

Executive Summary

Tesoro Savage Petroleum Terminal LLC (the Applicant) has submitted an Application for Site Certification¹ ([ASC] No. 2013-01) to the Washington State Energy Facility Site Evaluation Council (EFSEC) to construct and operate the Vancouver Energy Distribution Terminal Facility (proposed Facility or proposed Project) at the Port of Vancouver (Port) in Vancouver, Washington, located on the Columbia River (Figure ES-1). EFSEC is the state agency responsible for evaluating and making recommendations to the governor on approval or denial of certain major energy facilities in Washington.

This executive summary explains the purpose of the Draft Environmental Impact Statement (Draft EIS) in EFSEC's decision-making process, describes the Applicant's proposed Project and why it is being proposed, and presents a summary of the potential environmental impacts associated with the proposed Project (including rail transport of crude oil to the proposed Facility and transshipment of crude oil from the proposed Facility by vessel) if the proposed Project is approved. This executive summary also summarizes EFSEC's efforts to involve the general public; federal, state, and local agencies; and other interest groups during preparation of the Draft EIS.

During the site certification process, EFSEC functions as the Lead Agency responsible for complying with the procedural requirements of the Washington State Environmental Policy Act (SEPA; Washington Administrative Code [WAC] 197-11-938[1]). As authorized under WAC 463-47-090, the Applicant prepared a Preliminary Draft EIS for EFSEC review, together with supporting technical information. EFSEC subsequently prepared the Draft EIS with the assistance of an independent consultant, as provided for in WAC 463-47-090(2)(b). To ensure objectivity and technical accuracy, EFSEC staff and EFSEC's consultant reviewed all Applicant-provided information and analyses before including them in the Draft EIS. EFSEC staff and EFSEC's consultant also extensively supplemented Applicant-provided information and analyses.

1 PURPOSE OF THIS ENVIRONMENTAL IMPACT STATEMENT

The purpose of the Draft EIS is to inform agencies, tribes, and the public about the environmental effects of the proposed Facility and the various measures identified by the Applicant, EFSEC staff, and EFSEC's independent consultant to minimize those impacts, and to solicit input on that information during the public comment period. Input received during the comment period is used to revise the document and prepare the Final EIS.

At the same time the Draft EIS is developed, EFSEC may begin adjudicative proceedings. EFSEC's adjudication is a formal hearing process similar to a courtroom trial. In the adjudication, EFSEC hears evidence presented by the parties to the adjudication, including the applicant, state agencies and local governments, and recognized intervenors such as tribes, interest groups, other local, state, or federal agencies, an assistant attorney general as counsel for the environment, and individuals with an interest not adequately represented by the other parties.

1 An Application for Site Certification (ASC) is a formal submittal prepared by an applicant that provides EFSEC with information regarding the applicant, the proposed project design and features, the natural environment, and the built environment in sufficient detail to enable EFSEC to go forward with its application review. The ASC documents for this Project can be found on EFSEC's website:
<http://www.efsec.wa.gov/Tesoro%20Savage/Application/Tesoro%20Savage%20Application%20Page.shtml>.

The Final EIS is used by EFSEC in conjunction with additional relevant information, including information gathered during the adjudication, to inform EFSEC's recommendation and the governor's final decision on an ASC. The information in the Final EIS can be used to condition the proposal to reduce impacts or to deny the proposal if significant adverse environmental impacts cannot be mitigated.

2 SUMMARY OF THE VANCOUVER ENERGY DISTRIBUTION TERMINAL PROJECT

The Applicant is proposing to construct and operate a Facility that would receive an average of 360,000 barrels (bbl) of crude oil per day by rail, temporarily store the oil onsite, and then load the oil onto marine vessels for transport to existing refineries primarily located on the West Coast of the United States² (Figure ES-1). The crude oil would be delivered to the proposed Facility by rail in "unit trains" composed of up to 120 sole-purpose crude oil tank cars, each with a tank car capacity of 750 bbl.³ An average of four unit trains would arrive at the proposed Facility each day. Occasionally, a fifth train may arrive within a 24-hour period. A fifth train would begin unloading within that 24-hour period but would not complete unloading until the following 24-hour period. On other days (or subsequent days) only three trains may arrive within certain 24-hour periods, thus equating to an average of four train arrivals per day (Vancouver Energy 2015) for a total of 2,920 one-way train-trips (1,460 round trips) per year. Based on these assumptions, the maximum throughput of crude oil at the proposed Facility would be 131,400,000 bbl per year.

All tank cars used to transport crude oil to the proposed Facility would be required to meet the new US Department of Transportation (DOT) Specification 117 tank car standards jointly issued by the Pipeline and Hazardous Materials Safety Administration (PHMSA) and Federal Railway Administration (FRA) on May 1, 2015. These new standards require increased thickness of the tank shell, full height protection (head shields) at each end, improved protection for top fittings and discharge valves, and reconfigured tank vents for automatic reclosing to reduce vulnerability to breaching or failure during derailments (see Section 4.2.4.2 for details on DOT Specification 117 standards and retrofitting timeline for existing cars).

Once a loaded unit train arrives at the proposed Facility, the crude oil would be unloaded from the railcars and either pumped directly to marine vessels at modified berths on the Columbia River or pumped through a network of transfer pipelines to a storage area containing six aboveground storage tanks. During marine vessel loading, the crude oil would be transferred via pipeline and associated hoses to a modified existing marine terminal on the Columbia River. The marine vessels would then transit down the Columbia River and across open ocean to marine facilities capable of offloading the crude oil for delivery to receiving refineries.

