# OCTOBER 2016 REVISED APPLICATION FOR SITE CERTIFICATION
# CHANGE HISTORY PART 2 - PROPOSAL

The following table is a summary of the main revisions and updates made to the May 2016 Application for Site Certification (ASC). The table indicates the source of the materials used for the revisions, as follows, and the date the sources were submitted to EFSEC.

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| **Part 2** | | | | |
| 2.1.1 | Impact Acreages were updated. This revision was included throughout the ASC as applicable. | PRM | 5-27-2015 | |
| 2.1.1 | Number of people directly employed by businesses at the Port was updated. | See references | 5-27-2016 | |
| 2.1.1.1 | The status of the BHP Billiton proposal, adjacent to the Facility site, was updated. | PDEIS | 7-28-2014 | |
| Figure 2.1-1 | The figure was updated with the most current Facility site boundary. | PRM | 5-27-2015 | |
| Figure 2.1-2 | The figure was updated with the most current Facility site boundary. | PRM | 5-27-2015 | |
| 2.1.1.2 | The reference to the boilers in Area 300 was removed. | PDEIS | 7-28-2014 | |
| 2.1.1.2 | The current use of Parcel 1A was updated. | See references | 5-27-2016 | |
| 2.1.1.5 | This section was updated to reflect that steam piping facilities are included in Area 600 for purpose of the project description, and that an | PDEIS | 7-28-2014 | |

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| | E-house will also be constructed at this location. | | | |
| 2.1.1.6 | The description of rail improvements at Terminal 5 was revised. This revision was included throughout the ASC as applicable. | PRM | 5-27-2015 | |
| 2.1.2.3 | Width of the Columbia River at Terminal 4 was revised. This revision was included throughout the ASC as applicable. | PDEIS | 7-28-2014 | |
| 2.1.3.1 | Revised name of Portland West Hills to Tualatin Mountains. This revision was included throughout the ASC as applicable. | PDEIS | 7-28-2014 | |
| Figure 2.3-1 | Revised figure showing product flow. | PDEIS | 7-28-2014 | |
| 2.3.1 | Added information regarding the project need and purpose. | | 10-6-2016 | Section 2.3.1 has been updated with information regarding the project need due to decline in Alaska North Slope crude oil and limited pipeline connections. |
| 2.3.1 | Clarified grade of crude oil received, handled, stored, and loaded at the facility. This revision was included throughout the ASC as applicable. | NA | 5-27-2016 | |
| 2.3.1 | Clarified the Applicant will neither own nor source the crude oil shipped through the Facility. | PDEIS[1],[2] | 2-5-2015 | |
| 2.3.1 | Summary of Primary and Ancillary Project Elements were updated. | PDEIS, PRM | 7-28-2014<br>5-27-2015 | - |

[1] Letter from David Corpron and Irina Makarow to Stephen Posner, Responding to Request for Additional Information to Assess EIS Alternatives, February 5, 2015.
[2] Letter from Irina Makarow to Stephen Posner, Response to EFSEC Request for Review of Draft Environmental Impact Statement (EIS) Chapter 2- Proposal Description, April 1, 2015.

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| | This revision was included throughout the ASC as applicable. | | 5-27-2016 | |
| 2.3.1 | Named the private access road to Old Alcoa Facility Access Road for purposes of the ASC. This revision was included throughout the ASC as applicable. | PDEIS | 7-28-2014 | |
| 2.3.1 | Revised the parking at the marine terminal area to be located on a reconstructed asphalt and gravel area. | NA | 5-27-2016 | |
| 2.3.1.1 | Revised capacity of intermediate berms. | PDEIS | 7-28-2014 | |
| 2.3.1.1 | Revised capacity of stormwater facilities. | ER, Appendix C.2 | 10-15-2015 | |
| 2.3.1.1 | Clarified the transfer pipeline conveyance locations. | PDEIS | 7-28-2014 | |
| 2.3.1.1 | Clarified Port lease agreement. | Appendix E.2 | 8-29-2013 | |
| 2.3.1.1 | Clarified dredging operations at berths 13 and 14 are a separate operation and not subject to site certification. | ASC 2013 | 8-29-2013 | |
| 2.3.2 | Clarified average of four train arrivals per day. | PDEIS[3] | 7-28-2014 | |
| Figure 2.3-2 | The figure was updated with the most current Facility site boundary and updated Facility elements. This revision was included throughout the ASC as applicable. | PRM | 5-27-2015 | |

[3] Letter from Irina Makarow to Stephen Posner, Response to EFSEC Draft EIS Data Request 2, February 23, 2015.

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| Figure 2.3-3 | The figure was updated with the most current Facility site boundary and updated Facility elements. | PRM | 5-27-2015 | |
| Figure 2.3-4 | The figure was updated with the most current Facility site boundary and rail track numbers. | PRM | 5-27-2015 | |
| 2.3.3.1 | Revised number of cars and locomotives in each unit train. This revision was included throughout the ASC as applicable. | PDEIS[2] | 7-28-2014 | |
| 2.3.3.1 | Clarified duration of train unloading. | PDEIS[2] | 4-1-2015 | |
| 2.3.3.1 | Clarified foundation elements of the unloading structure. | PRM | 5-27-2015 | |
| Figure 2.3-5 | The figure was updated with the most current rail track numbers. | PRM | 5-27-2015 | |
| Figure 2.3-6 | The figure was updated with the most current Facility site boundary. | PRM | 5-27-2015 | |
| Figure 2.3-7 | The figure was updated to clarify surface material under tank car. | PRM | 5-27-2015 | |
| Figure 2.3-8 | The figure was updated to show the updated track numbering. | PRM | 5-27-2015 | |
| 2.3.3 | Clarified the collection pans will convey stormwater in addition to inadvertent releases. | PDEIS, ER | 7-28-2014<br>10-15-2015 | |
| 2.3.3 | Revised the rail car unloading facility combined secondary containment volume. This revision was included throughout the ASC as applicable. | NA | 5-27-2016 | |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| Figure 2.3-9 and Figure 2.3-10 | The figure was updated with the most current Facility site boundary. | PRM | 5-27-2015 | |
| 2.3.3 | The dimensions of the pump basins were revised. | PDEIS | 7-28-2014 | |
| 2.3.3 | The quantities and capacities of the rail car unloading facility containment tanks were revised. This revision was included throughout the ASC as applicable. | PDEIS | 7-28-2014 | |
| Figure 2.3-11 | Added new figure to show heated tank cross section. | PDEIS | 7-28-2014 | |
| Figure 2.3-12 | A note was added to the figure to indicate intermediate berms are not shown. | PDEIS | 7-28-2014 | |
| 2.3.3 | The dimensions of the E-houses were updated. | PDEIS[2] | 4-1-2015 | |
| 2.3.3 | Dimensions and components of electrical equipment for the unloading facility were refined. | NA | 5-27-2016 | |
| 2.3.3 | Added DOT 117 rail car or better mitigation measure. | NA | 5-27-2016 | |
| 2.3.3.1 | Revised number of cars and locomotives in each unit train. This revision was included throughout the ASC as applicable. | PDEIS2 | 7-28-2014 | |
| 2.3.3.1 | Clarified duration of train unloading. | PDEIS2 | 4-1-2015 | |
| 2.3.3.1 | Clarified foundation elements of the unloading structure. | PRM | 5-27-2015 | |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| 2.3.4 | Description of Administrative and Support Buildings foundations was added. | PRM | 5-27-2015 | |
| 2.3.5 | Added conveyance of crude oil from Area 200 to Area 400. This revision was included throughout the ASC as applicable. | PDEIS | 7-28-2014 | |
| 2.3.5 | Updated description of the 36-inch diameter pipeline to be electrically heat-traced. | PRM | 5-27-2015 | |
| 2.3.5 | Updated diameter of the pipeline delivering hydrocarbon vapor. | Appendix B.5 | 5-26-2015 | |
| 2.3.5 | Updated minimum aboveground piping vertical support height. | Appendix B.5 | 5-26-2015 | |
| 2.3.5 | Added the belowground transfer pipeline sections will be catholically protected. | PDEIS | 7-28-2014 | |
| 2.3.5 | Added information regarding the crude oil transfer rates. | PDEIS[2] | 4-1-2015 | |
| 2.3.5 | Added information regarding the proving station located at the exit of Area 200. | PRM | 5-27-2015 | |
| 2.3.5 | Clarified unloading transfer rate from Area 200 to Area 400. | | 10-6-2016 | Unloading operation can be conducted so that the flow from one unloading track is diverted to Area 400 (i.e., 14,000 bbl/hr for one feed line), or flow from both tracks is diverted if two trains are unloading at the same time (i.e., 2*14,000 bbl/hr = 28,000 bbl/hr for two feed lines). |
| Figure 2.3-14 | Removed call outs to upland facilities. | NA | 5-27-2016 | |
| 2.3.6 | Height of storage tanks updated. | PRM | 5-27-2015 | |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| 2.3.6 | Shell capacity of storage tanks updated. | PRM | 5-27-2015 | |
| 2.3.6 | Added positioning of storage tanks. | Appendix N.1 | 2-26-2015 | |
| 2.3.6 | Clarified potential heating components of two tanks. | PDEIS | 7-28-2014 | |
| 2.3.6 | Added the minimum and maximum distances between the tanks and containment berms. This revision was included throughout the ASC as applicable. | Appendix N.1 | 2-26-2015 | |
| 2.3.6 | Revised the height of the intermediate containment berms. This revision was included throughout the ASC as applicable. | PDEIS, PDEIS[2] | 7-28-2014<br>4-1-2015 | |
| 2.3.6 | Provided additional detail regarding the impervious liner in the containment berm. This revision was included throughout the ASC as applicable. | DEIS Letter | 1-25-2016 | |
| 2.3.6 | Stormwater system within the containment area was revised. This revision was included throughout the ASC as applicable. | ER | 10-15-2015 | |
| 2.3.6 | Tank storage pump basin description and dimensions were revised. | NPDES Letter | 5-27-2016 | |
| 2.3.6 | E-house footprint has been updated. | PDEIS | 7-28-2014 | |
| 2.3.6 | Transformer footprint has been updated. | NA | 5-27-2016 | |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| 2.3.6 | Added information regarding electrical switchgear. | NA | 5-27-2016 | |
| 2.3.6 | Refined design of fire foam skid and fire water pump house building. This revision was included throughout the ASC as applicable. | PDEIS | 7-28-2014 | |
| 2.3.6 | Added seismic importance factor for the tank design. | | 10-6-2016 | Added commitment that the tank design will meet a seismic importance factor of 1.25. |
| 2.3.7.1 | Added information regarding marine terminal loading operations. | PDEIS[2] | 4-1-2015 | |
| 2.3.7.1 | Added additional information regarding the types and capacities of vessels calling at the Facility. | PDEIS[4] | 5-12-2015<br>10-6-2016 | Added new requirement that vessels will only be permitted to arrive and load at the Facility's marine terminal that have been vetted in accordance with the Tesoro Maritime proprietary vetting process. |
| Table 2.3-3 | Added table of ATB and tanker vessel dimensions. | Moved from Part 4. | 2-25-2014 | |
| Figure 2.3-13 | Added new figure to show Veteran Class Crude Oil Tanker. | PDEIS | 8-29-2014 | |
| 2.3.7.1 | Added information regarding the operations of vessel arrivals. | PDEIS[2] | 4-1-2015 | |
| 2.3.7.1 | Added information regarding the booming and loading of vessels at the Facility. This revision was included throughout the ASC as applicable. | PDEIS[2], Appendix B.5 | 4-1-2015<br>5-26-2015 | |
| 2.3.7.1 | Added information regarding the operations of vessel departures and transit. | PDEIS[2] | 4-1-2015 | |

[4] Letter from Irina Makarow to Stephen Posner, Response to EFSEC Draft EIS Data Request 8, May 12, 2015.

