("TEC") project.

The City operates a municipal domestic water system supplied by 7 active wells. There is a large diameter municipal water supply main proximate to the proposed TEC site with sufficient capacity to satisfy reasonably foreseeable construction water needs for the project during the construction phase.

The City of Troutdale has begun discussions with Development Partners Group with respect to supplying recycled water to the TEC for use as non-contact cooling water during operation of the facility following construction. The recycled water supply would be finished effluent from the City's Water Pollution Control Facility at 1820 NW Graham Road (a sanitary sewer treatment plant). If negotiations between Development Partners and the City are successful and the State of Oregon regulatory authorities ultimately authorize the recycled water system, the City anticipates that it can supply an average of 1.3 MGD in recycled water to the TEC for non-contact cooling.

The above statements are intended to demonstrate the reasonable likelihood of water availability for the TEC during the construction phase and during subsequent operation. These statements do not represent any existing, or create any new, contractual obligation between Development Partners and the City; Such agreement is still to be negotiated.

Sincerely,

[Signature]

Travis Hultin, PE  
Chief Engineer

C: Craig Ward, City Manager  
Charlie Warren, Public Works Director
Evidence of the Port of Portland’s Ability to Provide Water Service
May 3, 2012

Robert Howard  
Development Partners  
11 Merne Avenue, 9th Floor  
White Plains, NY 10606

Dear Bob:

The Port of Portland non-potable water rights at the Troutdale Reynolds Industrial Park (TRIP) were originally obtained by Reynolds Metals Company (RMC) for use at the former aluminum production facility located on the TRIP property. The largest and most senior water right associated with TRIP is groundwater registration GR-462, which was filed by RMC claiming use of 31.729 cfs (14,240 gpm) of groundwater from 15 wells beginning in January 1942.

Groundwater registration GR-462 is available for use by Development Partners for the Troutdale Energy Center (TEC) facility, and based on preliminary groundwater analysis the rate of water use allowed under GR-462 is more than sufficient for the initial approximately 4,000 gpm rate needed for the first phase of the TEC facility, and also for potential expansion to the approximately 8,000 gpm rate that will be needed upon full build-out of future phases of the TEC facility.

The Port has initiated adjudication proceedings with OWRD during which evidence of the initiation of groundwater development and the historic use of the groundwater will be reviewed to establish the existence and terms of a groundwater right that pre-dates the 1955 groundwater code. All terms of the groundwater right will be established, including the priority date, and the rate of groundwater use.

The Port has initiated the first set of necessary changes in the form of a groundwater registration modification application for GR-462 that was submitted to OWRD in April 2012. The application included a request to change the character of use (i.e., the authorized use of water) from industrial to municipal and to change the place of use (i.e., the location where water can be used) to cover the entire TRIP property.

After modification of the Port’s water rights, the Port and TEC will execute a Water Use Agreement that will define the terms and obligations of the parties with respect to the completion and use of non-potable water at TRIP. This letter is intended to demonstrate that TEC has a reasonable likelihood of obtaining non-potable water at TRIP under the Port’s existing water rights, but is not a contractual agreement between TEC and the Port.
Robert Howard  
Page 2  
May 3, 2012

Please contact me with any questions at (503) 415-6533.

Joe Mollusky

Sincerely,

Joe Mollusky

Real Estate Program Manager

c: Ken Anderton, Port of Portland  
David Breen, Port of Portland  
Wendy Hain, Port Portland  
Dorothy Sperry, Port of Portland