2 Receiving refineries could include those located in Alaska, Hawaii, California, and Washington.

3 The capacity of a single rail tank car is assumed to be 750 bbl, though actual carloads are limited by cargo weight, tank car weight, and vapor space requirements. In actual practice, each tank car often holds from 650 to 690 bbl of crude oil (Appendix E).

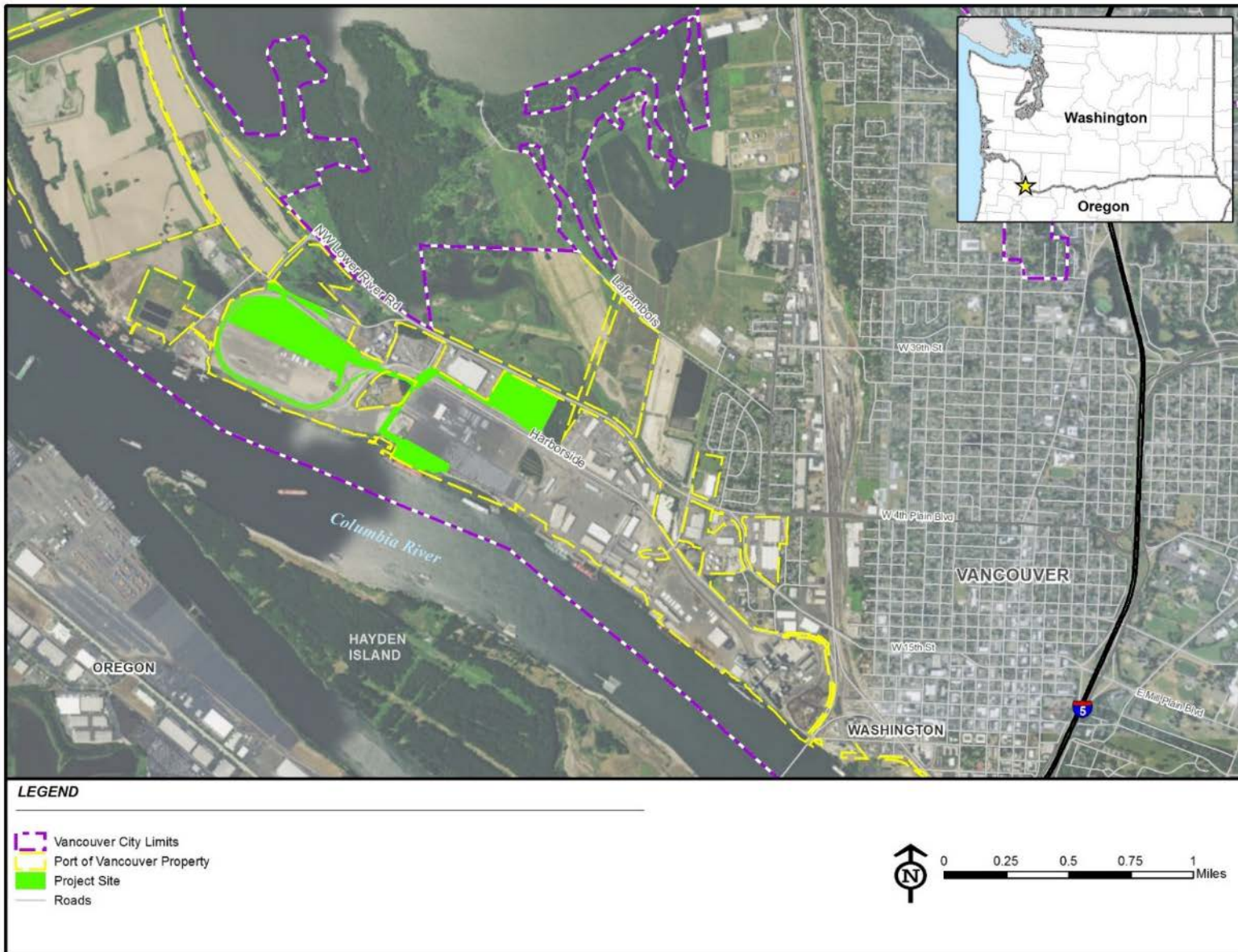


Figure ES-1. Vicinity Map of the Proposed Facility

According to the Applicant, approximately 80 percent of the marine vessels expected to call at the proposed Facility would be in the 46 million deadweight tons (MDWT) size range. Smaller numbers of the marine vessels in the 105 and 165 MDWT size ranges (approximately 15 percent and 5 percent, respectively) may also call at the proposed Facility. Typical operations would involve the arrival, loading, and departure of one vessel in each 24-hour period, which equates to approximately 365 vessel calls per year. Each vessel call would involve two river transits—one inbound and one outbound. The Applicant has indicated that vessels would be allowed to depart the marine terminal only when conditions at the Columbia River bar allow departure to the open sea without having to anchor or loiter upriver from the bar. This requirement would likely result in an actual range of vessel calls of between 345 and 365 per year.

It should be noted that the Applicant (Tesoro Savage Petroleum Terminal LLC) would not source or own any crude oil, nor arrange for rail transportation of crude oil to the proposed Facility, or for marine vessel transportation of crude oil from the proposed Facility. Rather, the Applicant would receive its customers' crude oil by rail, unload and stage that crude oil in onsite tanks, and load the crude oil onto vessels provided by those customers. The Applicant has reported its customers would likely source crude oil primarily from mid-continent North American locations, including the Bakken formation that covers parts of North Dakota; Montana; and Saskatchewan, Canada. Depending on market conditions and the needs of the proposed Facility's customers, crude oil may also come from other North American formations, such as the Niobrara in Wyoming and Colorado and the Uinta in northeast Utah (Corpron and Makarow, pers. comm., 2015).