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| 2.3.7.1 | Added information regarding tug escort operations. | | 10-6-2016 | Revised vessel departure and transit to include a tug escort for the vessel during river transport. |
| 2.3.7.2 | Added information regarding containment capabilities at the dock | | 10-6-2016 | Clarified containment at the dock is 84 barrels. Revised containment design at the dock to increase pumping capacity and physical storage capacity of the catch basin. This will include (1) connecting the containment area to the existing pump and return pipeline and implementing an automatic trigger that would turn the pump on in the event of a system shutdown and (2) installation of an additional pump. Additional design features of the pumps and pipeline shutoff valves at the dock are described. |
| 2.3.7.2 | Clarified walkway dimensions and descriptions. This revision was included throughout the ASC as applicable. | PRM | 5-27-2015 | |
| 2.3.7.2 | Removed steel tie back wires at the mooring points. | NA | 5-27-2016 | |
| 2.3.7.2 | Clarified operations to be conducted at each berth. | PRM; PDEIS[2] | 5-27-2015<br>4-1-2015 | |
| 2.3.7.2 | Added information regarding dockside equipment. | PRM | 5-27-2015 | |
| 2.3.7.2 | Revised the dimensions and components of the combined fire pump foam, e-house, and control room building. | PRM | 5-27-2015 | |
| 2.3.7.2 | Revised booming configurations. | PRM | 5-27-2015 | |
| 2.3.7.2 | Revised MVCU dimensions and clarified system operations. | PRM | 5-27-2015 | |
| 2.3.8 | Updated natural gas delivery to boiler building. | NA | 5-27-2016 | |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| 2.3.8 | Revised the boiler system water treatment. This revision was included throughout the ASC as applicable. | NPDES Letter | 5-27-2016 | |
| 2.3.8 | Revised the boiler plant discharge pretreatment. This revision was included throughout the ASC as applicable. | NPDES Letter | 5-27-2016 | |
| 2.3.8 | Clarified the diameter of the natural gas service line to the Area 600 Boiler Building. | | 10-6-2016 | A new pressure regulator and 6-inch-diameter service line to the boiler building will be constructed. |
| 2.3.8.1 | Removed the Area 300 Boiler and associated references. This revision was included throughout the ASC as applicable. | PDEIS | 7-28-2014 | |
| 2.3.9 | Added information regarding decommissioning and lease terms. | PDEIS | 7-28-2014 | |
| 2.3.9 | Added discussion of decommissioning costs. | | 10-6-2016 | Preliminary decommissioning costs have been provided and updated decommissioning costs will be provided after final Facility design. |
| Table 2.3-4 | Added preliminary decommissioning costs for the Facility. | | 10-6-2016 | Provided a preliminary cost estimates to decommission each Area of the Facility as well as total cost. |
| 2.3.10 | Revised estimated capital cost of the Facility. This revision was included throughout the ASC as applicable. | PDEIS. | 7-28-2014 | |
| Figure 2.6-1 | The figure was updated with the most current Facility site boundary. | PRM | 5-27-2015 | |
| 2.6.3 | Maximum daily water use quantity was updated. | NPDES Letter | 5-27-2016 | |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| 2.6.3 | Added water use for ground improvement installation. | PDEIS | 7-28-2014 | |
| 2.6.4 | Revised the process water descriptions. This revision was included throughout the ASC as applicable. | NPDES Letter | 5-27-2016 | |
| 2.6.4 | Clarified the process water description to non-process industrial water. This revision was included throughout the ASC as applicable. | | 10-6-2016 | The industrial processes onsite do not use water for manufacturing and water does not come into contact with any raw, intermediate, or finished products. |
| Table 2.6-1 | Revised Table listing process water use and rates. | PDEIS, NPDES Letter | 7-28-2014<br>5-27-2016 | |
| 2.6.5 | Revised the potable water usage and description. | NPDES Letter | 5-27-2016 | |
| Table 2.6-2 | Revised Table listing potable water use and rates. | PDEIS, NPDES Letter | 7-28-2014<br>5-27-2016 | |
| 2.6.6 | Added new mitigation measure | | 10-6-2016 | Added mitigation measure that would install a 12" waterline loop to eliminate the dead-end supply to the Port. |
| 2.7 | Revised quantity and use of boilers, and quantity of process water discharged. This revision was included throughout the ASC as applicable. | NPDES Letter | 5-27-2016 | |
| 2.7 | Revised description of heat dissipation system. | NPDES Report | 10-6-2016 | Added the option of cooling blowdown water through dry cooling or to be used in combination with previously described technology. |
| 2.8.1 | Revised description of aquatic discharge systems. This revision was included throughout the ASC as applicable. | NPDES Letter | 5-27-2016 | |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| 2.8.1 | Added area within the Port's general use stormwater area. | | 10-6-2016 | Added the non-pollution-generating rail yard area on the north side of the rail unloading building. |
| 2.8.1.1 | Updated description of Terminal 5 stormwater system. | ER, Appendix C.2 | 10-15-2015 | |
| 2.8.1.1 | Provided ASC section for spill containment devices | | 10-6-2016 | Added clarification to refer to Section 2.8.1.2, which provides details on spill containment devices for stormwater inlets receiving stormwater from the general use areas. |
| 2.8.1.2 | Updated description of Terminal 4 stormwater system. | ER, Appendix C.2 | 10-15-2015 | |
| 2.8.1.2 | Clarified stormwater inlet devices | | 10-6-2016 | Clarified that the Applicant will complete assessment to identify downstream stormwater inlets lacking oil-water spill control devices. Install oil-water spill control devices designed to capture a minimum 5 gallons of oil and may include the installation of an inverted 90-degree bend; or installation of an internal tee or baffle on the outlet pipe. |
| 2.8.1.3 | Revised the discharge amounts during a 100-year storm at the combined marine terminal and Subaru treatment and infiltration swales. | PRM | 5-27-2015 | |
| 2.8.1.3 | Added information regarding stormwater discharge from the containment area. | ER, Appendix C.2 | 10-15-2015 | |
| 2.8.1.4 | Revised wastewater sources discharging to City sanitary sewer. | PRM | 5-27-2015<br>10-6-2016 | Clarified the language regarding permitting the disposal to City sanitary sewer. |
| 2.8.1.4 | Added information regarding alternative disposal options. | NPDES Letter | 5-27-2016 | |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| 2.8.1.5 | Added information regarding haul off as an alternative disposal option. | NPDES Letter | 5-27-2016 | |
| 2.8.2.1 | Added information regarding Area 600 process wastewater discharge alternatives. | NPDES Letter | 5-27-2016 | |
| 2.8.2.2 | Added information regarding Area 300 process wastewater discharge alternatives. | NPDES Letter | 5-27-2016 | |
| 2.9.1 – 2.9.5 | Revised section to be consistent with language and terminology updates | | 10-6-2016 | Clarified text consistent with changes to industrial, non-process water |
| 2.9.1 | Revised process wastewater sources and descriptions. | NPDES Letter | 5-27-2016 | |
| Table 2.9-1 | Revised Table listing process wastewater sources. | NPDES Letter | 5-27-2016 | |
| 2.9.1 | Revised analysis for process wastewater discharge. | NPDES Letter | 5-27-2016 | |
| Table 2.9-2 | Revised table listing estimated chemical makeup of process water discharge | NPDES Letter | 5-27-2016 | |
| 2.9.1 | Added alternatives for discharge of the boiler plant wastewater. | NPDES Letter | 5-27-2016 | |
| Table 2.9-3 | Revised table listing domestic wastewater quantities. | NPDES Letter | 5-27-2016 | |
| 2.9.3 | Revised pretreatment processes requirements. | NPDES Letter | 5-27-2016 | |
| 2.9.4 | Added alternatives for treatment of industrial wastewater. | NPDES Letter | 5-27-2016 | |
| 2.9.5 | Added alternatives for discharge of industrial wastewater. | NPDES Letter | 5-27-2016 | |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| Table 2.9-4 | Added Table 2.9.4 Required Wastewater Discharge Constituent Limits listing Facility wastewater discharges compared to City of Vancouver's pre-treatment limits | NPDES Letter | 5-27-2016 | |
| 2.9.5 | Added compliance information regarding the City of Vancouver wastewater discharges and regulatory provisions. | NA | 5-27-2016 | |
| 2.10 | Clarified: Oils the Facility will handle - Groups 2, 3, and 4 persistent oils as defined in WAC 173-182-030 (24) with a specific gravity less than 1 and an API gravity ranging from 15 to 45, and oils the Facility will not receive. | ASC 2013 | 8-29-2013 | |
| 2.10.1.2 | Added WAC 173-184 regulation for advance notice of oil transfer. | PDEIS | 7-28-2014 | |
| 2.10.1.2 | Added WAC 463-60-205 regulation for inclusion of construction and operation SPCC plan description. | NA | 5-27-2016 | |
| Table 2.10-1 | Updated table with state requirements for advance notice of oil transfer. | PDEIS | 7-28-2014 | |
| Table 2.10-3 | Added table. | PDEIS, Appendix B.3 | 7-28-2014<br>6-26-2015 | |
| Table 2.10-4 | Updated Table 2.10-4 Hazardous Materials On site during Operation and Maintenance listing hazardous materials on site during operation and maintenance. | PDEIS | 7-28-2014 | |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| 2.10.2.2 | Revised containment pan description and containment tank capacity. | PRM, PDEIS | 5-27-2015<br>7-28-2014 | |
| 2.10.2.3 | Updated hydrostatic testing requirements. | PDEIS[2] | 4-1-2015 | |
| 2.10.2.3 | Added foundation information for storage tanks. This revision was included throughout the ASC as applicable. | PDEIS | 7-28-2014 | |
| 2.10.2.3 | Added berm capability during seismic induced liquefaction. | | 10-6-2016 | Statement regarding the demonstrated capacity of the berm area if worst case subsidence due to seismic induced liquefaction were to occur. |
| 2.10.2.4 | Added information regarding ultrasonic flow meters. | PRM | 5-27-2015 | |
| 2.10.2.4 | Added information regarding secondary containment for underground pipe runs, aboveground pipeline construction, and applicable regulations. | PDEIS | 7-28-2014 | |
| 2.10.2.4 | Clarified catholically protected pipeline. | PDEIS | 7-28-2014 | |
| 2.10.2.4 | Added information regarding ESD valves. | PDEIS[2] | 4-1-2015 | |
| 2.10.2.4 | Clarified the spill containment measures applied to transfer pipeline. | | 10-6-2016 | See 2.8.1.2 – Stormwater inlet devices |
| 2.10.2.4 | Clarified the available secondary containment capacity in Area 200 | May 27, 2016 NPDES Response Letter | 10-6-2016 | Piping systems in Area 200 will be placed in concrete trenches; the concrete trenches and connected pump basins have a secondary containment capacity of 33,400 bbls. |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| 2.10.2.5 | Added information regarding the risk of release from vessel loading operations. | DEIS Letter | 1-25-2016 | |
| 2.10.2.5 | Clarified the available containment at the dock and provided description of design changes. | | 10-6-2016 | See 2.3.7.2 – Containment capabilities at the dock |
| 2.10.2.6 | Added information regarding booming equipment and spill response equipment. | Appendix B.5 | 5-26-2015 | |
| 2.10.2.6 | Revised length of fence boom. | Appendix B.5, PDEIS | 5-26-2015<br>7-28-2014 | |
| Figure 2.10-1 | Revised figure to show updated booming plan and location of spill response equipment. | PRM, PDEIS | 5-27-2015<br>7-28-2014 | |
| 2.10.2.6 | Clarified pre-booming activities. | Data Request No. 11 | 10-6-2016 | Provided a description of pre-booming activities and alternative measures proposed for the Facility and their compliance with applicable regulatory statues. |
| 2.10.2.6 | Clarified name of mobile containment boom to Current Buster. This revision was included throughout the ASC as applicable. | | 10-6-2016 | Previously referenced Harbour Buster has been changed to Current Buster. The Harbour Buster and Current Buster are the same equipment. |
| 2.10.3.1 | Revised Facility construction spill prevention, control and contingency plan description | Appendix B.2, PDEIS | 4-30-2015<br>7-28-2014 | |
| Table 2.10-5 | Added table of oils, fuels, and hazardous materials to be stored during construction. | PDEIS | 7-28-2014 | |
| 2.10.3.2 | Indicated submittal of preliminary spill preparedness and response plans. | NA | 5-27-2016 | |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| 2.10.3.2 | Clarified the Applicant's obligation to comply with the Vancouver planning standards. | | 10-6-2016 | Added demonstrated compliance with the specified benchmarks for spill response equipment, resources, and timelines stated in the Vancouver planning standard in WAC 173-182-420. |
| Table 2.11-1 | Revised table listing construction source control BMPs | Appendix C.1 | 8-14-2015 | |
| 2.11.2 | Revised annual rainfall amount. | NA | 5-27-2016 | |
| Table 2.11-2 | Revised table listing drainage basin areas. | ER, Appendix C.2 | 10-15-2015 | |
| 2.11.2 | Added regulation for stormwater facilities. | ER | 10-15-2015 | |
| 2.11.2.1 | Revised description of source control BMPs. | PDEIS, PDEIS[5], ER | 7-28-2014 | |
| Table 2.11-3 | Revised Table 2.11-3 listing applicable structural source control and operational BMPs. | PRM | 5-27-2015 | |
| 2.11.2.1 | Clarified spill containment to be provided for transfer pipelines. | | 10-6-2016 | See 2.8.1.2 – Stormwater inlet devices |
| 2.11.2.3 | Provided additional information regarding status of Tier II anti-degradation analysis | NPDES Letter | 5-27-2016 | |
| All subsections of Section 2.12 | In August 2014 the Applicant submitted to EFSEC a revised air permit application. The entirety of Section 12.2 was, therefore, replaced with the corresponding contents of the 2014 submittal. Major changes from the August 2014 submittal are indicated below. Since that time the | August 2014 NOC | 8-11-2014<br>5-6-2016<br>5-27-2016 | |

[5] Letter from Irina Makarow to Stephen Posner, Response to EFSEC Draft EIS Data Request on Berm Size, July 27, 2015.

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| | Applicant has also responded to an EFSEC request for information dated March 14, 2016; a response was submitted to EFSEC on May 6, 2016. The information submitted in that response has also been incorporated in these ASC revisions, as indicated below. Additional changes have been made for clarification and are also indicated below. See also the changes to Section 5.1. | | | |
| 2.12 | Added construction emissions from third party batch plant. | PRM | 5-27-2015 | |
| 2.12.2 | Corrected definition of nitrogen oxide. | NA | 5-27-2016 | |
| 2.12.2.1 | Added ground improvement activities to construction emissions (temporary batch plant). | PRM | 5-27-2015 | |
| 2.12.2.2 | Clarified the operation assumptions of the Area 600 boilers. | Response to NOC[6] | 5-6-2016<br>5-27-2016 | |
| Table 2.12-1 | Revised table listing projected annual emissions based on updated boiler assumptions and errors corrected. See 5.1.2.17. | Response to NOC[6] | 5-6-2016<br>5-27-2016 | |
| Table 2.12-2 | Revised table listing Facility-wide TAPs/HAPs emissions based on refined tank emission estimates. See 5.1.2.1.7 | Response to NOC[6] | 5-6-2016<br>5-27-2016 | |
| 2.13 | Added Applicant's CO2 emissions mitigation commitment. | PDEIS | 7-28-2014 | |

[6] Additional information to this response is included in this May 2016 ASC Revision.

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| Table 2.13-1 | Added table listing Facility stationary source annual GHG emissions. | PDEIS | 7-28-2014 | |
| 2.15.1 | Revised construction schedule and milestones. This revision was included throughout the ASC as applicable. | NA | 5-27-2016 | |
| 2.15.2 | Revised construction workforce. | PDEIS | 7-28-2014 | |
| Table 2.15-1 | Revised table listing construction workforce by trade for Phase I. | PDEIS | 7-28-2014 | |
| 2.15.3 | Revised operation workforce. | PDEIS | 7-28-2014 | |
| Table 2.15-3 | Revised table listing operations staff. | PDEIS | 7-28-2014 | |
| Figure 2.15-1 | Revised figure showing construction milestones | NA | 5-27-2016 | |
| 2.16.2 | Revised status and content of the Construction Safety and Health Manual. This revision was included throughout the ASC as applicable. | Appendix D.2 | 4-30-2015 | |
| 2.16.2 | Added EFSEC's review comments of the CSHM as revisions to be made to the plan. | Appendix M | 5-27-2016 | |
| 2.16.6 | Added information regarding the Construction Communication Plan. | | 10-6-2016 | Detailed contents of the Construction Communication Plan that will be distributed to the public, City, County, EFSEC, and other appropriate state agencies. |
| 2.17 | Added additional information regarding construction staging and laydown activities. | PRM | 5-27-2015 | |
| 2.17 | Added types of construction equipment to be used during construction. | PRM | 5-27-2015 | |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| Figure 2.17-1 | Revised figure showing temporary construction boundary and laydown areas. | PRM | 5-27-2015 | |
| 2.17.3 | Removed description of foundations and referenced description in Section 2.18.1.4. | NA | 5-27-2016 | |
| 2.17.4 | Added information regarding soil excavation in Area 300. | PRM | 5-27-2015 | |
| 2.17.6 | Revised and added information regarding natural gas service lines that will serve the Facility. | Personal communication with NW Natural | 5-27-2016<br>10-6-2016 | A new pressure regulator and 6-inch-diameter service line to the boiler building will be constructed.<br><br>Information from discussions with NW Natural representatives did not indicate a lack of system capacity to serve the Facility. |
| 2.18.1.4 | Added compliance with City and State design standards | DEIS Letter | 1-25-2016 | |
| 2.18.1.4 | Added descriptions of ground improvement design and potential construction methods. | DEIS Letter, Appendix L.3, PRM | 1-25-2016<br>4-20-2015<br>5-27-2015 | |
| 2.18.1.4 | Added description of additional seismic modeling to be completed by the Applicant. | | 10-6-2016 | The Applicant has agreed to conduct 2D static and psuedostatic seismic modeling and provided information on the modeling approach. |
| 2.18.1.4 | Clarified design standards for rail infrastructure. | | 10-6-2016 | AREMA standards for design and settlement criteria for a loop track with the outside rail having a differential elevation of 8" will be met. |
| 2.18.1.4 | Clarified ground improvement verification. | | 10-6-2016 | If the required settlement is not met, the following action was revised to add additional improvements. |
| 2.18.2.1 | Added that ash fall will be addressed in the | DEIS Letter | 1-25-2016 | |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| | Construction/Operations Emergency Plan | | | |
| 2.18.3.1 | Added activities to be performed in the event of an expected site inundation. | | 10-6-2016 | Added a mitigation measure that movable equipment will be relocated above the 500-year floodplain and static equipment will be secured. |
| 2.19.1 | Added information regarding the Port's security force. | Appendix D.4 | 4-30-2015 | |
| 2.19.2 | Added description of Construction Security Plan contents. | Appendix D.4 | 4-30-2015 | |
| 2.19.2.1 | Added description of security measures to be implemented at the site during construction. | Appendix D.4 | 4-30-2015 | |
| 2.19.2.2 | Added description of access control measures to be implemented at the construction sites. | Appendix D.4 | 4-30-2015 | |
| 2.19.2.3 | Added description of entry and exit screenings at the site to be implemented during construction. | Appendix D.4 | 4-30-2015 | |
| 2.19.2.4 | Added description of protocols for the blockage of roadways to be implemented during construction. | Appendix D.4 | 4-30-2015 | |
| 2.19.2.5 | Added description of monitoring and patrols to be implemented during construction. | Appendix D.4 | 4-30-2015 | |
| 2.19.2.6 | Added description of incident procedures and emergency response to be implemented during construction. | Appendix D.4 | 4-30-2015 | |
| 2.19.3 | Added description of Operations Security Plan contents. | Appendix D.3 | 4-30-2015 | |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| 2.19.3 | Clarified presence of Facility personnel. | | 10-6-2016 | Added text to clarify that personnel will be present at the Facility 24/7 to provide emergency responders access to the Facility in the event of an emergency. |
| 2.19.4 | Added description of Facility Security Plan contents. | Appendix D.3 | 4-30-2015 | |
| 2.20 | Added information regarding additional analyses. | NA | 5-27-2016 | |
| 2.22.1 | Revised status of the Port of Kalama Northport facility. | NA | 5-27-2016 | |
| 2.22.1 | Added Port of Portland position on crude-by-rail development, and City of Portland fossil fuel resolution. | PDEIS, See references | 7-28-2014<br>5-27-2016 | |
| 2.22.1 | Added statement regarding the use of Terminal 5. | PDEIS | 7-28-2014 | |
| 2.22.2 | Added statement regarding benefit of the covered unloading facility. | PDEIS | 7-28-2014 | |
| 2.22.4 | Added information regarding wastewater characterization for the proposed discharge streams. | NPDES Letter | 5-27-2016 | |
| 2.22.6 | Added refinements to the marine terminal modifications | PDEIS | 7-28-2014 | |
| 2.22.7 | Added information regarding design changes impacting Facility emissions. | PDEIS | 7-28-2014 | |
| Table 2.23-1 | Updated table showing applicable Federal, State, and Local permits and regulations | DEIS | 11-25-2015 | |
| Table 2.23-1 | Updated table showing applicable federal requirements for ballast water management | | 10-6-2016 | Added ballast water management under authority of USCG and regulation 33 CFR 151 |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| 2.23.2.2 | Revised status of biological evaluation and ESA consultation activities. This revision was included throughout the ASC as applicable. | NA | 5-27-2016 | |
| 2.23.2.4 | Revised status of marine mammal monitoring plan and consultation activities. This revision was included throughout the ASC as applicable. | Appendix H.3 | 5-27-2016 | |
| 2.23.2.5 | Added information regarding Migratory Bird Treaty Act. | DEIS | 11-24-2015 | |
| 2.23.2.6 | Added information regarding Bald and Golden Eagle Protection Act. | DEIS | 11-24-2015 | |
| 2.23.2.7 | Added information regarding Cultural Resources Inadvertent Discovery Plan. | Appendix A.3 | 4-30-2015 | |
| 2.23.2.8 | Revised Section 10 permit application status. This revision was included throughout the ASC as applicable. | NA | 5-27-2016 | |
| 2.23.2.18 | Added information regarding CERCLA. | NA | 5-27-2016 | |
| 2.23.2.19 | Added information regarding Pretreatment Section 307(b). | NA | 5-27-2016 | |
| 2.23.2.20 | Added information to clarify federal requirements for ballast water management. | | 10-6-2016 | Added applicable regulations and agreements pertaining to ballast water management, and how the project will comply. |
| 2.23.3.2 | Added information regarding Section 401 Water Quality Certificate. | NA | 5-27-2016 | |

| ASC Section | Revision | Referenced From | Date Originally Submitted to EFSEC | Description of October 6,-2016 Information *(PD) indicates the Project Description was revised)* |
|---|---|---|---|---|
| 2.23.3.8 | Removed information regarding PSD permit (no longer applicable) | August 2014 NOC | 8-11-2014 | |
| 2.23.3.16 | Added information regarding Washington State Waste Discharge Permit Program | NA | 5-27-2016 | |
| 2.23.3.17 | Added information regarding recent regulations adopted by Washington State Department of Ecology. | | 10-6-2016 | Added applicable regulations pertaining to crude oil advance notice requirements and a statement of compliance upon Facility operations. |
| 2.23.4.5 | Added information regarding Hazardous Materials Regulatory Fee Certificate. | NA | 5-27-2016 | |
| 2.23.4.6 | Added information regarding Critical Areas Protection. | PDEIS | 7-28-2014 | |
| 2.23.4.7 | Added information regarding Archaeological Resource Protection. | NA | 5-27-2016 | |

# Section 2.3 Construction On Site

## 2.3.1 Project Overview

*The following information is added to this section to clarify the Facility's purpose and the need to which it responds, as shown in underlined text.*

The Facility will provide the service of trans-loading mid-continent crude oil delivered to the West Coast by rail to vessels in order to allow shipment of crude oil to refineries located primarily on the West Coast of North America.

Refineries require a reliable supply of crude oil feedstock (Roach 2016a). However, supply to Washington refineries is jeopardized by an ongoing decline of traditional sources. Alaska North Slope (ANS) crude oil, a critical source of crude to Petroleum Administration Defense District (PADD) V refineries in general, and Washington in particular, is declining (Roach 2016b).While that decline began in the 1980s and has been gradual over the last several decades, the evidence demonstrates that ANS may very well be eliminated as a source of crude oil, to Washington refineries, over the life of the terminal (Roach 2016c). If ANS supply is reduced below a critical threshold, the decline in supply then becomes precipitous. The pipeline system from Alaska may simply stop operating due to a reduction in flow (Roach 2016c). The ANS pipeline "could become very intermittent or face reliability issues where a corrosion issue shuts it down for a time or some icing up." If ANS supply to refineries becomes erratic, it is problematic for refiners and is disruptive to the market, especially if companies who hold a first right on ANS crude oil choose to exercise that first call, and the rest of the refiners depending on that source see their supply of ANS crude oil diminish entirely (Roach 2016d).

Feedstock replacement sources for PADD V (including Washington) refineries are limited. This refinery system is isolated and has limited pipeline connection to the national crude oil transportation infrastructure elsewhere in the United States (Roach 2016e). The limited existing pipeline infrastructure is operating at capacity, and it would take a significant amount of time to develop new or expanded pipeline infrastructure to deliver North American crude oil to PADD V and Washington (Roach 2016f). Given the level of controversy associated with new pipeline siting, it is not certain whether it would even be feasible (Roach 2016g). Available foreign sources, which require increased marine vessel transport, are less reliable and potentially unstable (Roach 2016h). Washington refinery production would be put at risk if left only with foreign sources for alternative supply.

By contrast, the Terminal will use existing rail and marine infrastructure to deliver reliable sources of mid-continent North American crude oil to satisfy near-term need over the 20-year life of the Project (Roach 2016i). Its reliance on existing rail and marine infrastructure stands in contrast to new pipeline construction, which requires a longer lead time, retains a more permanent footprint, and involves investment costs that would require much longer term commitments to justify new construction (Roach 2016j).

A diversified crude oil supply is of significant energy benefit to Washington citizens because PADD V refineries, including those in Washington, operate as part of a larger system (Roach 2016k). Each refinery in the system operates at an optimal level with a slightly different mix of crude oil feedstocks (Roach 2016k). The system can optimize quality, quantity, and cost of refined product throughout the system of refineries, as well as at each individual refinery

(including Washington refineries) by moving available crude oil supplies around the system based on availability, price, and crude oil characteristics (Roach 2016j). As additional crude oil supplies become available (such as the mid-continent North American supplies that would use the terminal), there is increased opportunity to optimize the entire system. This benefits the system as a whole, and benefits Washington refineries as part of that system, regardless of which crude oils flow to which refinery in the system (Roach 2016j). In addition, as explained in section 1.4.1.18, in-state refiners will have first call on all commercially available barrels, to ensure availability of feedstocks to Washington state refineries.

### 2.3.5 Area 500 – Transfer Pipelines

*The following text is clarified as shown in underlined text. This text was previously provided to EFSEC in June 2016.*

To allow greater flexibility in operations, the transfer piping system will be equipped with valves to allow crude oil being unloaded in Area 200 to be directly conveyed to the Area 400 Marine Terminal for loading onto vessels. This capability will allow occasional topping off of vessel loads, and may allow the Facility to begin limited operation during the construction of the Area 300 storage tanks. Direct transfer rates from train to vessel would vary depending on the vessel being loaded and the vessel loading phase. Pump systems are expected to be designed for an approximate maximum transfer rate from Area 200 to Area 400 of 14,000 bbl/hr for one feed line and 28,000 bbl/hr for two feed lines. As a result of the configuration, the unloading operation can be conducted so that the flow from one unloading track is diverted to Area 400 (i.e., 14,000 bbl/hr for one feed line), or flow from both tracks is diverted if two trains are unloading at the same time (i.e., 2*14,000 bbl/hr = 28,000 bbl/hr for two feed lines) (Makarow 2016b).

### 2.3.6 Area 300 – Storage

***Storage Tanks***

*The seismic importance factor for the tank design has been added to this section as shown in underlined text.*

The crude oil will be stored in up to six double-bottom, internal floating-roof aboveground storage tanks (ASTs) located in Area 300 (see Figure 2.3-10). These tanks will be approximately 50 feet in height and 240 feet in diameter with a shell capacity of approximately 400,000 barrels each. The normal amount of product stored in each tank will be approximately 360,000 barrels, to take into account the presence of the internal floating roof and the additional headspace required to allow product movement in the event of seismic conditions. The working capacity of the tanks will be approximately 340,000 bbl[19]. The tanks will be painted white and positioned so that the distance between each tank is 120 feet in any direction. A typical cross-section of a storage tank is included in Figure 2.3-12.

[19] Although the tanks could hold approximately 380,000 bbl, in actual operation internal floating roof tanks are never completely full. The working capacity of the tanks is slightly lower than the normal fill capacity.

The ASTs will be erected in the field and constructed per API ~~Standard~~ 650 standards. AST features include a uniformly supported convex flat bottom, welded carbon steel construction, and control of crude oil temperature and internal tank pressure to API specifications, and will use appropriate live load characteristics for roof design. The design of the tanks will meet a seismic importance factor of 1.25, which far exceeds the required design criteria of 1.0. The tank design (inclusive of the 1.25 seismic importance factor) performs similarly to structures in risk Category III (ASCE 7). Two of the tanks may be equipped with electric tank heaters so that the contents of the tanks can be heated to approximately 150°F to control oil viscosity during loading and unloading. A cross-section of a typical electrical heated tank is shown on Figure 2.3-11. All of the tanks will be equipped with mixers to prevent crude oil from stratifying during storage.

## 2.3.7 Area 400 – Marine Terminal

### 2.3.7.1 Marine Terminal Operations

***Vessels Calling at Vancouver Energy Terminal***

*The following additional commitment is added to this section as shown in underlined text.*

Only vessels vetted in accordance with the Tesoro Maritime proprietary vetting process will be permitted to arrive and load at the Facility's marine terminal. This vetting system, "Tesoro Assessment and Ship Clearance" (TASC), is used to review and evaluate the vessel, vessel systems, management company, and vessel crews to ensure all safety and environmental standards are met by the ship, ship owner, and crew. Tesoro's vessel vetting system, TASC, goes above international, and federal standards. Tesoro's most current vessel vetting system is provided at Appendix D.5, along with Tesoro's commitment to safe operating procedures for vessel loading activities (Worley Parsons and DNVGL 2014[20], Bayer 2016a, 2016b). These vetting procedures will be updated as appropriate to reflect conformance with applicable federal standards.

[20] Also included as Appendix N to the PDEIS.

***Vessel Departure and Transit***

*The following text is clarified as shown in underlined text for new/added items and shown in strikethrough for deletions to explain escort tug operations.*

At this time, the pilot comes onboard and the gangway is removed. Two large docking assist tugs are made fast on the starboard bow and starboard quarter. The tugs are then directed to push gently on the vessel, and the mooring lines are released from the shore and retrieved aboard ship starting with the head and stern lines, followed by the breast lines, and lastly the spring lines. Once the lines are all onboard, the second mate on the stern passes the word to the bridge that the propeller is clear and all lines are on board. The pilot uses the docking assist tugs to pull the vessel off the berth and then turn the vessel to starboard in the channel until the bow is pointing down river. Once the laden tanker is undocked from the terminal and pointed down river towards the sea, one tug will remain alongside and become the escort. The tanker will then begin its transit down river followed by the escort. Under normal transit conditions, the escort tug is not exerting any forces on the tanker but rather is shadowing its path closely in order to respond if needed. The actual escort configuration will be determined after consultation with the Columbia River and Bar Pilots and time spent in a ship-handling simulator modeling Columbia River escort scenarios. ~~Once the vessel starts to make headway towards the sea the tugboats are released and the vessel proceeds towards~~ Near Astoria ~~where~~ the River pilot disembarks and the Bar pilot embarks to take the vessel to sea. Once the tanker reaches the mouth of the Columbia River, the escort tug will disengage from the tanker and retrieve the tether line. The tug will then standby as a sentinel until the tanker crosses the bar and is safely underway in open ocean.

### 2.3.7.2 Marine Terminal Configuration and Construction

***Dock-Side Loading Equipment***

*The discussion regarding the 3-bbl catchment and/or sump to be provided at Berth 13 is clarified as shown in underlined text. (Makarow 2016b).*

The Applicant will increase the volume of containment available to capture potential releases at the dock during vessel loading activities.

Federal regulations require a catch basin at the dock that can contain 3 bbl in the event of a spill. The current design has a catch basin with a capacity to contain 84 bbl.

In addition to the catch basin design, the Applicant is committing to change the design to further increase that physical storage capacity of the catch basin by pumping oil out of the catch basin in the event of a spill. This change involves two components. First, the Applicant would use the existing pump and return pipeline already depicted in plans that are used to strip the loading hoses of any residual crude oil and return that crude oil to the Area 300 storage tanks. The Applicant proposes to connect the containment area into this system and implement an automatic trigger that would turn the pump on in the event of a system shutdown, as would occur during a rupture of the loading hoses (further described below). When engaged, that pump operates at a rate of 286 bbl/hr. Second, to further increase the pumping capacity in the event of a larger spill at the dock, the Applicant proposes to install an additional larger landside pump that will connect to the same return piping and catch basin. The additional pump would be of the same size as the ones proposed in the rail unloading area and would pump 2,800 bbl/hr (46 bbl/min). Collectively, this improved system far exceeds the 3 bbl regulatory requirement.

In addition to the improvements described above, several of the design features proposed in the submitted plans are engaged in the event of a spill during vessel loading to limit the volume released. First, the pump electrical drives that power the positive displacement pumps (the pumps responsible for moving oil from the storage tanks to the vessel) include a "safe torque off" feature. This feature removes rotational power from the motor of the positive displacement pumps instantly when an alarm or ESD is triggered. A change in pressure in the transfer pipeline or if the gas detection system is activated (as would occur in the event of a release), are examples of system alarms. An ESD can be manual or automatic, including manual pull station, fire system alarm, or if ground shaking is detected through the seismic sensors. In these cases, alarms or ESDs will stop additional flow of material to the pipelines. Additionally, the pipelines at the dock have 30-second shutoff valves. In the event of a release, the valves are actuated and complete closure will occur within 30 seconds. During those 30 seconds, the valves are incrementally restricting the flow such that it is decreasing over that span of time.

If one assumes it takes 5 seconds for the positive displacement pumps to stop when the "safe torque off" is engaged, and one does not take into consideration any incremental decrease of flow that would be expected when the valve closes during the 30-second shutoff time (both of which are conservative assumptions and tend to underestimate the expected performance), the resulting volume that would flow past the valve during the 30 seconds is approximately 44 bbl.

By comparison, the improvements to the containment design at the dock would provide for the 84 bbl of physical storage capacity and would also remove an additional 48 bbl via pumping in that span of time. More generally, the containment system as described above would take roughly 1 minute to empty the 84-bbl containment area back to the aboveground storage tanks.

### 2.3.8 Area 600 – Boiler Building

*The following is a clarification regarding the diameter of the natural gas service line to be constructed to the Area 600 Boiler Building. Due to the way the "track changes" version of the May 2016 ASC was formatted, it may have led the reader to understand that the natural gas service line was "64" inches in diameter. The following appeared in the "clean version" of the May 2016 ASC and is the correct wording of the statement:*

A new pressure regulator and 6-inch-diameter service line to the boiler building will be constructed.

### 2.3.9 Decommissioning

*The following added information supplements the discussion of anticipated decommissioning requirements in accordance with WAC 463-72-040.*

The Applicant has completed a preliminary assessment of the cost to decommission the Facility, presented as Table 2.3-4 (Corpron 2016). This assessment is based on the status of Facility design as of May 2016, and is illustrative of the approximate decommissioning cost anticipated. The Applicant will provide an updated decommissioning cost based on final Facility design as part of its initial site restoration plan to be submitted in accordance with WAC 463-72-040, and will obtain a performance bond or provide other financial assurance instrument satisfactory to EFSEC for the decommissioning estimate as required by those EFSEC regulations.

## Table 2.3-4. Vancouver Energy Decommissioning Costs

| Area 200 | | | |
|---|---|---|---|
| | Item | Remain | Decom. |
| 1 | Steel weather enclosure/structure | | x |
| 2 | Steel walkways and crossovers | | x |
| 3 | Access platforms | | x |
| 4 | Concrete trenches and vaults. *Note one section of the wall will remain as it will be part of the Capped area and a liner will be tied into this concrete.* | | x |
| 5 | Pilings – will not be removed | x | |
| 6 | Pumps | | x |
| 7 | Piping – product and steam | | x |
| 8 | MCC buildings | | x |
| 9 | Electrical wiring | | x |
| 10 | Lights, horns, and strobes | | x |
| 11 | Fire control buildings | | x |
| 12 | Fire piping | | x |
| 13 | Metering \| Custody transfer skid | | x |
| 14 | Office buildings | | x |
| 15 | Office foundations | | x |
| 16 | Water and sewer piping | x | |
| 17 | Electrical feed | | x |
| 18 | Containment tanks | | x |
| 19 | Asphalt parking area | | x |
| 20 | Drainage catchments to remain | x | |
| 21 | Water line improvements to remain | x | |
| **TOTAL** | | **$6,500,000** | |

| Area 300 | | | |
|---|---|---|---|
| | Item | Remain | Decom. |
| 1 | Ground improvements | x | |
| 2 | Tanks | | x |
| 3 | Ring wall foundation | | x |
| 4 | Interconnecting piping | | x |
| 5 | Pump basin concrete | | x |
| 6 | Fire control building | | x |
| 7 | Fire piping | | x |
| 8 | Storage building | | x |
| 9 | Switch gear and transfer | x | |
| 10 | Tank berm | | x |
| 11 | Liner | x | |
| **TOTAL** | | **$2,000,000 to $6,000,000** | |

Vancouver Energy | Decommissioning Costs June 1, 2016 | Page **1** of **2**

| Area 400 | | | |
|---|---|---|---|
| | Item | Remain | Decom. |
| 1 | All dock structural improvements, mooring changes, and control room | x | |
| 2 | Gear inside MCC room will be disconnected and wire removed, but gear to remain | x | |
| 3 | MVCU units will be removed and foundation eliminated | | x |
| 4 | Spill response equipment and associated conexes will be removed | | x |
| 5 | Overhead steel piping and supports | | x |
| 6 | Loading platform and associated piping | | x |
| 7 | Access platform to remain | x | |
| TOTAL | | $1,300,000 - $2,500,000 | |

| Area 500 | | | |
|---|---|---|---|
| | Item | Remain | Decom. |
| 1 | Spread footings | | x |
| 2 | Piping (all sizes) | | x |
| 3 | Casing and cathodic protection for underground areas – will remain in place for future utility access | x | |
| TOTAL | | $750,000 - $1,200,000 | |

| Area 600 | | | |
|---|---|---|---|
| | Item | Remain | Decom. |
| 1 | Boilers | | x |
| 2 | Building | | x |
| 3 | Water treatment system | | x |
| 4 | Steam piping | | x |
| TOTAL | | $450,000 | |

| RECAP | |
|---|---|
| Area | Decommission Cost Estimate |
| 200 | 6,500,000 |
| 300 | 2,000,000 - 6,000,000 |
| 400 | 1,300,000 - 2,500,000 |
| 500 | 750,000 - 1,200,000 |
| 600 | 450,000 |
| TOTAL | $11,000,000 - $16,650,000 |

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# Section 2.6 Water Supply System

The Facility will require potable water for domestic purposes, non-process industrial water, and emergency fire suppression water. All water required for the Facility is proposed to be obtained from the City's water utility. The Facility will connect to the City's existing water distribution network and construct necessary water service connections.