While projecting future market conditions is nearly impossible, based on the strength of Bakken production and market conditions known at this time, it is assumed that the Bakken would be the likely source of the mid-continent North American crude oil delivered to the proposed Facility. Because Burlington Northern Santa Fe (BNSF) owns or controls the rail infrastructure in the Bakken region, and rail transport agreements and rates tend to favor a single carrier, EFSEC has assumed that BNSF would be the likely rail transporter of crude oil from the Bakken to the proposed Facility. It is noted that currently four trains per day transport crude oil through Washington to receiving refineries using the same main rail lines that would be used by trains associated with the proposed Facility.

The proposed Facility would occupy several distinct but connected areas at Terminals 4 and 5 at the Port, along the northern bank of the Columbia River. The proposed Facility would occupy approximately 47.4 acres, consistent with the terms in the existing land lease agreement with the Port. The transfer pipelines that would convey crude oil between the unloading areas, storage tanks, and vessel loading area would be located in nonexclusive easements within the Port. The Applicant estimates that the total capital cost of the proposed Facility is approximately \$210 million, which includes both capital and construction costs.

3 PROJECT PURPOSE AND NEED

The Applicant's stated purpose and need for the proposed Facility is to:

...construct and operate a facility that would provide the service of trans-loading mid-continent North American crude oil to the West Coast to allow shipment of crude oil to refineries located primarily on the West Coast of North America. (BergerABAM 2014)

4 ALTERNATIVES CONSIDERED

Reasonable alternatives to the proposed Project and associated actions, including the No Action alternative (as required by SEPA) were identified and analyzed in the Draft EIS. The different types of

action alternatives considered during the development and evaluation of alternatives to the Proposed Action included alternative methods of transporting crude oil from mid-continent sources to West Coast refineries (including refineries in Alaska and Hawaii); alternative sites in Washington that could accommodate a similar project; and alternative onsite Facility configurations, operations, and component designs. As alternatives were identified, they were measured against the following criteria:

- Does the alternative feasibly attain or approximate the proposed Project's objectives?
- Does the alternative provide a lower environmental cost or decreased level of environmental degradation than the proposed Project?

Each alternative was analyzed to determine whether the alternative met or failed to meet these criteria. An alternative that failed to meet either one of these criteria was eliminated from further consideration. A summary of the alternatives to the Proposed Action is presented in Table ES-1.

Table ES-1. Alternatives to the Proposed Project

Alternative Description	Alternative Evaluation
Delivery of Crude Oil by Tanker Trucks	Transportation of crude oil by tanker truck to the proposed Facility for subsequent shipment to West Coast refineries is a feasible alternative to the Proposed Action. However, this alternative would not provide a lower environmental cost or decreased level of environmental degradation than the Proposed Action due to increases in noise levels, air emissions (two-thirds greater greenhouse gas emissions), and reductions in transportation safety.
Delivery of Crude Oil to the Proposed Facility by Barge	This alternative would deliver crude oil to the Port by barge. It would exchange the transport of crude oil to the proposed Facility by rail for transport by barge for the 227 miles between Kennewick/Pasco and Vancouver. This alternative would require an increase in surface facilities at the Port by 38 acres, for a total of 83 acres of surface impact, and it would require construction and operation at two sites rather than one. A second unit train unloading, aggregation, storage, and loading process would need to occur at Kennewick. Therefore, it would not provide a lower environmental cost or decreased level of environmental degradation when compared to the Proposed Action.
Alternative Site Locations: Ferndale, Anacortes, Bellingham, Port Angeles, Everett, Seattle, Tacoma, Olympia, Grays Harbor, Kalama, Longview, Vancouver	Twelve ports were identified in Washington that could accommodate a facility similar to the proposed Facility: Ferndale, Anacortes, Bellingham, Port Angeles, Everett, Seattle, Tacoma, Olympia, Grays Harbor, Kalama, Longview, and Vancouver. These sites were evaluated based on initial siting criteria. Two sites met these initial criteria (Kalama and Longview) and were further evaluated based on site characteristics. Constructing a facility similar to the proposed Facility at the ports of Kalama or Longview could be feasible based on the initial siting criteria, but would likely result in greater impacts than the Proposed Action due to the need for filling wetlands at the Kalama site and the requirement for a new marine terminal at the Port of Longview. Rail capacity at both of these ports is also constrained. No alternative site locations were identified that would provide a lower environmental cost or decreased level of environmental degradation when compared to the Proposed Action.
Onsite Alternatives: Storage Tanks Site Alternative; Railcar Unloading Facility Alternative; Industrial/Sanitary Wastewater Discharge Alternative; Stormwater Treatment Alternative; Marine Terminal Alternative; Reduced Capacity Alternative	Alternative site layouts for required facilities, alternative facility elements, and alternative facility designs at the Port were evaluated. No alternatives that would result in a lower environmental cost or decreased level of environmental degradation were identified. A reduced capacity alternative would not represent a lower environmental cost or decreased level of environmental degradation at the Port site compared to the Proposed Action because the same proposed Facility elements would be built at the site. A reduced capacity alternative would likely reduce the number of train deliveries to the proposed Facility with an associated decrease in impacts from train transportation. The probability of a major spill from trains would be decreased with a reduction in the number of trains, but considering that the probability of such an event is extremely low, further reduction would not represent a substantial difference from the Proposed Action.

Port = Port of Vancouver

The comprehensive review of alternatives did not identify any alternatives that were found to be reasonable alternatives to the Proposed Action. No alternatives were found to clearly show a lower environmental cost or decreased level of environmental degradation than the Proposed Action. The

alternatives carried forward for detailed analysis in this EIS were therefore the Proposed Action and the No Action Alternative.