## 2.6.4 Non-Process Industrial Water

*The following text is updated as underlined text for new/added items and strikethrough text for deletions to provide consistency with the NPDES Engineering Report submitted*

Industrial processes at the Facility are limited to the transfer and storage of crude oil. ~~Process~~The industrial processes on site do not use water for manufacturing, and water does not come into contact with any raw, intermediate, or finished products. Non-process industrial water for the Facility is limited to the boiler plants, miscellaneous part and equipment wash, and cooling water for the fire suppression pumps.

The boiler plant in Area 600, will provide steam to heat crude oil within the rail cars to assist with unloading. The majority of the process water used to make steam will be maintained in a closed loop system. However, some non-process water for the boilers will be necessary for makeup water to replenish the equivalent of steam lost in the system, blowdown water, reverse osmosis reject water, miscellaneous drains, and water treatment. Some steam is lost during the condensate process as the water is returned to the boiler. Additionally, steam condensate blowdown is generated during the unloading of tank cars in Area 200. Within the rail unloading building as part of operating this system, during the connection and disconnection of the rail car steam coils, the operator opens the steam line valves and discharges steam directly to the containment pans. This procedure is an operational necessity, as it purges the lines of debris. Blowdown water is used for flushing particulates from the boiler system. The total of all non-process water for the boilers, including all sources of process water, is summarized in Table 2.6-1.

Inside the rail unloading area (Area 200), there is a ~~process~~ water line for the occasional use of a single pressure washer to clean miscellaneous piping fittings, work surfaces, rail car exterior wash, and equipment. At a maximum, the pressure washer will be rated for 5 gallons per minute (gpm). Conservative water use estimates for the miscellaneous part/equipment wash is included in Table 2.6-1.

The Rail Unloading area, Storage Tanks, and Marine Terminal area are protected with emergency fire pumps. The fire pumps selected for this project require a heat exchanger and cooling water supply to maintain operational engine temperatures. A maximum 30 gpm of cooling water supply is required each week for the required 30-minute maintenance cycling. Once a year fire pump flow testing is additionally required. Fire pump cooling water for the maintenance cycling is included in Table 2.6-1.

**Table 2.6-1. ~~Process~~ Industrial Water Uses and Rates**

| Industrial Process | Average Water Use (gpd) | Maximum Water Use (gpd) |
|---|---|---|
| Area 200 | | |
| - Misc Part/Equipment Wash[a] | 1,000 | 2,000 |
| - Fire Pump[b] | 107 | 900 |
| Area 300 | | |
| Area 300 – Fire Pump[b] | 107 | 900 |
| Area 400 | | |
| - Fire Pump[b] | 100 | 200 |
| - Hose Bibb[c] | 10 | 20 |
| Area 600 – Boiler Building | 52,177 | 69,264 |
| **Total ~~Process~~ Industrial Water** | **53,508** | **73,984** |

Note: gpd – gallons per day, gpm – gallons per minute
[a] Pressure washer rated at 5 gpm, with conservative usage assumptions.
[b] Averaged considering weekly 30-minute maintenance cycling at 30 gpm.
[c] Assumed water use for occasional miscellaneous maintenance activates and facility wash down.

The anticipated maximum day ~~process~~ industrial water demand is approximately 51.4 gpm. ~~Process~~ Industrial water will be isolated from the potable water using approved reduced pressure cross-connection control devices. The annual water usage will vary based on the density and viscosity of the crude oil received, the volume of crude requiring heat and the ambient air temperatures, with lower ambient temperatures requiring higher water usage.

### 2.6.5 Potable Water

Potable water for the Facility is limited to the amount needed to serve the Administrative and Support Buildings (Area 200), future restroom inside the Storage Building (Area 300), and landscape irrigation. The Washington State Department of Health Water System Design Manual estimates that for a "factory" water use can be estimated by using a range of 15 to 35 gallons per day (gpd) per employee. A water use consumption rate of 35 gallons per person per day was used for the maximum, and 25 gpd was used for the average flow. Additional potable water demands for landscape irrigation were calculated and added to the appropriated water system connection location.

Table 2.6-2 shows a breakdown of the potable water uses and rates.

**Table 2.6-2. Potable Water Uses and Rates**

| Potable Water Uses | Average Water Use (gpd) | Maximum Water Use (gpd) |
|---|---|---|
| Area 200 – Admin and Support Buildings | 4,291 | 6,566 |
| Area 300 – Storage Building | 1,148 | 3,131 |
| Area 400 – Future Domestic | 565 | 845 |
| Area 600 – Landscape Irrigation | 266 | 779 |
| Total Potable Water | 6,270 | 11,321 |

Note: gpd – gallons per day
[a] The volume of 35 gpd for industrial factory sewer rates is based on Table G2-2, Design Basis for New Sewage Works (Ecology 2008)
[b] Assumption of 157 employees using facilities in Area 200, 6 employees in Area 300 with other sanitary uses, and 19 employees in Area 400 with other sanitary uses.

The maximum daily potable water demand is equivalent to the need for 6 gpm. Potable water use will be isolated from ~~non-~~potable industrial ~~process~~ water using approved double check cross-connection control devices. The annual water usage will vary based on ambient air temperatures and rainfall, with lower ambient temperatures and higher rainfall requiring less irrigation water usage.

### 2.6.6 Mitigation Measures

*The following section is revised as shown in underlined text for added mitigation.*

Mitigation measures for the water supply consist of the monetary contribution required by the City for water connections and new services. Service connection fees, system development charges, and industrial water use billing will be paid to the City. Connection fees and system development charges paid at the time of building permit application and application for water service is compensatory mitigation paid to the City for the long-term impacts to water rights, source development, system storage, and distribution piping.

The connection to the city water supply system will be made consistent with standard specifications adopted by the City. Backflow devices will be tested yearly per State requirements.

<u>Additionally, a new 12-inch diameter water line loop will be constructed at no cost to the City to eliminate the dead-end supply into the Port of Vancouver and increase overall flow and water supply (Larrabee 2016, Makarow 2016). The section of water line proposed to be constructed would extend from approximately the Port's Administration Offices south of the rail corridor and west along the south side of the Parcel 1A wetland until connection with the existing section of the city's water system located along the east portion of Area 300.</u>

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# Section 2.7 System of Heat Dissipation

*The following text is updated as underlined text for new/added items and strikethrough text for deletions to provide consistency with the NPDES Engineering Report submitted August 12, 2016 (BergerABAM 2016).*

To maintain the quality of water used in the closed system, a small amount of water from the closed steam system will be purged from the system and replaced with fresh water treated to the appropriate quality (see section 2.3.8). In order to meet the temperature discharge limits, the blowdown will be cooled through either a non-contact tube and shell heat exchanger, dry cooling, or a combination there of~~ using the inlet raw water to cool the discharge~~ as discussed in detail in section 2.9.1. The total amount of process water discharged from the boiler building will not exceed 22,464 gallons per day (15.6 gpm).

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# Section 2.8 Characteristics of Aquatic Discharge Systems.

## 2.8.1 Description of Discharge Systems

*The following text is updated as underlined text for new/added items to provide consistency with the NPDES Engineering Report submitted*

There are five separate conveyance systems in which discharges are released from the Facility to eventual aquatic discharges. The multiple discharges are directly related to the spread-out nature of the Facility and the boundaries of the existing drainage basins at the Port. The conveyance systems are listed below.

- Terminal 5 stormwater system
- Terminal 4 stormwater system
- Combined Marine Terminal and Subaru lot stormwater treatment swales
- Process wastewater and domestic sewage discharge to City sanitary sewer
- Process wastewater and domestic sewage hauled off site

A portion of the Facility lease boundary is located within areas determined by the Port to be within its general use area, which the Port defines as areas in which it is not feasible that individual tenants collect and treat their own stormwater discharges. Areas in this Facility that fall under that designation are limited to rail improvements located within the master plan rail corridor, transfer pipeline alignment, <u>and non-pollution-generating rail yard area on the north side of the rail unloading building.</u>

### 2.8.1.1 Terminal 5 Stormwater System.

*The following text is clarified as shown in underlined text to indicate the Applicant's commitment in Section 2.8.1.2.*

Stormwater generated on Terminal 5 is currently collected and treated in accordance with the current stormwater regulations and permitted under permit WAR045201. Construction of the additional rail lines will not affect collection or treatment of the stormwater adversely as the facilities in place were previously designed for the entire 91-acre basin. The conveyance pipeline and non-pollution-generating yard area is considered non-pollution-generating. As part of this project, stormwater inlets receiving stormwater from the general use areas in which the Facility is making improvements will be confirmed to have, or will be retrofitted, with spill containment devices<u>, as described in section 2.8.1.2</u>.

### 2.8.1.2 Terminal 4 Stormwater System

*The following text is clarified as shown in underlined text for new/added items and strikethrough for deletions to identify the Applicant's commitment.*

Stormwater from the general use area of Terminal 4 is currently collected and treated in accordance with the current stormwater regulations and permitted under permit WAR000424. Construction of the transfer pipeline along the general use area will not impact collection or treatment of the stormwater adversely as the facilities in place were designed for stormwater runoff along the rail corridor. ~~As part of this project, stormwater inlets receiving stormwater from the general use areas in which the Facility is making improvements will be confirmed to have, or will be retrofitted with, spill containment devices. The typical containment device is the~~

~~installation of a T or 90 degree elbow on the outlet pipe to prevent crude oil from entering the outlet. Final design and maintenance requirements will be completed in consultation with the Port.~~ Federal regulations require that containment measures be designed for the most likely quantity of oil that will be discharged during the typical failure mode (40 CFR 112.7 (5)(c)). The most likely spill event is small drips resulting from nicks, corrosion pinholes, or gasket seal failures resulting in discharges less than 5 gallons. The Applicant will complete an assessment of the downstream inlets located adjacent to the Facility's transfer pipeline to confirm whether the inlets have existing oil-water spill control devices (Makarow 2016). If any of these inlets do not have existing oil-water spill control devices, the Applicant will equip such inlets with oil-water spill control devices to capture a minimum 5 gallons of oil. The type of spill prevention device most commonly used in these applications is the installation of inverted 90-degree bend or installation of an internal tee or baffle on the outlet pipe that provides sufficient hydraulic volume to capture and contain the 5 gallons of oil.

#### 2.8.1.4 Wastewater Discharge to City Sanitary Sewer

*The following text is clarified as shown in underlined text for new/added items and strikethrough for deletions for disposal to sanitary sewer.*

Wastewater discharging to the City sanitary sewer is generated from the following Facility locations and is described in further detail in section 2.9.

- ~~Process w~~Water from Area 600 Boiler effluent
- ~~Process w~~Water from Storage Fire Pump cooling water
- Domestic sewage from Administrative and Support Buildings
- Domestic sewage from Storage Building

Wastewater is discharged to the City's sanitary sewer at two locations, one just north of the Administrative and Support Buildings into an existing 18-inch diameter gravity sewer, and a second just south of the Storage Area into an existing 18-inch diameter gravity sewer.

Capacity at the connection location for the 18-inch discharge gravity sewers at the Administrative and Support Buildings and Storage Area are 4.84 cubic feet per second and 6.65 cubic feet per second.

Wastewater is conveyed through the City's conveyance system to the WWTP located approximately 1 mile east of the Storage Area at 2323 West Mill Plain Boulevard. The City owns the conveyance pipeline system, treatment plant, and associated outfall. The treatment plant and outfall are regulated under the Municipal NPDES Individual Permit WA0024350.

The WWTP discharges to the Columbia River, which is designated a Class A receiving water in the vicinity of RM 105. The Columbia River has a special temperature standard of 20°C (68°F). Nearby outfalls include Northwest Packing Company (RM 105.1), Great Western Malting (RM 106), Vancouver Marine Park Treatment Plant (RM 110), Vancouver Trout Hatchery (RM 113.5), City of Gresham STP (RM 117.5), and Camas STP (RM 121.2). Ecology approved the most recent mixing zone report in January 1996. A detailed discussion and engineering analysis relating to water body depth, width, maximum and minimum velocities, and a complete mixing zone engineering analysis for surface water quality-based discharge limitations and conformance are included in the previously approved mixing zone study.

A letter confirming conveyance system and treatment capacity from the City has been received (see Engineering Report in section 5.3 of this ASC). The Applicant submitted the City's Industrial Information Form, along with a completed Wastewater Discharge to publicly owned treatment works (POTW) permit application as the basis of review (see Appendix I.1). The maximum day wastewater generated from the Facility is approximately 26 gpm. The Applicant has demonstrated that the proposed discharge will not cause the waste treatment facility to exceed capacities or to violate its authorized discharge limits, including both the quality of the discharge and the volume of the discharge, or to violate the permits governing its operation.

Disposal to sanitary sewer is the Applicant's preferred option. An industrial waste<u>water</u> discharge permit <u>has been submitted to the City of Vancouver, which</u> ~~demonstrating~~ <u>demonstrates</u> compliance with the City of Vancouver's pretreatment standards. <u>Due to timing and uncertainties of this permit being outside of the</u> ~~can and should be issued by~~ EFSEC ~~through the~~ integrated process<u>, the Applicant is proposing additional alternatives be permitted</u>. The Applicant has investigated and confirmed two alternative means by which industrial wastewater can be disposed of without directing discharges to the City's POTW. A description of the discharge options are included in section 2.9.4 below.

#### 2.8.1.5 Haul Off

*The following text is clarified as shown in underlined text for new/added items.*

Wastewater generated from the following Facility locations will be temporarily stored on site and hauled off; these discharge streams are described in further detail in section 2.9.

- ~~Process~~ wastewater from Area 200 Rail Unloading Building
- Fire pump <u>non-contact</u> cooling water from Area 400
- Domestic sewage from Area 400

On-site storage for ~~process~~ wastewater streams is provided through double-walled storage tanks.

- As described in section 2.3.3.1, at Area 200, the double-walled steel fabricated containment tanks are located above-grade. The tanks are sized to store a minimum of three days of average annual flow and/or two days of the maximum day flow (whichever is greater) while preserving an additional 825 bbl of spill containment capacity. The containment tanks are connected to a collection and containment system that contains approximately 35,000 bbls of total storage and secondary containment capacity.
- The fire pump <u>non-</u>cooling water from Area 400 will be discharged to a minimum 1,000-gallon underground storage tank. The wastewaters from the fire pump cooling are estimated at a total of 900 gallons in the worst case produced once per week.
- Domestic sewage in Area 400 will be collected in portable toilets as described in section 2.9.2.

### 2.8.2 ~~Process~~ Wastewater Discharge Alternatives

*The following text is clarified as shown in underlined text for new/added items and strikethrough for deletions.*

Although sanitary sewer discharge is preferred for discharges from the Area 600 Boiler Plant and for Area 300 Fire Pump <u>non-</u>cooling water, these discharges could be routed to either the

Terminal 5 and Terminal 4 NPDES municipal stormwater outfalls or stored on site and hauled off site. The alternative non-process wastewater discharge would be routed to either the Terminal 5 NPDES municipal stormwater outfall or stored on site and hauled off site.

#### 2.8.2.1 Area 600 Boiler Building Discharge

*The following text is clarified as shown in underlined text for new/added items and strikethrough for deletions for disposal to sanitary sewer.*

Discharge to the NPDES outfall would occur by comingling the Area 600 discharge with the stormwater system proposed to be installed on site. The water quality of the discharge alternative ~~is currently being~~ has been evaluated under Ecology's water quality criteria WAC 173-201A-320 for compliance with anti-degradation standard for the Columbia River. Additional discharge cooling would be added to the currently proposed raw water and discharge treatment for the Area 600 boiler plant. The discharge cooling would be provided to achieve a maximum of 20°F discharge temperature.

The downstream stormwater system as proposed would not be significantly modified if this alternative was selected. The stormwater would continue south across the rail corridor and east along the south side of the rail unloading building. The stormwater water quality vault would be upsized to treat the water quality storm plus the maximum day wastewater discharges. This upsizing is required to maintain treatment of the full water quality stormwater flows.