4.1 The No Action Alternative

Under the No Action Alternative, the governor would deny the Applicant's request to construct and operate the proposed Project at the Port. Rail infrastructure improvements planned at the Port (i.e., the West Vancouver Freight Access [WVFA] project) would be completed as permitted. Under this alternative, the following scenarios could occur:

- **No development.** It is possible that no facility would be constructed during the 20-year timeframe for the proposed Facility, with no improvements to the site with the exception of continuation of current maintenance.
- **A different industrial facility.** With the completion of the WVFA project, the Port would likely seek other tenants to develop an industrial facility to use the existing unit train rail infrastructure and vessel berthing facilities at the marine terminal. Such a facility would likely be designed and operated to handle dry and/or liquid bulk commodities, but of unknown type or quantity. Based on current operations at the Port, these commodities could include grain, sand and gravel, lumber, metal, or petroleum products.

Under the No Action Alternative, the current demand by West Coast refineries for mid-continent North American crude oil would continue. This demand would require continued transport of crude oil by existing transportation modes (including pipelines, tanker trucks, and rail) from sources to refineries or from sources to new or expanded crude-by-rail terminals in other West Coast locations.

5 ENVIRONMENTAL RESOURCES/ISSUES ANALYZED IN THIS DRAFT EIS

SEPA requires analysis of impacts to various elements of the human and natural environment, but all categories may not pertain to all projects and additional resource topics may be included as appropriate. EFSEC identified environmental issues for analysis after reviewing comments received from the public, agencies, and other interested stakeholders during the scoping process and through additional agency coordination during development of the Draft EIS. The environmental resources analyzed in the Draft EIS are as follows:

- Earth Resources (including seismic hazards)
- Air Quality
- Water Resources
- Terrestrial Vegetation
- Terrestrial Wildlife
- Aquatic Species
- Energy and Natural Resources
- Environmental Health
- Historic and Cultural Resources
- Transportation
- Public Services and Utilities
- Noise
- Land and Shoreline Use
- Visual Resources
- Recreation

EFSEC has included analysis of the following issues in the Draft EIS to address specific concerns raised by members of the public, government agencies, tribal representatives, and other interested stakeholders during the SEPA scoping process⁴:

- Rail transportation impacts near the proposed Facility site, specifically including Vancouver and nearby communities.
- Greenhouse gases (GHGs) and other air emissions from proposed Project operations.
- Proposed Facility site emergency response capabilities, including hazmat response to incidents involving crude oil transported by railcar.
- Proposed Project impacts to socioeconomic resources including employment, tax revenue, and economic conditions.
- Rail transportation impacts to communities in Washington.
- Emergency response capabilities including hazmat response to incidents involving crude oil transported along the rail route within Washington.
- GHGs and other air emissions from rail and vessel traffic within Washington.
- Emergency response capabilities along cargo ship traffic lines on the Columbia River, from the proposed Facility site to the confluence with the Pacific Ocean.
- Cargo ship impacts from the proposed Facility site to the confluence with the Pacific Ocean.
- Qualitative analysis of rail transportation data along the rail route beyond the state boundary.
- Qualitative analysis of cargo ship transportation data beyond the state boundary.
- Qualitative analysis of proposed Project data related to crude oil extraction, refining and burning of fossil fuels, and their contribution to GHG emissions.

In addition to the evaluation of direct and indirect impacts to specific resources, an analysis of the cumulative effects of past, present, and reasonably foreseeable future actions was undertaken. This analysis considered other possible development projects at the Port as well as projects in the region that may contribute additional rail and vessel traffic to the systems that would be used by the proposed Project. The potential effects of other projects were added to the projected effects of the proposed Project to determine the magnitude and extent of cumulative effects.

6 POTENTIAL ENVIRONMENTAL IMPACTS

This Draft EIS describes the direct, indirect, and cumulative environmental impacts that could occur from construction, operation and maintenance, and eventual decommissioning of the proposed Facility, as well as from the transportation of crude oil to the proposed Facility by rail and from the proposed Facility to receiving refineries by vessel.

- **Direct impacts** are the effects of an action on a resource that occur at the same time and place as the action causing the impact.

4 See <http://www.efsec.wa.gov/Tesoro%20Savage/20140403FinalSepaScope.pdf>.

- **Indirect impacts** are similar to direct impacts in that they are caused by the same action; however, they occur later in time or are farther removed in distance from the activity causing the impact.
- **Cumulative impacts** are impacts to the environment that result from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions.

The environmental impacts in this Draft EIS are identified using the following four-level rating method to describe the magnitude, duration, and degree of potential impacts (Figure ES-2):

- **Negligible.** Impacts that are extremely low in intensity and often not measurable or observed.
- **Minor.** Impacts that are low in intensity, temporary, and local in extent, and do not affect unique/rare resources.
- **Moderate.** Impacts of moderate intensity independent of duration, with significant or unique resources potentially affected, on either a local or regional scale.
- **Major.** Impacts of high intensity and/or of long-term or permanent duration, of localized or regional extent, and/or that affect culturally important, ecologically important, or unique/rare resources.