Downstream of the water quality filter is the proposed NPDES monitoring point for this portion of the facility. The discharges are then comingled with the runoff from Terminal 5 as described in section 2.8.1.1.

For the haul-off alternative, the Area 600 wastewater discharges would be pumped or stored on site to a holding tank. The holding tank would be sized to receive a minimum of two days of the maximum day flows, or three days of the average day flows (whichever is greater). The downstream hauling, discharge, and treatment systems are characterized above in section 2.8.1.5.

#### 2.8.2.2 Area 300 Fire Pump Non-Contact Cooling Water

*The following text is clarified as shown in underlined text for new/added items and strikethrough for deletions.*

Discharge to the NPDES outfall was considered during early project development. Discharge to sanitary sewer is considered the preferred discharge alternative; however, if discharge is not authorized to the sanitary sewer, then the volume of weekly maintenance cycling water will be stored on site and hauled off site for disposal.

# Section 2.9 Wastewater Treatment

*The following text is clarified as shown in underlined text for new/added items and strikethrough for deletions.*

Sources of wastewater from the Facility include the boiler plant effluent(including blowdown, reverse osmosis reject water, and miscellaneous drains from the boiler plant), miscellaneous part and equipment wash (including facility wash down, part wash, and occasional rail car exterior wash), fire pump non-contact cooling water, and domestic sewage from the Administrative and Support Buildings and the Storage Area building. Most domestic wastewater sources and the boiler effluent discharges will be connected to the City public sanitary sewer system. Sanitary sewage collected from within the Port area is conveyed to the City's WWTP where it is treated and discharged to the Columbia River under City's NPDES Permit No. WA0024350. All ~~process~~ industrial wastewater discharged from the Facility to the City's sanitary sewer system will undergo pretreatment to ensure compliance with the City's pretreatment program. A copy of the ~~Application for a State Waste Discharge Permit to Discharge Industrial Wastewater to a POTW and the~~ Application for a city Wastewater Discharge Permit is included in section 5.2.

## 2.9.1 ~~Process~~ Industrial Wastewater Sources

*The following text is clarified as shown in underlined text for new/added items and strikethrough for deletions.*

Sources of process wastewater include the following:

- Feed water treatment effluent (reverse osmosis reject water) from the Area 600 Boiler Building
- Blowdown from the Area 600 Boiler Building
- Miscellaneous part and equipment wash water in the rail unloading area (including rail car exterior washing)
- Fire pump cooling water from the Rail Unloading and Office Area, Storage Area, and Marine Terminal

The boiler plant is expected to produce continuous blowdown, with discharge flow rates fluctuating depending on steam demand. Blowdown temperature at the boiler plant will be lowered to a maximum of 104°F through the use of a non-contact tube and shell heat exchanger. The blowdown water will then be pumped to the Area 200 systems, pass through an oil-water separator, and mixed with domestic waste from the Admin Buildings prior to discharge to sanitary sewer. Average and maximum process wastewater steady state flow rates are summarized in Table 2.9-1.

Miscellaneous part and equipment washing (including rail car exterior wash) will be completed in a designated area located within the Rail Unloading and Office Area. Wash water will be generated from a single 5-gpm pressure washer and will be collected and conveyed to the Unloading Facility Containment Tanks for haul off.

Steam condensate blowdown is generated during the unloading of tank cars in Area 200. Within the rail unloading building as part of operating this system, during the connection and disconnection of the rail car steam coils, the operator opens the steam line valves and discharges

steam directly to the containment pans. This procedure is an operational necessity, as it purges the lines of debris. This results in the discharge of steam condensate blowdown. The steam condensate blowdown is collected in the Area 200 containment pans, which discharge to the Area 200 containment tanks.

The fire pumps are required to operate for a 30-minute maintenance cycle once a week. Non-contact ~~C~~cooling water from the fire pumps will be discharged for the Unloading Facility Containment Tanks, City's sanitary sewer system, and on-site storage tanks for the Unloading Area, Storage Area and Marine Terminal areas, respectively.

Venting from the crude oil drain line will be piped in a continuous loop back through the top of the rail car, capturing all crude oil vapors within the rail car and/or crude pipelines. Therefore, no discharge of heavily hydrocarbon saturated condensate is necessary.

**Table 2.9-1. ~~Process~~ Industrial Wastewater Sources**

| Wastewater Stream | Average Daily Flows (gpd) | Maximum Daily Flows (gpd) |
|---|---|---|
| Area 200 | | |
| – Miscellaneous Part/Equipment Wash | 1,000[a] | 2,000[a] |
| – Fire Pump Non-Contact Cooling Water | 107[a] | 900[a] |
| – Steam Condensate Blowdown | 6,441 [a] | 7,952 [a] |
| Area 300 | | |
| – Fire Pump Non-Contact Cooling Water | 107 | 900 |
| Area 400 | | |
| – Fire Pump Non-Contact Cooling Water | 107[a] | 900[a] |
| – Miscellaneous Equipment Drains | 10[a] | 20[a] |
| Area 600 | | |
| – Boiler Building Effluent | 16,922 | 22,464 |
| **Sanitary Wastewater Total ~~Process~~ Industrial Wastewater** | **24,694** | **35,136** |

Note: gpd – gallons per day

[a] Process water discharged to stormwater system for treatment or stored on site and hauled off site for disposal.

The approximate constituent concentrations in the non-process wastewater are shown in Table 2.9-2. Detailed analysis of the boiler plant effluents was completed by DMS-Nalco assuming City water for make-up water and a reverse osmosis treatment unit for processing of boiler feed water. The analysis demonstrated that the combined effluent from the boiler plant will meet the discharge standards in the City's Pretreatment Ordinance VMC 14.10.

**Table 2.9-2. Estimated Chemical Makeup of Process Water Discharge**

| Key Water Constituents | Pre-Treatment Ordinance Local Limits (VMC 14.10) | |
|---|---|---|
| **All Units in mg/L** | | **Final Waste Water Discharge** |
| *Ag as Ag* | 1.130000 | ND |
| *As* | 0.220000 | ND |
| *Cd as Cd* | 0.140000 | ND |
| *Cr as Cr* | 7.220000 | ND |
| *Cu as Cu* | 3.670000 | ND |

| Key Water Constituents | Pre-Treatment Ordinance Local Limits (VMC 14.10) | |
|---|---|---|
| All Units in mg/L | | Final Waste Water Discharge |
| *Hg as Hg* | 0.008000 | ND |
| *Mo as Mo* | 0.420000 | ND |
| *Ni as Ni* | 0.900000 | ND |
| *Pb as Pb* | 0.440000 | ND |
| *Se as Se* | 0.310000 | ND |
| *Tl as Tl* | 0.530000 | ND |
| *Zn as Zn* | 1.640000 | 0.061776 |
| *CN as CN* | 0.470000 | NT |
| *BOD5* | 500.000000 | 6.428280 |
| *FOG* | 50.000000 | 7.713936 |
| *pH* | 10.000000 | 8.418850 |
| *Temp F* | 104.000000 | 75.774029 |

Additional non-process wastewater may be generated intermittently from the unloading area. Non-process wastewater originating from within the unloading area may include rainwater that enters the building from rail cars and is blown in at the entry and exits, oil and other contaminates dripping off rail cars, and fire retardant foam released by the fire suppression system during routine maintenance. Containment pans and secondary containment trenches will be installed between and adjacent to the tracks of the rail car unloading building to capture any spilled oil, rainwater, and biodegradable fire retardant and direct it to sump pumps installed at low points within each containment trench. The sump pumping system will transfer any collected non-process wastewater to a series of aboveground containment tanks where it will be removed by a vacuum truck or pumped out of the tanks and hauled off site to a licensed and approved disposal Facility.

The Applicant is considering the following feasible alternatives for discharge of the boiler plant wastewater. These options will be pursued as part of the EFSEC permit approval process for the wastewater discharges.

***Option 1 – Preferred Discharge to City's sanitary sewer***

Discharges from the boiler plant will be cooled to reduce its temperature below 104°F, and then will be pumped to the Area 200 systems, passed through an oil-water separator, and mixed with domestic wastewater from the admin buildings prior to discharge to sanitary sewer. A detailed evaluation of the boiler plant wastewater characterization was completed and confirmed that the discharges from the boiler plant meet the City's Pretreatment Ordinance for discharge to City's sanitary sewer. A sewer availability letter was received from the City indicating that the City has sufficient capacity in the collection system and treatment plant to receive these flows. This discharge would be permitted through ~~EFSEC following conformation by EFSEC and their contract reviewer that the discharges meet the City's pretreatment requirements~~ the City of Vancouver. The City's Industrial Information Form and application ~~for a State Waste Discharge Permit to Discharge Industrial Wastewater to a Publicly Owned Treatment Works is included in~~ for a wastewater discharge permit is included in section 5.2 of this ASC.

***Option 2 – Discharge to stormwater outfall***

Discharges from the boiler plant will be cooled to reduce their temperature below 20°C. Discharges will be comingled at the boiler plant with the stormwater from Area 600 and discharged south under the railroad tracks into Area 200 where the comingled stormwater and process water will be additionally treated through water quality filter vaults. A Tier II anti-degradation water quality ~~review is underway~~ has been completed as part of the permitting process that ~~will~~ demonstrates that there is no measureable change in the water quality of the Columbia River in accordance with WAC 173-201A-320. This discharge would be permitted through the NPDES Industrial Individual Permit process by EFSEC.

***Option 3 – Haul off***

Discharges from the boiler plant will be cooled to reduce its temperature below 104°F. Storage of the boiler plant discharges will be constructed on site in a storage tank of approximately 70,000 gallons. The sizing of the tank would be sufficient to store three days of the maximum day discharge from the Boiler Plant. Haul off would be provided through a contract vendor, such as Bravo Environmental, and hauled to a permitted industrial wastewater pretreatment facility, such as PPV Inc. It is anticipated that the haul-off option would result in an average of additional 2.5 truck trips per day during operation of the Facility.

### 2.9.2 Domestic Strength Wastewater Sources

Sources of domestic strength wastewater include the following:

- Domestic strength sanitary discharge from the administrative and support buildings
- Domestic strength sanitary discharge from the Storage Area Building
- Domestic strength sanitary discharge from the Marine Terminal

Domestic strength sanitary wastewater from the Administrative and Support Buildings in Area 200 will consist primarily of domestic waste from kitchen/break room, restroom facilities, and shower areas. Domestic strength sanitary wastewater from restrooms and other sanitary facilities will also be produced at the Area 300 Storage Building. No pretreatment is proposed at these locations. Discharges from both the Administrative and Support Buildings and Storage Building will be discharged directly to the sanitary sewer. Marine Terminal (Area 400) employees will use portable toilets located at the Marine Terminal. Sanitary waste from the Marine Terminal would be hauled off site (see Table 2.9-3).

**Table 2.9-3. Domestic Wastewater Sources**

| Wastewater Stream | Average Daily Flows (gallons per day) | Maximum Daily Flows (gallons per day) |
|---|---|---|
| Area 200 – Admin and Support Buildings | 3,925 | 5,495 |
| Area 300 – Storage Building | 150 | 210 |
| Area 400 – Portable toilets | 475[a] | 665[a] |
| **Total Domestic Wastewater** | **4,550** | **6,370** |
| **Domestic Wastewater to Sanitary Sewer** | **4,075** | **5,705** |

Note: gpd – gallons per day

[a] Domestic wastewater stored on site and hauled off site for disposal.
[b] Wastewater production at Areas 300 and 400 is assumed with employee concentrations of 6 and 19, respectively.

### 2.9.3 Process Wastewater Treatment Alternatives

Final treatment of all wastewater discharged from the Facility to the public sanitary sewer will be done at the City's existing WWTP. No treatment process modifications at the WWTP will be necessary to accommodate this project. Pretreatment will be conducted on site per the requirements of the City's pretreatment ordinance. Non-~~P~~process wastewater streams requiring pretreatment include Area 600 boiler effluent and Area 300 fire pump non-contact cooling water. Pretreatment ~~processes~~ for these waste streams will be designed and furnished to meet wastewater discharge permit requirements.

Treatment technologies used in the boiler plant consist of a reverse osmosis raw water treatment with rechargeable water softener cartridges. Two heat exchangers are installed on the discharge side of the boiler plant to adjust temperature to a maximum of 104°F. A detailed analysis of the water quality and balance within the boiler plant was completed by DMS-Nalco and demonstrates that the water quality of the discharge meets the discharge requirements of the City's pretreatment ordinance, monitoring for pH, conductivity, and flow.

The fire pump non-contact cooling water may require treatment for chlorine residual prior to discharge to the City's sanitary sewer system. After the fire pump maintenance cycling, the discharge water will be temporarily stored in on-site tank to confirm that temperature and chlorine levels are suitable for discharge. The performance specifications for the fire pump indicates that the water temperature leaving the units should be approximately 70°F and, therefore, treatment is not proposed. Chlorine levels could be reduced through the addition of Vitamin C or sodium sulfite tablets.

### 2.9.4 Selection of Wastewater Treatment Alternatives

The total discharge amount of the Facility's wastewater flows is not significant when compared to the overall treatment plant flows or capacity. The boiler units and effluent pretreatment systems are standard. An assessment of all known, available and reasonable methods of prevention control and treatment (AKART) was completed at a high level for the Facility. The wastewater discharges from the site were identified for the appropriate discharge location as a result of proximity to the City's sewer, and risk of potential contaminates with the transloading process. Where the transloading process had the potential to interface with stormwater or wastewater, a haul-off approach was selected to protect water quality. This approach allows for the use of additional testing of effluents by the receiving facility, allows the capture and recycling of any oils within the wastewater, and centralizes the treatment at a facility with advanced forms of treatment.

The on-site wastewaters proposed for discharge to the City's sanitary sewer are all treated through the use of off-the-shelf-treatment technologies, such as package reverse osmosis units, package water softeners, heat exchangers, and dechlorination systems. The design team considered the use of package water softener in lieu of the reverse osmosis unit and found through detailed modeling that the background silica levels in the City's water presented operational concerns for the boiler plant. Therefore, the treatment technology was replaced to a reverse osmosis unit with water softener canisters.

Plate and tube and shell heat exchangers were also evaluated, and the tube and shell variety was selected as the preferred alternative due to ease of maintenance.

### 2.9.5 Waste Discharge/Water Quality Standards

Maximum wastewater discharges to the City's sanitary sewer system by the Facility will account for less than 0.1 percent of the total treatment capacity of the City's WWTP. The WWTP uses an activated sludge process, UV disinfection, and sludge incineration for treatment, and is rated for a maximum wet weather treatment capacity of 28.4 MGD. Current treatment plant maximum demands listed in the most recent Ecology facility fact sheet dated 2003 is 17.4 MGD. The WWTP is permitted through Ecology and its municipal NPDES Individual Permit WA0024350.

New wastewater sources will be connected to the existing public sanitary sewer via a combination of new gravity and pressure sewer lines. A small ~~sanitary sewer~~ wastewater pump station is necessary to convey wastewater from the Area 600 Boiler Building to the discharge location near the Administrative and Support Buildings. The public sanitary basin to which the Facility discharges contains a single pump station at the southeast corner of the Storage Area.

The City reviewed a pre-application narrative which listed wastewater discharges of 30 gpm and indicated that the City has sufficient wastewater treatment and conveyance capacity to serve the project (Aaron Odegard, City of Vancouver, Personal Communications, July 2013). An Industrial Information Form and copy of the Wastewater Discharge to POTW permit application have been submitted to the City. A letter stating that the City has sufficient capacity has been received and is attached in the Engineering Report in section 5.3 of this ASC.

The City commented on page 76 of the "City of Vancouver Comments Regarding Consistency of Proposal with Land Use Plans and Zoning Regulations" that the facility, with regard to non-domestic discharges, has sufficient capacity to receive the wastewaters from the Facility. Additionally, the City commented, "The applicant has provided sufficient information to grant preliminary approval related to this standard. Final civil engineering review and approval is required." A detailed analysis of the wastewater discharges demonstrates full compliance with the City's pretreatment ordinance in VMC 14.10.

Discharges to the City's sanitary sewer system will comply with VMC Title 14.10 Pretreatment Ordinance. The following discharge limits are specified in VMC 14.10.

**Table 2.9-4. Required Wastewater Discharge Constituent Limits**

| Constituent | Daily Maximum Concentration Limit | Instantaneous Concentration Limit | Unit |
|---|---|---|---|
| pH (minimum) | 5.5 | N/A | - |
| pH (maximum) | 10.0 | N/A | - |
| Arsenic | 0.22 | 0.44 | mg/L |
| Biological oxygen demand | 500 | - | ppd |
| Cadmium | 0.14 | 0.28 | mg/L |
| Chromium | 7.22 | 14.44 | mg/L |
| Chromium (hexavalent) | 4.28 | 8.56 | mg/L |
| Copper | 3.67 | 7.34 | mg/L |
| Cyanide | 0.47 | 0.94 | mg/L |
| Hydrocarbon based Oil & Grease | 50.0 | - | mg/L |
| Lead | 0.44 | 0.88 | mg/L |
| Mercury | 0.008 | 0.016 | mg/L |
| Molybdenum | 0.42 | 0.84 | mg/L |

| | | | |
|---|---|---|---|
| Nickel | 0.90 | 1.80 | mg/L |
| Selenium | 0.31 | 0.62 | mg/L |
| Silver | 1.13 | 2.26 | mg/L |
| Temperature* | 104 | | mg/L |
| Thallium | 0.53 | 1.06 | mg/L |
| Zinc | 1.64 | 3.28 | mg/L |

* Temperature of the total influent measured at the treatment plant.