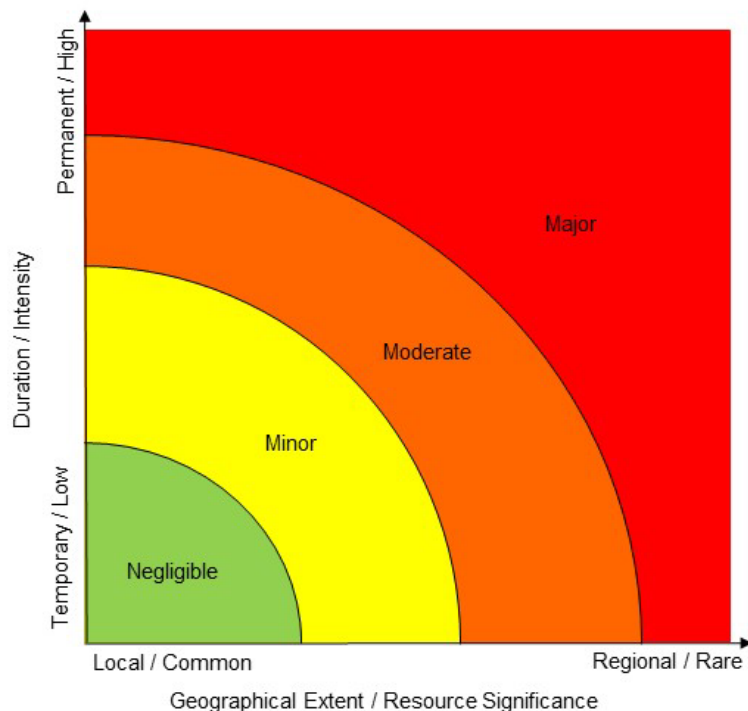


Figure ES-2. Schematic of Environmental Impact Ratings

6.1 Direct and Indirect Impacts

The following subsections provide an overview of the types of environmental impacts identified in this Draft EIS. These environmental impacts are also listed in summary Tables ES-2 and ES-3, located at the end of this chapter. The content and organization of the tables are discussed in more detail below.

Table ES-2 summarizes potential direct and indirect impacts to environmental resources from construction, operation and maintenance, and eventual decommissioning of the proposed Facility, as well as from transportation of crude oil to the proposed Facility by rail, and from the proposed Facility by vessel. Design features, best management practices (BMPs), and other actions proposed by the Applicant to avoid or minimize environmental impacts during construction, operations and maintenance, and decommissioning were assumed to be part of the Proposed Action and were taken into account when identifying the **Impacts** listed in Table ES-2. This table also lists additional **Mitigation Measures** identified by EFSEC to further reduce environmental impacts. Impacts that would remain moderate or major in magnitude, duration, or degree, even after all mitigation measures committed to by the Applicant or recommended by EFSEC have been applied are identified in Table ES-2 as **Significant Unavoidable Impacts**.

Table ES-3 summarizes impacts at the proposed Facility and along associated rail and vessel transportation routes from small to very large spill, fire, and explosion events. These impacts were identified assuming all measures intended to reduce impacts identified by the Applicant in the Preliminary Draft EIS and ASC would be fully implemented. Potential mitigation measures to address the risk of a crude oil spill, fire, and/or explosion at the proposed Facility and along associated rail and vessel transportation routes are presented in Section 4.8.

6.2 Cumulative Impacts

Cumulative impacts are the summation of impacts to a resource resulting from the incremental impact of an action (proposed action or alternative), including connected actions, when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes those actions. Section 5.1 of this EIS describes the methods undertaken and the reasonably foreseeable future actions identified for the cumulative impact analysis. Impact levels use the same rating method described above for direct and indirect impacts. Cumulative impacts that have been identified as moderate or major in this Draft EIS are briefly described below. The full discussion of cumulative impacts to resources is provided in Sections 5.2 through 5.19.

6.2.1 Proposed Facility

No significant (moderate to major) cumulative impacts were identified for the proposed Facility in combination with past, present, and reasonably foreseeable future actions.

6.2.2 Rail Transportation

According to the *Washington State Rail Plan* (Washington State Department of Transportation [WSDOT] 2014), the state's rail infrastructure has adequate capacity to meet current demands. However, the total number of trains that would be added to the system if all of the identified existing and future projects (Table 5-2) were to be permitted and operated is approximately 155 unit trains or 310 one-way train-trips per week. This amount would increase the overall use of rail facilities and would likely reach or exceed capacity in some areas.

In instances where demand approaches or exceeds capacity, a rail operator could implement various operational and/or physical improvements to minimize congestion on the rail network. Operational improvements include changing train scheduling and/or routing; physical improvements include measures to increase capacity such as additional sidings or segments of double-track. However, if adequate operational and/or physical improvements to minimize congestion are not implemented, the increase in rail transportation from trains associated with the Proposed Action in combination with existing and future foreseeable train traffic could have a moderate to major cumulative impact to rail transportation in

the future. Impacts include increased rail congestion, which could impact other users of the rail system, such as grain farmers, resulting in delays in moving their goods to market.

Cumulative increases in rail traffic would also likely increase gate downtimes and associated vehicular delays. Increases in gate downtimes would be worse during peak commuting times, particularly in urban areas, resulting in major cumulative impacts to transportation. In urban areas and during peak commuting periods, the number of highway vehicles idling while delayed at crossings could be substantial and result in minor to moderate localized increases in emissions. Rail traffic delay costs from congestion and increased gate downtimes are expected to be a moderate cumulative effect of increased trains associated with the Proposed Action in combination with existing and future foreseeable train traffic. Mitigation measures identified in Section 3.14.5 address these impacts.

Increased rail operations could contribute to increased volumes of leaks of small quantities of grease, oil, and fuel along the rail lines. Small spills and leaks would be expected to remain on the gravel railbed and potentially within adjacent soils, and could affect vegetation in close proximity to rail lines. Increased rail traffic associated with the Proposed Action in combination with existing and future foreseeable train traffic could also facilitate the rate at which noxious weeds are dispersed along the rail line. The increase in rail traffic with associated small spills and leaks and facilitated movements of noxious weeds and invasive plants could contribute to moderate, long-term cumulative impacts to vegetation communities along rail lines. The incremental increase in rail traffic associated with the Proposed Action, existing train traffic, and future foreseeable train traffic would also likely contribute to a moderate increase in wildlife collision mortality. Mitigation measures are identified in Section 3.5.5 to address this impact.