Discharges additionally will comply with VMC 14.10.050 Prohibited Discharge Standards, VMC 14.10.060 National Categorical Pretreatment Standards, and VMC 14.10.070 State Pretreatment Standards.

An application for a wastewater discharge permit has been submitted to the ~~EFSEC to approve discharges to the~~ City of Vancouver~~'s POTW~~.

The Facility is not subject to categorical standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N, and does not meet the definition in VMC 14.10.040 WW as a significant industrial user. A detailed wastewater characterization was completed for the proposed industrial wastewater discharge streams. Detailed modeling of the boiler plant was completed by DMS-Nalco and is based upon DMS-Nalco's expertise modeling, maintaining, and servicing local boiler facilities. The full wastewater characterization report was submitted to EFSEC in the NPDES response letter dated May 17, 2016 (Makarow 2016). The industrial wastewater discharges from the Facility will meet the requirements of the City's pretreatment ordinance in VMC 14.10.

The Applicant believes that disposal to sanitary sewer is the preferred option for the Facility~~ and that a pretreatment permit can and should be issued by EFSEC~~. The Applicant is concerned that a City permit would be subject to a separate review and appeal process, rather than the integrated process envisioned by Ch. 80.50 RCW. For that reason, the Applicant has investigated and confirmed two alternative means by which industrial wastewater can be disposed of without directing discharges to the City's POTW. These are summarized as follows (Makarow 2016).

***Alternative 1: Boiler Wastewater Discharge to NPDES Outfall***

Discharges from the boiler plant as compared to the state water quality standards in WAC 173-201A by DMS-Nalco are suitable for discharge to the Columbia River through the existing stormwater system. Additional treatment for temperature may be required following detailed engineering design of the systems to meet the anti-degradation water quality standard within the Columbia River.

For ~~If~~ this alternative~~ is selected as the preferred alternative~~, a Tier II anti-degradation water quality standards review (WAC 173-201A-320) ~~will be~~ has been completed, ~~for the Facility to~~ which demonstrates that Facility discharges from the Boiler Building will not result in a detectable change in water quality.

Under this alternative, the fire pump non-contact cooling water discharge from Area 300 will be converted from a discharge to the City's sanitary sewer system to a collection tank and hauled off. PPV Inc. reviewed the anticipated characterization for the fire pump non-contact cooling water and provided a description of treatment methods they would use at the treatment facility.

***Alternative 2: Boiler Wastewater Haul Off***

The wastewater constituents of the discharge was provided to PPV Inc. and reviewed by their in-house staff who prepared a summary of the proposed treatment process to be used for the Terminal's wastewater. This summary is provided as an attachment to the NPDES Engineering Report response letter attached in section 5.3 of this ASC.

Under this alternative, the fire pump non-contact cooling water discharge from Area 300 will be converted from a discharge to the City's sanitary sewer system to a collection tank and hauled off. PPV Inc. reviewed the anticipated characterization for the fire pump non-contact cooling water and provided a description of treatment methods they would use at the treatment facility.

# Section 2.10 Spill Prevention and Control

### 2.10.2.3 Aboveground Storage Tanks

*The following text is clarified with the addition of the underlined text.*

- As described in section 2.3.6, constructing the tanks in a fully lined bermed area with the capacity to contain 110 percent of the API 650 maximum capacity of the largest tank and precipitation from a 24-hour, 100-year storm event. The Applicant has demonstrated capacity will remain if worst-case subsidence due to seismic induced liquefaction (Makarow 2016a).

### 2.10.2.4 Transfer Pipelines and Pumping Systems

*To clarify the spill containment measures applied to transfer pipelines, the following information is added with text shown in underline*

Federal regulations require that containment measures be designed for the most likely quantity of oil that will be discharged during the typical failure mode (40 CFR 112.7 (5)(c)). The most likely spill event is small drips resulting from nicks, corrosion pinholes, or gasket seal failures resulting in discharges less than 5 gallons. The Applicant will complete an assessment of the downstream inlets located adjacent to the Facility's transfer pipeline to confirm whether the inlets have existing oil-water spill control devices (Makarow 2016b). If any of these inlets do not have existing oil-water spill control devices, the Applicant will equip such inlets with oil-water spill control devices to capture a minimum 5 gallons of oil. The type of spill prevention device most commonly used in these applications is the installation of inverted 90-degree bend or installation of an internal tee or baffle on the outlet pipe that provides sufficient hydraulic volume to capture and contain the 5 gallons of oil.

*The following text is clarified as shown in underlined text to identify the available secondary and tertiary spill containment volume in Area 200:*

Design elements related to containing unanticipated discharges will include:

Piping systems associated with the unloading of crude oil in Area 200 will be placed in concrete trenches; these trenches ~~can~~ serve as secondary containment in the event of a product discharge. Should a discharge occur in the trench, the materials will be removed by vacuum truck and recycled or disposed off site at an approved location. The concrete trenches and connected pump basins have a secondary containment capacity of 33,400 bbls.

Pumps will be located in concrete basins; the concrete basins can serve as secondary containment in the event of a product discharge. Should a discharge occur in the pump basins, the materials will be removed by vacuum truck and recycled or disposed off site at an approved location.

### 2.10.2.5 Marine Vessel Loading

As described in section 2.3.5, the trestle at Berth 13 will be equipped with piping and hoses to transfer the crude oil from the transfer pipeline system to the receiving marine vessel. In accordance with 33 C.F.R. § 154.530 a facility transferring oil or hazardous materials to or from a vessel with a capacity equal to or greater than 250 barrels, must have fixed catchments, curbing, or other fixed means for small discharge containment of materials at the hose handling and loading arm area, each hose connection manifold area, and under each hose connection that will be coupled or uncoupled as part of the transfer operation. For this Facility, it is anticipated

that the hose diameter will be between 6 and 12 inches, requiring that discharge containment capacity must be at least three barrels.

At Berth 13, a catchment and sump ~~capable of holding 3 bbl of discharge~~ will be constructed at or below the deck level of sufficient capacity to hold the small discharge containment in addition to stormwater that may fall in the catchment area. The containment will be discharged within one hour of completion of any transfer by pumping into the return line.

*The discussion regarding the 3-bbl catchment and/or sump to be provided at Berth 13 is clarified as follows (Makarow 2016b) as shown in underlined text, in this section following paragraph 2.*

The Applicant will increase the volume of containment available to capture potential releases at the dock during vessel loading activities.

Federal regulations require a catch basin at the dock that can contain 3 bbl in the event of a spill. The current design has a catch basin with a capacity to contain 84 bbl.

In addition to the catch basin design, the Applicant is committing to change the design to further increase that physical storage capacity of the catch basin by pumping oil out of the catch basin in the event of a spill. This change involves two components. First, the Applicant would use the existing pump and return pipeline already depicted in plans that are used to strip the loading hoses of any residual crude oil and return that crude oil to the Area 300 storage tanks. The Applicant proposes to connect the containment area into this system and implement an automatic trigger that would turn the pump on in the event of a system shutdown, as would occur during a rupture of the loading hoses (further described below). When engaged, that pump operates at a rate of 286 bbl/hr. Second, to further increase the pumping capacity in the event of a larger spill at the dock, the Applicant proposes to install an additional larger landside pump that will connect to the same return piping and catch basin. The additional pump would be of the same size as the ones proposed in the rail unloading area and would pump 2,800 bbl/hr (46 bbl/min). Collectively, this improved system far exceeds the 3-bbl regulatory requirement.

In addition to the improvements described above, several of the design features proposed in the submitted plans are engaged in the event of a spill during vessel loading to limit the volume released. First, the pump electrical drives that power the positive displacement pumps (the pumps responsible for moving oil from the storage tanks to the vessel) include a "safe torque off" feature. This feature removes rotational power from the motor of the positive displacement pumps instantly when pressure in the line drops or if the gas detection system is activated (as would occur in the event of a release), thus, stopping additional flow of material to the pipelines. Additionally, the pipelines at the dock have 30-second shutoff valves. In the event of a release, the valves are actuated and complete closure will occur within 30 seconds. During those 30 seconds, the valves are incrementally restricting the flow such that it is decreasing over that span of time.

If one assumes it takes 5 seconds for the positive displacement pumps to stop when the "safe torque off" is engaged, and one does not take into consideration any incremental decrease of flow that would be expected when the valve closes during the 30-second shutoff time (both of which are conservative assumptions and tend to underestimate the expected performance), the resulting volume that would flow past the valve during the 30 seconds is approximately 44 bbl.

By comparison, the improvements to the containment design at the dock would provide for the 84 bbl of physical storage capacity and would also remove an additional 48 bbl via pumping in

that span of time. More generally, the containment system as described above would take roughly 1 minute to empty the 84-bbl containment area back to the aboveground storage tanks.

In addition the design elements aimed at preventing discharges of oil during conveyance will include:

Hoses and their supporting equipment will be designed to meet the applicable hose protection requirements of WAC 173-180 Part B and 33 CFR 156.

All piping located over water will be welded and will not contain any mechanical joints. Vessel mooring systems will meet the applicable requirements of 33 CFR 156.

The Applicant conducted an assessment of the oil spill risk from vessel loading operations and equipment at the Facility (see section 8 and Appendix B of Appendix P.1 to this ASC). In general, the study did not take into account any of the required containment systems that would be in place at the terminal, nor does it account for catchments or surface elevation changes on the facility (with only one exception in one scenario). Also, because the majority of the equipment analyzed in the study is proposed to be located on land, not all spills would reach the river. The use of the phrase "release" for purposes of the study refers to oil, which is no longer in its intended equipment (i.e., within piping, hoses, connecting equipment), but has not necessarily reached the water. The cargo loading oil spill risk assessment derived the types of equipment failures most likely to occur. The study used two different methodologies. The first used standard safety QRA practices and global failure frequencies. The second used Tesoro-specific historical spill experience and a spill study prepared for Ecology to estimate the potential for spills of various quantities. The study identified release scenarios based on the equipment where the failure occurred, whether the release resulted from a small, medium, large or full bore opening, and whether isolation of the transfer piping was successful or not. Released oil spill volumes were estimated for these scenarios, taking into consideration static and dynamic equipment inventories, and representative isolation times. The study concluded that small releases (less than 100 bbl) were the most likely, with an estimated frequency of one every seven to nine years. This conclusion was supported by the historical record, which demonstrates that the majority of spills are less than 1 bbl. Loading hoses contribute to the majority of this risk. The replacement of these hoses every five years (as mandated by state and federal regulations) is expected to further reduce the likelihood of these small releases. Spills of tens of thousands of bbl resulting from full bore rupture of the largest transfer pipeline were estimated to be very significantly less frequent, occurring once every 39,000 years or more.

### 2.10.2.6 Booming

*The following clarification and additions as shown in underlined text and deletions as shown in strikethrough text, is provided to this subsection regarding how the Applicant will comply with the pre-booming requirements of WAC 173-180-224 (Makarow 2016c). Attachment 1 to the response to Data Request 11 (Makarow 2016c) is also incorporated into the ASC as Appendix B.7. As identified in the response to EFSEC EIS Data Request 11, the "Current Buster" and "Harbour Buster" are the same equipment and this subsection is, therefore, revised as shown in underlined text for new/added items and strikethrough for deletions.*

In accordance with the requirements of WAC 173-180, the Applicant will ~~prepare and~~ implement a booming plan. The purpose of the booming plan is to deploy booms in advance of each crude oil transfer to ensure that any materials accidentally discharge to surface water can be contained.

The Facility will be classified as a "Class I" facility under WAC 173-180-025 (8), that meets "Rate A" oil transfer conditions (i.e., transfers greater than 500 gallons per minute, per WAC 173-180-220 (2)(a). The Facility will, therefore, be required to meet the pre-booming requirements and Rate A alternative measure requirements of WAC 173-180-221. In accordance with these requirements, the Applicant has developed and submitted to EFSEC for review the following preliminary reports contained within the Facility Oil Handling Manual[22].

- Appendix K – Safe and Effective Threshold Determination Report (included as Appendix K of the Operations Facility Oil Handling Manual, Appendix B.5 of this ASC). - identifies the conditions under which booming can be conducted safely. ~~"safe and effective threshold determination report" (included as Appendix K of the Operations Facility Oil Handling Manual, Appendix B.5 of this ASC)~~. ~~This~~ The final version of this report will identify a Facility-specific booming strategy taking into account ambient conditions (e.g., currents, wind speeds, vessel traffic, etc.) to ensure that transfers are conducted to meet the standards for safe oil transfer operations and meet the zero spill goal (WAC 173-180-010). The Applicant will develop a final safe and effective determination report based on final terminal design, and will submit the report for state review and approval 120 calendar days prior to the first crude oil transfer operation at the Facility as required by WAC 173-180-224 (4).

- Appendix L – Unsafe Operating Conditions - identifies the thresholds for unsafe operating conditions. Appendix L currently sets the threshold at wind speeds of 35 miles per hour. In the next update of the spill planning documents, the Applicant will amend this threshold to prohibit transfer operations when winds exceed 35 mph or river current (as measured at the dock) exceeds 4 knots.

- Appendix M – Pre-booming Oil Transfer - identifies the standard procedures that will be used to pre-boom the vessel before being loaded, taking into consideration the safe and effective thresholds and the unsafe operating conditions identified in Appendices K and L, respectively. The pre-booming procedures will also comply with WAC 173-180-221 (6).

[22] These appendices were originally submitted with the preliminary Facility Oil Handling Plan to EFSEC in June 2015 and have been reproduced in Appendix B.5 of the May 2016 Revised Application for Site Certification (2016 ASC).

Based on the preliminary design of the Facility as presented in this ASC, and experience with oil transfers at other facilities, the Applicant has performed a preliminary review of booming requirements and anticipates the pre-booming system will consist of a fence boom placed between the vessel location and the shoreline, and a floating boom deployed after a vessel is at the berth. The floating boom would be connected with the fence boom on the downstream and upstream to ensure the vessel is fully encircled by boom.

Figure 2.10-1 illustrates this conceptual pre-booming configuration. As noted above, the final configuration will be submitted for review to EFSEC.

The fence boom would be secured with tide slides and fixed down wires hung from the berth structure. The floating boom would be stored on the berth, and would be deployed using a boom boat. Once in place, the floating boom would be anchored at the upriver and downriver ends to hold the boom position during the transfer operation.

As required by WAC 173-180-224, the Applicant considered and presented site-specific information to identify the safe and effective thresholds for booming. The Applicant identified a safe and effective current threshold of 1.5 knots, which is in excess of the average current in the area of the proposed facility on the Columbia River for most of a calendar year[23]. In addition, the Applicant will retain a licensed professional to gather and assess relevant weather and current data to determine, to the best extent possible and based on historical trends, the number of days per year conditions are projected to exceed two thresholds relevant to transfer operations: (1) the "safe and effective threshold" identified in Table 1 and Figure 2 of Appendix K (Safe and Effective Threshold Determination Report) of the Preliminary Operations Facility Oil Handling Manual; and (2) the conditions that determine when transfer operations must cease, as specified in Table 4 of the preliminary Operations Facility Oil Handling Manual. Additionally, Applicant will install equipment at the dock that measures wind speed, wind direction, and current speed to facilitate ongoing compliance with these thresholds and to continue monitoring frequency with which conditions exceed these thresholds after project construction. That data may be incorporated when assessing regularly required updates of the Operations Facility Oil Handling Manual and other spill planning documents.

When conditions prevent safe and effective pre-booming, WAC 173-180-224 allows transfers when alternative measures are in place to respond to a spill. The WAC requires that a report be submitted to Ecology when pre-booming cannot be safely conducted and that alternative measures be implemented (WAC 173-180-224(3)). The Applicant has demonstrated that alternative measures will be implemented in accordance with the requirements of WAC 173-180-224 (7) as follows.

- WAC 173-180-224 (7) (a) – Access to four times the length of the largest vessel involved in the transfer, or 2,000 feet, whichever is less: As indicated in section 7.1.8 of the Oil Spill Contingence Plan, the Facility will have available 1,600 feet of fence boom permanently installed, 1,000 feet of boom placed on a reel for deployment and recovery during pre-booming, and 2,000 feet of boom on standby. A boom boat (aka skiff) will be used to

[23] See Table 1 and Figure 2 of Appendix K (Safe and Effective Threshold Determination Report) to the Operations Facility Oil Handling Manual.

deploy the boom during pre-booming. As indicated in the Facility Oil Handling Manual, Appendix M "Pre Booming Transfer Plan," page M-2: "During transfer, the boom boat will remain in the water and on site to tend to and provide standby inspection of the boom."

- WAC 173-180-224 (7) (b) – Availability of containers for holding recovered oil, non-sparking hand scoops, shovels and buckets, sorbent materials, and capacity for a seven-barrel oil spill: The Applicant will provide these materials in the vicinity of the loading operation.

- WAC 173-180-224 (7) (c) – Ability to safely track the spill in low visibility conditions, on scene within 30 minutes of the identification of a spill: As indicated in section 2.4 of the Oil Spill Contingency Plan, the Applicant has identified such means, including the use of patrol boats, tracking buoys, and aerial surveillance.

- WAC 173-180-224 (7) (d) and (e)(i) – Ability to completely surround the vessel(s) and facility/terminal dock area directly involved in the oil transfer operation, or pre-boom the portion of the vessel and transfer area, which will provide for maximum containment of any oil spilled into the water: See the pre-booming plan and the response to WAC 173-180-224 (7)(a).

- WAC 173-180-224 (7) (e)(ii) – Availability of a skimming system in standby status, with the capability of 50 barrels recovery and 100 barrels of storage: two fuzzy disc skimmers for the rapid response boom will be provided.

~~Booming activities will meet and effective booming threshold of 1.5 knots (in excess of the typical 1.0 knot effective threshold) so that effective pre-booming would not be precluded a substantial portion of the year.~~ Furthermore, Vancouver Energy has purchased two NOFI ~~Harbour~~ Current Busters©[24]. The ~~Harbour~~ Current Busters© are mobile containment booms that can withstand current speeds up to ~~3 to~~ 5 knots, and include an integrated oil/water separator and storage tank (15 cubic meters gross, approximately 5 cubic meters of net oil). One of these systems will be located at the Facility Marine Terminal; the second is currently stored in Portland but will be moved to the Pasco area when the Facility begins operation. These containment booms can be rapidly deployed, and the one located at the Facility will be on standby during all marine transfer operations.

~~The booming system would be designed with connections for a rapid oil skimmer (also known as e.g. the a "Harbor Current Buster") designed for use in current speeds expected at the facility.~~ The ~~Harbor-~~ Current Buster would be stowed ~~on~~ at the berth on a reel in a container on a flatbed trailer towable by three-quarter ton or one-ton pickup truck. ~~for example on a small aluminum flat-barge with wheels~~. When needed, it would be ~~launched~~ deployed. In addition, two trailer-mounted, aluminum, recovered-oil storage barges will be stored at the berth. The barges would be designed for compatibility with the boat that is used for deploying the floating boom. The

[24] These mobile containment booms will also be added to Table 4 of the Operations Oil Handling Manual, and Figure 7.2 of the Operations Oil Spill Contingency Plan in future revisions.

boat would maneuver the ~~Harbor~~ Current Buster-barge into position where the fence- and floating- boom pigtails would be attached to the ~~Harbor~~ Current Buster and it is then deployed into the water from the barge or would be a stand-alone recovery boom just downstream from the dock.

If conditions preclude safe and effective booming, the skiff will be deployed to the waters in the vicinity of the loading operations at all times during loading and will be on standby to assist with deployment of the Current Buster and to perform spill response activities[25,26].

Finally, as indicated in the subsection entitled "Other" of the Appendix L - Unsafe Operating Conditions, the Applicant will also employ and rely upon response equipment made available by Marine Spill Response Corporation (MSRC): "Currently, requirements for Rate A transfers under the Alternative Measures requirement are being met for the Vancouver Energy Dock through MSRC-owned and -operated equipment. Contractors are trained to retrieve and deploy initial response equipment owned by MSRC."

In summary, the Applicant proposes to implement the following state of the art equipment during vessel loading operations in support of the pre-booming requirements:

1. Fence Boom – 1,600-foot total length in 100-foot sections, the fence boom must be 18 inches in height. End connectors will be made of aluminum and be the ASTM Universal Slide connector.
2. Containment Boom – 1,000 feet in length in 100-foot sections, the boom will have 12 inches of freeboard with a 6-inch skirt. The outer fabric will be 26-ounce PVC and the flotation logs will be in 3-foot lengths to accommodate being placed on a reel for deployment and recovery. The end connectors will be made of Aluminum and be the ASTM Universal Slide connecter.
3. Containment Boom – This boom will be 2,000 feet total length in 100-foot sections, the boom will have 12 inches of freeboard with a 6-inch skirt. The outer fabric will be 26-ounce PVC and the flotation logs will be in 6-foot lengths to accommodate being placed in a Conex box on shore. The end connectors will be made of aluminum and be the ASTM Universal Slide connecter.
4. Twenty foot Conex box – This Conex box is to store the boom listed in item 3 above and will be placed along the shoreline near the berth for rapid deployment.
5. Aluminum Hydraulic Boom Reel – Reel must be designed large enough to contain 1,000 feet of the ~~contractor~~ containment boom in item 2. It must be hydraulically controlled

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[25] ~~-~~Testimony of Jared Larrabee before the EFSEC Council Adjudicative Hearings, 28 July 2016. Rough Draft of Hearing - Vol. 21 (page 233:15 to 233:22): "So we have talked, I believe our other experts have talked specifically about booming and the things that we would do in booming, but what I'm not sure was fully clear was that we would have a boom, boat that is in the water, any time there is a vessel, that is loading, it's out there all the time watching, the operations and making sure that's happening and able to respond at all times."

[26] Testimony of Eric Haugstad before EFSEC Council, Adjudicative Hearings, 5 July 2016, Hearing - Vol. 6 (page 1408:8 to 1408:16): "But we'd use -- look at the current speed and, the wind speed and wave height to determine if it's safe to put the equipment out. And if not, with the Current Buster being there, well, we're going to have a boom boat crewed up and in the water whenever there's a vessel alongside, that they would then get the Current Buster prepared to deploy as a mitigation if it was too high of current or too windy to put the contractor boom out."

for deployment and recovery of the boom. There must be an override on the hydraulic system so boom can be deployed without hydraulic power ~~also~~ if necessary.

6. Boom Boat – One boat constructed of aluminum material (minimum of 24 feet in length with at least a 6-foot beam for stability) with ~~200~~ 125 horsepower or above. Tow post must be a minimum of three feet forward of the turning axis to ensure mobility while towing boom. Boat must have center console with a cab to provide weather shelter for crew.

7. Two trailer-mounted, aluminum, recovered-oil storage barges. Each barge holds 100 barrels.

~~7.~~ 8. Rapid Response Boom – NOFI Current Buster 2 Systems, two each of these systems. Each system will come on a reel in a container on a flatbed trailer towable by three-quarter ton or one-ton pickup truck. Each container will house the reel and the diesel power pack to deploy and retrieve the boom. Each container will house two each portable leaf blowers for inflating the boom as it is deployed. This type of boom is effective in currents up to 5 knots and can contain up to 95 barrels of oil in the separator bag. Figure 2.10-2(a) is an example of a container housing a reel and diesel power pack to deploy and retrieve the boom.

~~8.~~ 9. Skimmers for Rapid Response Boom – two each 13/30 fuzzy disc skimmers with diesel hydraulic power pack. Skimmer and power pack with the hydraulic hoses and discharge line. Figure 2.10-2(b) is a photograph of this type of skimmer.

~~9. Two NOFI Harbour Busters©.~~

Finally, Vancouver Energy will have access to the following Tesoro equipment (Haugstad 2013):

- In Pasco, 5,000 feet of river boom and associated anchor systems, a boom boat, and a 20-foot Conex box stocked with foam, and other emergency response equipment ~~and one Current Buster number 2 (already purchased as indicated above) on reel in a conex with blower and HPU system installed~~.
- In Vancouver, 5,000 feet of river boom and associated anchor systems.~~, and one Current Buster number 2 on reel in a conex with blower and HPU system installed~~
- In Spokane, containment boom and spill response equipment.

## 2.10.3 Spill Prevention, Control, and Contingency Planning

### 2.10.3.2 Facility Operations

*The following clarification shown as underlined text for new/added items (at the end of this section) clarifies the Applicant's obligation to comply with the Vancouver planning standards (WAC 173-182-420), and report the actual amounts of oil recovered.*

A number of the plans identified above, including the Oil Spill Contingency Plan presented at Appendix B.4, must demonstrate that specified benchmarks for spill response equipment and resources are available within a prescribed time line set forth in state regulation. For the Terminal, that time line is set forth in the Vancouver planning standard in WAC 173-182-420. These descriptions of the minimum equipment needed in each time period identifies the percentage of oil that the equipment must be able to recover within a certain time (e.g., the plan must demonstrate that within 12 hours of a spill, Vancouver Energy would be required to provide equipment with the "Capacity to recover the lesser of 10 percent of worst-case spill volume, or

36,000 barrels within 24-hour period…" (see WAC 173-182-420, 12-hour requirements). Notwithstanding such planning assumptions, the Applicant will implement its Ecology-approved oils spill response plans to recover the maximum amount of oil possible at the site, during time and weather-specific conditions if an unlikely spill event should occur. Vancouver Energy's spill planning documents and the recent tabletop spill drill demonstrate that available spill response resources, starting with pre-booming and escalating to implementation of all of the resources required by the planning standards, exceed these minimum requirements and that recovery will exceed the recovery thresholds (Taylor 2016). The actual amount of oil recovered will be reported to Ecology in accordance with the requirements described in these plans, e.g., section 5.9, Recovered Oil Quantification Plan, of Appendix B.4.

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# Section 2.11 Surface Water Runoff

## 2.11.2 Permanent Stormwater Management

### 2.11.2.1 Source Control BMPs

*The following paragraph is clarified as shown in underlined text for new/added items and strikethrough for deletions regarding spill containment to be provided for transfer pipelines.*

Spill containment measures along the pipeline alignment (Area 500) will comply with 40 CFR 112.7 by providing secondary containment, inspections, and contingency planning. Federal regulations require that containment measures be designed for the most likely quantity of oil that will be discharged during the typical failure mode (40 CFR 112.7 (5)(c)). The most likely spill event is small drips resulting from nicks, corrosion pinholes, or gasket seal failures resulting in discharges less than 5 gallons. ~~An example of secondary containment that can address these discharges is to confirm or retrofit all stormwater inlets within the contributory drainage area of the pipeline alignment with spill control devices to contain small oil leaks or spills~~. The Applicant will complete an assessment of the downstream inlets located adjacent to the Facility's transfer pipeline to confirm whether the inlets have existing oil-water spill control devices (Makarow 2016b). If any of these inlets do not have existing oil-water spill control devices, the Applicant will equip such inlets with oil-water spill control devices to capture a minimum 5 gallons of oil. The type of spill prevention device most commonly used in these applications is the installation of inverted 90-degree bend or installation of an internal tee or baffle on the outlet pipe that provides sufficient hydraulic volume to capture and contain the 5 gallons of oil.

Containment measures and response protocols for larger non-typical events will be addressed in the SPCCP, as well as the contingency plan that will be prepared prior to beginning operation of the Facility.

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# Section 2.16 Construction Management

*The following mitigation measure section is added as shown in underlined text.*

## 2.16.6 Construction and Communication Plan

Before the beginning of construction, the Applicant will develop and implement a Construction Communication Plan. The purpose of the plan is to provide timely communication to the public, City, County, EFSEC, and other appropriate state agencies (e.g., Parks and Recreation Commission, WSDOT) of major construction phases and the duration of temporary noise and surface transportation impacts. As part of this plan, the Applicant will distribute the proposed schedule of construction activities to all potentially affected recreational sites within 2 miles of the Facility so recreational users are aware of construction-related disruptions and can schedule activities accordingly to avoid disruption.

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# Section 2.17 Construction Methodology

## 2.17.6 Utilities

***Natural Gas***

*The following text is corrected for consistency with Facility-related improvements described in Section 2.3.8 and to clarify the Applicant's coordination activities with NW Natural for service, as shown in underlined text for new/added items and strikethrough for deletions.*

Natural gas service will be obtained from Northwest Natural Gas. ~~A service regulator and 4-inch-diameter service line will be required~~ ~~for~~ A new pressure regulator and 6-inch-diameter service line to the boiler building will be constructed to provide service to the Area 600 Boiler Building. The existing 4-inch natural gas main in Gateway Avenue, which serves the Jail Work Center and other Port tenants, will be extended further south towards berths 13 and 14 to provide assist gas for the MVCU. A 4-inch main will be extended south in Gateway Avenue and then east in Harborside Drive. A meter will be placed on the Facility side of each of these connections. The Applicant had multiple discussions with NW Natural representatives, and at no time did they raise issues related to lack of system capacity to serve the Facility. Applicant anticipates further coordination with NW Natural when working to finalize a service contract with NW Natural. For additional information, see Letter to Stephen Posner, EFSEC, Response to Data Request 12 (Makarow 2016).

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# Section 2.18 Protection from Natural Hazards

## 2.18.1 Earthquake Hazard

### 2.18.1.4 Mitigation Measures for Earthquake Hazards

*The following added text identifies 2D static and psuedostatic modeling seismic modeling the Applicant has agreed to conduct at EFSEC's request as shown in underlined text for new/added items and strikethrough for deletions.*

**Seismic Modeling**

In July 2016, EFSEC and the Applicant's seismic experts discussed the details of the ground improvement performance 2-D static and psuedostatic modeling that the Applicant is performing at EFSEC's request for the ground improvements underlying the Area 400 Transfer Pipeline parallel to the Columbia River shoreline. EFSEC also requested a simplified 3-D analysis of the performance of these ground improvements, focusing on those parameters that have the most influence on the deformations, and only a limited number of event histories. The Applicant provided to EFSEC a summary description of the approach for the ground motion development and 2-D/3-D modeling.

Upon completion, EFSEC will incorporate these additional studies as part of the project's ongoing environmental review (Makarow 2016a).

(Makarow, Irina, 2016. Letter to Sonia Bumpus, EFSEC. Tesoro Savage Vancouver Energy Distribution Terminal Project Application No. 2013-0 [sic]; Docket: EF-131590. August 5, 2016.)

Per related EFSEC information requests, the Applicant provided the following:

Project Seismic Design Criteria (Vancouver Energy, August 2016)
Area 300 Stone Column Design (Hayward Baker, August 2016)
Ground Improvement Verification (Hayward Baker, August 2016)
Area 300 Berm Volume Post Settlement (R&M Engineering, August 2016)
Soilcrete Strength (Hayward Baker, August 2016)
(Makarow 2016b) ((Makarow, Irina, 2016. Letter to Sonia Bumpus, EFSEC. Tesoro Savage Vancouver Energy Distribution Terminal Project Application No. 2013-0 [sic]; Docket: EF-131590. August 19, 2016.)
Berth 13/14 Seismic Design Narrative (BergerABAM, August 2016)
(Makarow 2016c) ((Makarow, Irina, 2016. Letter to Sonia Bumpus, EFSEC. Tesoro Savage Vancouver Energy Distribution Terminal Project Application No. 2013-0 [sic]; Docket: EF-131590. August 29, 2016.)

A preliminary ground improvement design was submitted to EFSEC for review (Appendix L.3). The design proposes the use of deep soil mixing (DSM) columns, jet grout columns, and wick drains to mitigate the liquefiable soils at the Facility site. Combinations of these methods have been selected as appropriate to the subsurface soils present within each area of the Facility. These methods are described below. The proposed final design of the Facility will comply with the provisions of the building codes and requirements for seismic hazards that apply to the proposed location. These include the following:

- 2012 International Building Code (IBC),* Chapters 16, 17, 18, 19, 22, and 23
- ASCE 7-10 (Minimum Design Loads for Buildings and Other Structures), Chapters 11, 12, 13, 14, 15, and 23
- ACI 318-11 (Building Code Requirements for Structural Concrete), Chapter 21 and Appendix D
- AISC Steel Construction Manual, 14th Edition, including AISC 360-10 (Specifications for Structural Steel Buildings), Part 2
- AISC Seismic Design Manual 2nd Edition, including AISC 341-10 (Seismic Provisions for Structural Steel Buildings), General Sections
- AF&PA SDPWS 2008 (AF&PA Special Design Provisions for Wind and Seismic), General Sections

The Washington State Building Code Act adopts by reference building and related codes that local jurisdictions must adopt and enforce. Titles 16 and 17 of the VMC establish these requirements in the City.