The additional rail traffic associated with the Proposed Action in combination with existing and foreseeable future actions could increase the rate of accidents and fatalities to pedestrian trespass or motorists at at-grade crossings along the rail corridor since a greater number of trains would mean a greater number of potential conflicts. As discussed in Section 3.8, some at-grade crossings along the rail corridor may currently have elevated safety risks that would increase with additional train traffic. Mitigation measures are identified in Section 3.8.5 to address this impact.

6.2.3 Vessel Transportation

In the event that reasonably foreseeable future actions were to be permitted and operated, the total number of vessels that could be added to the Columbia River would be between approximately 2,610 and 3,948 vessel-trips per year.⁵ When this amount is added to the 2013 total (approximately 1,457 vessel trips), between 4,067 and 5,405 deep-draft vessels per year could travel through the Columbia River. This amount would significantly exceed the recent historical high of 2,086 vessel trips that occurred in 2000.

A substantial increase in deep-draft vessels would likely result in increased wakes that could induce bank erosion, increase turbidity and cause localized water quality effects, and cause added degradation and destruction to some archaeological resources located along the shoreline. Cumulatively more vessel wakes could impact riparian vegetation directly through breakage, swamping, and erosion and indirectly through altered patterns of erosion and deposition and spread of aquatic invasive plants. Localized reductions of existing vegetation, prey, and overall essential fish habitat function could also occur from wakes during vessel transit. Increased occurrences of wake stranding⁶ could also result from an increase

5 This includes the 365 vessels per year from the Proposed Action.

6 Wake stranding is when aquatic species are lifted by a wave onto a shoreline and are stranded.

in deep-draft vessels along the Lower Columbia River below Vancouver and is an issue of ongoing active management concern (E2 Consulting Engineers, Inc. 2012).

Juvenile salmonids and other fish present in the vessel corridor are susceptible to wake stranding. Such wake effects would be limited to the lower approximately 33 miles of the river (16 percent) where shorelines with beaches close to the channel are not shielded from wave action and have beach slopes less than 10 percent. Wake effects would be the greatest as vessels pass through the Columbia River estuary and its associated habitats including tidal wetlands, shallow water, and tidal flats. The habitat types in these areas serve as important nursery grounds for juvenile fish and contain some of the highest quality, unarmored shallow-water shoreline habitat that is of great importance to numerous aquatic species and associated fisheries.

The cumulative increase in deep-draft vessel traffic and associated increase in vessel wakes could have a minor to moderate impact to soil erosion and water quality, moderate long-term impacts to shoreline vegetation and spread of invasive wetland and riparian plants, and moderate to major impacts to archaeological resources. Reduced vegetation communities in these areas could result in a moderate to major long-term change to vegetation resources, indirectly affecting fish species that rely on these habitats to complete their life cycle. Possible wake stranding effects to juvenile salmonids and other fish species would represent a moderate to major cumulative impact. Mitigation for wake effects to aquatic species has been identified in Section 3.6.5, which would also address potential impacts to soils, archaeological resources, water quality, and vegetation.

Underwater noise would be generated by vessels associated with the Proposed Action, existing vessel traffic, and future foreseeable vessel traffic as they transit through the Columbia River and the Pacific Ocean, which could disturb fish, marine mammals, or turtles. It is not likely that an increase in vessels transiting through the marine portion of the vessel corridor would add a significant level of noise due to the high volume of existing marine traffic and large area in which vessels can travel, but in the event that a significant increase in vessel traffic occurs within the confines of the Columbia River, noise levels from transiting vessels could increase ambient noise levels in this area, resulting in minor to moderate impacts to the species that reside there.

Entrainment of aquatic larvae and eggs would likely increase as a result of increased vessel numbers associated with the Proposed Action, existing vessel traffic, and future foreseeable vessel traffic transiting the Columbia River, which may result in a minor to moderate additional impact to the reproduction, population size, or distribution of fish species present in the vessel corridor.

An increase in vessel traffic associated with the Proposed Action, existing vessel traffic, and future foreseeable vessel traffic would likely require tribal fishing vessels to give way more often to larger cargo vessels, which may temporarily impede access to usual and accustomed (U&A) areas. Impacts to aquatic species from vessel wakes could reduce localized populations of important tribal fish species such as salmon, particularly during vulnerable times such as during extremely high temperatures. Cumulative impacts to U&A areas from vessels associated with the Proposed Action, existing vessel traffic, and future foreseeable vessel traffic could be moderate. Mitigation measures identified in Sections 3.6.5 and 3.12.5 would reduce these impacts.

Recreational watercraft users and fishing activities on the Columbia River in the vicinity of vessel operations could experience an increase in noise and visual impacts and would likely require recreational vessels to give way more often to such vessels, which could reduce the fishing experience for some users during narrow fishing seasons, resulting in minor to moderate impacts. Mitigation measures identified in Section 3.12.5 could help to reduce this impact.

7 SPECIAL STUDIES

Three special studies were commissioned by EFSEC to address concerns from the public during scoping and from EFSEC itself. These studies address:

- The potential for seismic and other geologic hazards (e.g., earthquakes, landslides) to impact the proposed Facility, unit trains, and vessels;
- The likelihood of train and vessel incidents (e.g., derailments, vessel groundings, allisions, collisions), the likely range of crude oil spill sizes that could result from these incidents, and the possible spread if a spill reached the water; and
- The current preparedness of Vancouver Fire Department (VFD) response personnel and equipment to respond to crude oil spills and fires at the proposed Facility and along the rail delivery route within the city of Vancouver.