The upland Facility elements will be designed assuming a Facility importance factor of 1 combined with the site classification recommendations from the geotechnical investigation report. The upland facilities will meet the design criteria of IBC 2012 as supplemented by city and state amendments and ASCE 7. Based on the site classifications of D and E and the site specific hazards analysis conducted, API 650, Appendix B, requires that mitigation measures be constructed to address seismic, and in particular, liquefaction. The API standards are designed for the protection of life and to prevent catastrophic collapse of the storage tanks. To meet the mitigation requirements of the API standard, a combination of ground improvements as described above will be constructed for the essential facilities to meet or exceed the standards. Foundations for upland aboveground structures are described in section 2.17.3. Ground improvements are described in section 2.18.1.4. Design of the dock modifications will conform to IBC 2012, as amended and adopted by the state of Washington and the City with the exception of mooring and berthing design, seismic design, and structural load combinations, which are not adequately addressed by IBC; these will be supplemented with applicable industry standards. Seismic design will be a performance-based design approach using multi-level earthquake performance objectives. The dock design considers ground motion from the three levels of seismic hazards:

- Operational Level Earthquake—5.8 magnitude
- Contingency Level Earthquake—8.4 magnitude
- Design Earthquake—9.0 magnitude

During the Operational Level Earthquake, the structure will reach the operational limit on utilities with minor repairs necessary to regain dock operations. During the Contingency Level Earthquake, damage will occur to the structure but repairs could be accomplished. During the Design Earthquake, the structure will not collapse but significant damage could occur, likely taking the facility offline until repairs are made ~~likely beyond reasonable levels of repair~~. The dock improvements are described in section 2.17.7.

* Preliminary review of the Facility design indicates that the Facility complies with the 2015 IBC.

Tables 2.18-1 and 2.18-2 list the seismic design criteria for the Facility.

**Table 2.18-1. 2012 IBC Seismic Design Criteria Storage (Area 300)**

| Parameter | Value | 2012 IBC/ASCE 7-10 Reference |
|---|---|---|
| 0.2 Second Spectral Acceleration, $S_s$ | 0.94 | ASCE 7-10 Figure 22-1 |
| 1.0 Second Spectral Acceleration, $S_1$ | 0.41 | ASCE 7-10 Figure 22-2 |
| $MCE_G$ Peak Ground Acceleration, PGA (Site Class B) | 0.41 | ASCE 7-10 Figure 22-7 |
| Soil Profile Site Class | N/A* | ASCE 7-10 Section 20.3.1 and 21.3* |
| 0.2 Second $MCE_R$ Spectral Acceleration, $S_{Ms}$ | 1.04 | Site Specific Ground Motion, ASCE 7-10 Ch. 21 * |
| 1.0 Second $MCE_R$ Spectral Acceleration, $S_{M1}$ | 0.8 | Site Specific Ground Motion, ASCE 7-10 Ch. 21 * |
| $MCE_G$ Peak Ground Acceleration, PGA | 0.37 | Site Specific Ground Motion, ASCE 7-10 Ch. 21 * |
| 0.2 Second Design Spectral Acceleration, $S_{Ds}$ | 0.69 | 2012 IBC Equation 16-39 |
| 1.0 Second Design Spectral Acceleration, $S_{D1}$ | 0.53 | 2012 IBC Equation 16-40 |
| Seismic Design Category | D | 2012 IBC Table 11.6-1 (& -2) |

* A liquefaction hazard was identified for the Storage area (Area 300). In accordance with ASCE 7-10 Section 11.4.7 and 20.3, a site-specific ground motion analysis was completed for seismic design at the Storage area to develop the criteria listed above.

**Table 2.18-2. 2012 IBC Seismic Design Criteria Unloading and Office (Areas 200 and 600)**

| Parameter | Value | 2012 IBC/ASCE 7-10 Reference |
|---|---|---|
| 0.2-Second Spectral Acceleration, $S_s$ | 0.94 | ASCE 7-10 Figure 22-1 |
| 1.0-Second Spectral Acceleration, $S_1$ | 0.41 | ASCE 7-10 Figure 22-2 |
| $MCE_G$ Peak Ground Acceleration, PGA (Site Class B) | 0.41 | ASCE 7-10 Figure 22-7 |
| Soil Profile Site Class | E* | ASCE 7-10 Section 20.3.1* |
| Site Coefficient, $F_a$ | 0.97 | 2012 IBC Table 1613.3.3(1) |
| Site Coefficient, $F_v$ | 2.40 | 2012 IBC Table 1613.3.3(2) |
| Site Coefficient, $F_{PGA}$ | 0.9 | ASCE 7-10 Table 11.8-1 |
| 0.2 Second $MCE_R$ Spectral Acceleration, $S_{Ms}$ | 0.91 | 2012 IBC Equation 11.4-1 |
| 1.0 Second $MCE_R$ Spectral Acceleration, $S_{M1}$ | 0.98 | 2012 IBC Equation 11.4-2 |
| $MCE_G$ Peak Ground Acceleration, PGA | 0.37 | 2012 IBC Equation 11.8-1 |
| 0.2 Second Design Spectral Acceleration, $S_{Ds}$ | 0.61 | 2012 IBC Equation 11.4-3 |
| 1.0 Second Design Spectral Acceleration, $S_{D1}$ | 0.66 | 2012 IBC Equation 11.4-4 |
| Seismic Design Category | D | 2012 IBC Table 11.6-1 (& -2) |

* A liquefaction hazard was identified for the Unloading and Office area (Areas 200 and 600). Based on ASCE 7-10 Section 20.3.1, Site Class E was used to develop seismic design criteria for the structures in Areas 200 and 600 assuming the fundamental period of the structures in Areas 200 and 600 is less than 0.5 second.

Final analysis of the seismic conditions and determination of the building foundation and ground improvement designs will be completed to address seismic conditions found at the site prior to construction. The final design will be field verified to ensure design criteria is meet. CPT testing will be performed post-ground improvements to ensure design standards are met. ~~It is anticipated that EFSEC will contract with the City for the review of final project design for compliance with the required code provisions, as well as for providing the required inspections and issuance of occupancy permits.~~ The Applicant will submit the required plans, which will be designed in compliance with the codes and requirements referred to above.

As confirmed by a series of three geotechnical site-specific field explorations of subsurface materials and conditions, presented in Appendices L.1, L.2, and L.3, mitigation solutions for the risk of liquefaction during a design level earthquake, include improving the condition of soils beneath the site to reduce the risk of liquefaction during an earthquake or the use of deep foundations to provide foundation support below the liquefiable soils.

Final ground improvement methods will be determined during design refinements and documented in construction plans submitted to EFSEC for review. The following section provides the type of ground improvements considered for each area of the Facility. Ongoing design and analysis will determine the final configuration of the ground improvements that will be installed; ground improvements may be refined as the design progresses. The final ground improvement selection and design will be documented in the Facility construction plans and submitted to EFSEC for review prior to beginning construction.

***Area 300 (Storage)***

Ground improvements will be constructed below each tank ~~and the transfer pipeline~~. The ground improvements will consist of stone columns 3 feet in diameter and spaced approximately 8 feet on center (square grid spacing). The columns will be installed along the alignment of the pipeline to depths ranging from 25 to 47 feet below ground surface based on soil properties. At Tank 1, the base design is supplemented with two additional rings of more shallow stone columns (installed to 30-foot depth) to address potential differential settlement concerns in unusually poor soil conditions.

The tanks will be surrounded by a containment berm approximately 6 feet in height. A flexible impermeable liner will be used to mitigate the possibility of oil penetrating through the berm in the event of a seismic event. The berm will be designed in accordance with the requirements of WAC 173-180-320. Specifically, WAC 173-180-320 (9)(c) states “Secondary containment systems must be designed to withstand seismic forces,” and sub (e) that “Secondary containment systems must be designed and constructed in accordance with sound engineering practice and in conformance with the provisions of this section.” The containment berm design will have a capacity at least equal to 110 percent of the API 650 maximum capacity of the largest tank volume, plus precipitation from a 24-hour, 100-year storm event.

As stated in the geotechnical report (GRI Dec. 2013, Appendix L.1), Area 300 is estimated to potentially experience between 6 to 10 inches of liquefaction-induced settlement during a seismic event. ~~The containment berm design will have a capacity at least equal to 110 percent of the API 650 maximum capacity of the largest tank volume, plus precipitation from a 24-hour, 100-year storm event. This design results in a freeboard of 8 inches.~~ In a worst-case scenario of a maximum liquefaction-induced settlement, at the same time as a 24-hour, 100-year, storm event, not only would the berm settle up to 10 inches but so would the other non-ground improved

surface area inside of the berm. Calculations of the containment volume after a maximum liquefaction-induced settlement of 6 to 10-inches indicates that the facility would continue to have capacity to contain 110 percent of the API 650 maximum capacity of the largest tank plus precipitation from a 24-hour, 100-year storm event. ~~The settlement of the non-ground improved area inside the containment berm would be sufficient to contain the difference between the 10-inch liquefaction-induced settlement and the provided 8 inches of freeboard.~~

The geotechnical report addresses the seismic stability of the berm in terms of bearing capacity failure or breaching. Based on an assumed groundwater Elevation +12 feet, and the thickness of well-compacted structural fill at the storage site, the site will be mantled with 15 to 20 feet of non-liquefiable soils, which are not susceptible to reduction of seismic strength. Preliminary evaluation of the berm seismic stability indicates that the risk of seismic bearing capacity failure impacting the berm is low. The geotechnical report states there is a low risk of the design level earthquake damaging the berm and causing breaches.

***Area 400 (Marine Storage)***

A combination of jet grout columns, DSM panels, and stone columns to mitigate lateral spreading and liquefaction-induced settlement will be used. There are two zones of ground improvements in Area 400, the pipeline and the Marine Terminal abutment.

Ground improvements associated with pipeline includes stone columns, DSM, and jet grout. DSM panels will limit the potential liquefaction below the pipeline alignment, jet grout will provide vertical support of the pipe-rack foundation, and a series of stone columns will form a nonliquefiable buttress that stabilizes the shoreline area. The DSM panels are spaced approximately 35 feet apart and are planned to be 55 feet long, 6 feet wide, and extend to a depth of approximately 45 feet. A jet grout column will be situated below the DSM panels, which will be 8 feet in diameter and extend about another 32 feet below the DSM panels. The stone columns are located between the DSM panels and the top of the bank and are 3 feet in diameter and spaced at 8 feet on center. The stone columns extend to the non-liquefiable soils at about 78 feet below ground surface.

Ground improvements in the vicinity of the Marine Terminal abutment will be located where the pipeline support transitions from foundations bearing on improved soils to pipe-racks supported by the dock structure. The area for improvement is approximately 160 feet long (parallel to the river) and 72 feet wide (perpendicular to the river). All ground improvements will begin landward of OHWM and will use jet grout to a depth of approximately 78 feet. Jet grout columns are approximately 6 feet in diameter and spaced to achieve replacement ratios between 40 and 100 percent. Landward of the jet grout block, a combination DSM/jet grout, as described above for Area 400 pipeline, would be constructed to support Area 400 facilities.

Within Area 400, the pipeline, pipeline supports, and the ground improvement are designed to function as a system. When subjected to design earthquake loading, the system will result in actual movements less than the movement that would be expected to cause pipeline rupture or other damage. Following a seismic event, the Applicant will undertake system inspection and repair.

The system is designed in accordance with all applicable building codes using widely accepted design methods. Analysis of the ground improvements indicates that if isolated and discontinuous zones of liquefaction may occur, and should these discontinuous zones of

liquefaction develop, very little movement at the pipe supports is expected. Analysis indicates that, at the pipe supports, vertical movement less than 2 inches plus an additional 2 inches of horizontal movement is expected. The transfer pipes have been designed to accommodate this movement. The calculated movement includes the effects of lateral spreading associated with the portion of the riverbank between the pipe rack foundation and the top of the riverbank's slope.

Potential sliding of portions of the shoreline embankment south of and downslope from the system of proposed ground improvements is not mitigated by these improvements and, if this sliding occurs, it could deform the dock or displace a moored vessel. The dock structure has been analyzed for the potential impacts from failure of the slope on the piles. The improvements proposed by the Applicant have been designed to address these potential loads.

Deformation criteria for the pipeline supports near the abutment are indicated in the ground improvement basis of design. Additionally, universal tied expansion joints will be installed at the transition from the ground support to the support on the dock to mitigate differential movement between components.

### *Area 500 (Transfer Pipelines)*

In Area 500, spread footing foundations will be constructed at anchor points along the length of the pipeline to ensure transfer pipelines are supported. The footings would have depths of 5 or 10 feet. The shallower depths would be used for non-anchor footings, and the deeper depths for anchor footings. The spread footings will be constructed by excavating the footing footprint, layering base materials, concrete forming and pouring, and backfilling. They are a common foundation construction technique for providing stability in weak soils. The design and size of the footings accounts for both the bearing capacity and resistance, but also settlement that may occur.

### *Area 600 (Boiler)*

Ground improvements will not be necessary; the building will be constructed on a 1-foot-deep spread footing. The E-house will be constructed on a 2-foot slab-on-grade foundation.

### *Rail Infrastructure*

Ground improvements will not be necessary; the rail loops will be constructed on concrete or wooden ties. AREMA standards for design and settlement criteria for a loop track with the outside rail having a differential elevation of 8 inches will be met.

### *Ground Improvement Verification and Testing*

Within Areas 300 and 400, following installation of stone columns, verification and testing will be performed using a series of cone penetration test (CPT) soundings. If required, geotechnical drilled borings and seismic penetration testing may be used with the CPT soundings. The CPT soundings will extend at least 3 feet below the bottom of the immediately adjacent stone columns and will be performed at least seven days after the column installation The CPT data will be analyzed by the ground improvement design engineer to evaluate achievement of the settlement design criteria. If the required settlement is not met, additional improvements will be added until the design criteria is met ~~additional exploration, laboratory testing, and analysis will be conducted as necessary~~. See Appendix L.3, Section 7.0, for additional details.

Due to the sensitive fine grained soils in Area 300, the Applicant will hydro test each tank by slowly filling each tank with water over the period of one month. The plan is to fill each tank to

the 25 percent level and maintain that loading for one week, followed by another 25 percent and maintaining for one week until the tanks are full and the full load has been maintained for a week. By doing so, the ground improvement system will accelerate drainage of the fine grained soils. One of the benefits of hydro testing each tank with water and holding the largest load for more than seven days is the over-consolidation of the fine-grained soils and a reduction of the anticipated secondary compression. Because water is heavier than crude oil, the load placed during this testing exceeds the load during normal use. See Appendix L.3, section 7.0, for additional details.

### 2.18.3 Flooding

#### 2.18.3.1 Mitigation for Flooding

*The following shown as underlined text is added to this section to indicate that Vancouver Energy will design the Facility in accordance with the mitigation measure proposed by EFSEC in Table ES-2, page ES-28 of the DEIS, as indicated by the revisions below:*

All structures or portions of structures located in Area 400 will be located outside the 100-year floodplain. These include a dock transformer pad, combined control room/E-house, fire pump, and foam building. These structures will be elevated so that the floor is at least ~~1 foot~~ 2 feet above the base flood elevation. They will also be anchored to resist movement and designed with utilities and other connections that are designed to withstand flood events consistent with the requirements of VMC 20.740.120 Frequently Flooded Areas.

In the event of an expected site inundation, movable equipment, such as railcars and motor vehicles, will be demobilized and relocated above the 500-year floodplain to the extent possible. Static equipment that cannot be moved will be secured.

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# Section 2.19 Security Concerns

## 2.19.3 Operations Site Security Plan

*The following information is added to this section (Makarow 2016b) as shown in underlined text.*

Facility personnel will be present 24/7 and will be available to allow access to emergency responders to secure areas if the need arises in an emergency situation.

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# Section 2.23 Pertinent Federal, State, and Local Requirements

## 2.23.1 Applicable Federal, State, and Local Permits and Requirements

*The following entry is added to Table 2.23-1 to reflect federal requirements for ballast water management as shown in underlined text.*

**Table 2.23-1. Applicable Federal, State, and Local Permits and Requirements**

| Permit or Approval | Agency/Statute and/or Regulation | Application Section |
|---|---|---|
| **Federal Permits/Approvals** | | |
| Ballast Water Management | USCG<br>33 CFR 151 | 3.4.2.2 |

## 2.23.2 Federal Permits and Approvals

*The following subsection is added to clarify federal requirements for ballast water management as shown in underlined text.*

### 2.23.2.20 Ballast Water Management

***USCG***

*Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (16 U.S.C. 4701-4751), as amended by the National Invasive Species Act of 1996; 33 CFR 151*

These regulations establish ballast water management and treatment requirements for vessels operating within waters of the United States.

In addition, the United States is a signatory to the International Convention for the Control and Management of Ships' Ballast Water and Sediments, adopted in February 2004, and entering into force September 8, 2017 (International Maritime Organization 2016).

***Project Compliance***

Vessel owners and operators are required to comply with these regulations.

## 2.23.3 State Permits and Approvals

*The following subsections are added to reflect regulations recently adopted by the Washington State Department of Ecology as shown in underlined text.*

### 2.23.3.17 Oil Movement by Rail and Pipeline Notification

*Ecology*

*WAC 173-185*

This regulation establishes requirements for providing advance notice when facilities receive crude oil by railroad car.

***Project Compliance***

Upon beginning operations, Vancouver Energy will meet the advance notice requirements of WAC 173-185-080.