These studies were carried out by individuals with extensive expertise in these areas. The study reports are all included as appendices to this Draft EIS.

7.1 Seismic Hazard Analysis

EFSEC commissioned an independent review of potential seismic hazards that could affect the proposed Facility and an assessment of the design of the proposed Facility, including ground improvements committed to by the Applicant to address seismically induced soil liquefaction (Appendix C). EFSEC's consultants also reviewed existing information in the public record to assess geologic hazards along the rail and vessel corridors. Section 3.1.2.4 provides a summary of the geologic hazards that could occur at the proposed Facility site and along the rail and vessel corridors.

7.1.1 Proposed Facility

The Applicant's design would adhere to applicable industry seismic building codes and foundation design standards for all proposed Facility elements, including buildings, storage tanks, pipelines, and the marine terminal (see Section 3.1.3.4). Structures including buildings, storage tanks, and pipelines at the proposed Facility would be designed to minimize the risk of damage due to ground motion hazards from earthquakes. In addition to ground motion, geotechnical assessments of the proposed Facility location have concluded that soils in portions of the site could experience liquefaction⁷ during an earthquake, and structures that may otherwise withstand ground movement could be damaged if underlying soils liquefied. EFSEC's independent seismic analysis confirmed that liquefaction was a concern given soil conditions underlying the proposed Facility site and determined the following:

- Ground improvement procedures would prevent damage to tank foundations in the event of an 8.9 magnitude earthquake at the storage area (Area 300).
- At the storage area (Area 300), no ground improvement is proposed for soils underlying the secondary containment berm. The stone columns under the foundations supporting the storage tanks do not extend to the berm. Therefore, the potential exists for liquefaction and ground deformation under the secondary containment berm. Designing the berm to withstand ground motion/shaking is appropriate, but needs to be combined with an assessment of potential

7 Soil liquefaction describes a phenomenon whereby a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress, usually earthquake shaking or other sudden change in stress condition, causing it to behave like a liquid.

liquefaction beneath the berm, and the requirement to extend the ground improvements deeper into the ground.

- At the dock and adjacent transfer pipeline within the marine terminal (Area 400), the maximum considered earthquake (MCE) of 8.9 magnitude could result in 7 to 14 feet of lateral spreading at the dock and at the proposed transfer pipeline near the shoreline. Additionally:
 - Some of the vibroreplacement stone columns the Applicant proposes in this area may not reach stable foundation soils at depth based on existing geotechnical data.
 - Ground improvement consisting of deep soil mixed panels supported by jet grout columns does not have a well-established performance record.
 - 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.
- At the transfer pipelines (Area 500), near the shoreline at the southern end of the transfer pipeline, existing data indicate that the depth to stable nonliquefiable soils ranges from 33 to 51 feet below ground surface (bgs). The current ground improvement design includes stone columns with depths of between 5 and 16 feet bgs, which would not reach the underlying stable soils.

Given the potential for soil liquefaction from a large seismic event at the proposed Facility site, even with implementation of the Applicant's proposed ground improvements, impacts from these earthquake hazards could range from moderate to major. Additional mitigation measures were identified during the independent analysis that would, if implemented, reduce the range of impacts. These mitigation measures are described in Section 3.1.5.

7.1.2 Rail Corridor

Seismic hazard impacts along the rail corridor could vary from negligible to moderate. The potential for seismic activity capable of disrupting rail transportation is particularly high in Washington. Impacts include possible train derailment associated with earthquake hazards. A detailed description of earthquake hazards along the rail corridor in Washington is provided in Appendix C.

Landslides pose a minor to moderate impact to rail transportation. The rail corridor would pass through various regions with steep slopes where landslides could occur. A landslide could result in a train car derailment if the active slide were to strike the train, or if slide debris covered or damaged the tracks and a train were unable to stop prior to impacting the debris. BNSF has identified locations where landslide susceptibility is high, and these sites are monitored by rail operators to reduce the potential for injuries and damage to rail equipment. In addition, slide fences, catchment walls, and widened ditches have been installed in known landslide areas to contain landslide debris and stabilize slopes, and they are routinely inspected and maintained to minimize impacts to railroad operations when landslides occur.

7.1.3 Vessel Corridor

Seismic hazards along the vessel corridor occur near the Columbia River mouth and offshore along the marine transportation route. These hazards include tsunami and seiche waves generated by large earthquakes, particularly those associated with a subduction zone earthquake off the coast of Oregon or Washington. Impacts from these waves to vessels in the nearshore shallow-water environment could be major. Marine vessels on the open ocean are not likely to be impacted by earthquake-generated tsunami waves as these waves in the open ocean are typically less than a foot in height and pass under marine vessels unnoticed. As these waves approach shallow water, however, wave amplitudes increase substantially and the rise in seafloor topography causes the waves to increase in height. In the event of a

tsunami, a vessel could be inundated, grounded on the river bottom, pushed out of the navigation channel, or capsized from the wave. The probability of this type of incident is low, but it could have major impacts if it were to occur. The National Oceanic and Atmospheric Administration (NOAA) operates the Pacific Tsunami Warning System, which provides warnings for the Pacific Basin including the United States and other nations around the Pacific Rim. The warning system uses seismic data, tide gauges, and buoys to predict, detect, and issue warnings for seismic events. In the event of an earthquake capable of generating tsunamis, NOAA issues warnings to all potentially impacted vessels. Vessels in vulnerable nearshore environments would be encouraged to set a course for deeper water.

7.2 Crude Oil Spill Risk Assessments

Concerns were raised during scoping about possible crude oil spills related to operations at the proposed Facility, train derailments or vessel collisions. For the proposed Facility, the contingency planning spill volume consistent with WAC 173-182 for the storage tank area and contingency planning volumes estimated by the Applicant for four other elements of the proposed Facility are provided in Chapter 4 of this Draft EIS. These planning volumes would be used to finalize spill prevention, control and countermeasure plans, oil spill contingency plans, and a Facility Response Plan (before construction and operation of the proposed Facility occurred) unless the Washington State Department of Ecology (Ecology) determines that other volumes are more appropriate. An independent analysis of spill potential at the proposed Facility marine terminal during vessel loading was carried out using data gathered in previous studies involving transfer operations in Washington and California (Appendix E). In addition, EFSEC commissioned a lead consultant from Ecology's 2014 Marine and Rail Oil Transportation Study to conduct an independent analysis to address concerns related to the risk of crude oil spills from rail and vessel traffic associated with the proposed Facility (see Appendices E and J for the complete risk assessment reports). The independent analysis estimated the likelihood of rail and vessel incidents (derailments and vessel groundings, allisions, and collisions), the likely range of crude oil spill sizes that could result from these incidents, and the possible spread of oil in the event that a spill reached the Columbia River. These estimates have been used to assist in determining a range of possible spill scenarios for use in the resource-specific impact analysis. Examples of spill sizes are given here with additional information provided in Sections 4.3.2 (rail, Appendix E) and 4.3.3 (vessel, Appendix J). Results of the analyses include the following:

- The average number of years that would elapse between a derailment of one loaded car that results in a crude oil spill volume of 700 bbl or less is 27 years;
- The average number of years that would elapse between a vessel loading (transfer) spill of 1 bbl or less is approximately 14 years; and
- The average number of years that would elapse between a vessel grounding or collision resulting in a spill of 1,000 bbl is 34 years.

The proposed Facility, rail, and vessel safety considerations and accident prevention plans are designed to reduce the frequency of such incidents and to reduce the likelihood of a crude oil spill in the event of an incident (see Appendix D). Nonetheless, accidents could occur and the risk of a crude oil spill, fire, and/or explosion cannot be totally eliminated.

7.3 Emergency Response Preparedness

Concerns were raised during scoping about the potential for fires and explosions at the proposed Facility and/or during transportation of crude oil to and from the proposed Facility. EFSEC held discussions with the VFD during preparation of this Draft EIS to help determine the current preparedness of response personnel and equipment to respond to crude oil spills and fires at the proposed Facility and along the rail

delivery route within the city of Vancouver. The VFD identified the need for its staff to receive additional training on an annual basis in crude oil train derailment response, crude oil transshipment response at a marine terminal, industrial rescue, water response, industrial fire suppression, flammable liquids handling and fire suppression, and foam application in a live fire event. VFD further identified the need to fully identify and assess the risks involved in crude oil transportation and transshipment within the City and throughout their regional response area. VFD is concerned that the planning and training required to prepare for the development and operation of the proposed Facility could impact its ability to maintain its current service levels. VFD also stated that the need to attend training would create challenges in maintaining their regular minimum staffing and paying backfill and overtime for members to attend specialized training (Eldred 2015a, b).

Of the 34 fire departments/fire protection districts identified along the rail corridor in Washington and invited to participate in an EFSEC survey, 12 responded. Of the responding jurisdictions, the majority are volunteer agencies, where at least 75 percent of the agency's firefighters are unpaid members of the community. Only 1 out of the 12 fire agencies reported that its firefighters are trained and equipped to respond to a train derailment with resulting oil spill and fire. Three-quarters of fire agencies report having access to, either within their department/district or through mutual aid, personal protective equipment, aqueous film-forming (AFF) foam, and foam applicators. Only a quarter of responding jurisdictions reported having access to oil spill containment equipment (e.g., hard boom and/or sorbent boom).

All responding jurisdictions indicated that they can contact the owners of a crude oil unit train by dispatch or other method if an incident were to occur. However, only half of the responding fire agencies are aware of the location of the BNSF railroad equipment cache closest to their jurisdiction. The survey results show that most fire departments/districts have indicated they could use additional information to assist in response planning. In the EFSEC survey, each fire agency was asked whether it had sufficient personnel and equipment resources to respond to small, medium, large, and very large spill event scenarios and associated fire and/or explosion along the rail corridor that were used in the resource-specific impact analyses. All responding agencies indicated the need for additional resources to respond to one or more spill event scenarios, particularly the larger spill and associated fire and/or explosion scenarios. For all spill and/or associated fire scenarios, responding agencies most frequently cited the need for additional staffing to adequately respond to an incident and other calls for service within the community, closely followed by the need for additional logistical support.

The Maritime Fire Safety Association (MFSA) has developed and maintains a state-approved Vessel Response Plan that vessels can choose to adopt. It should be noted that the current MFSA spill contingency plan is not designed to address spills greater than 300,000 bbl, and is primarily focused on addressing spills of refined petroleum products rather than crude oil. Twelve fire agencies, including VFD, have an agreement with MFSA to provide one engine and three people for shipboard firefighting if the agency can provide these resources without impacting service within its jurisdiction. The fire suppression crew from VFD's Station 1 cross-staffs both the quick response vessel and Engine 1 (the fire engine for Station 1); therefore, Engine 1 is out of service while the quick response vessel is responding to a service call (Eldred 2015c).

8 POTENTIAL CRUDE OIL RELEASES

Potential crude oil spills related to operations at the proposed Facility and from train and vessel transportation are studied in the Draft EIS. Chapter 4 provides a discussion of safety considerations, accident prevention and response plans, and the actions that would be undertaken in the event of an accidental oil spill, fire, and/or explosion associated with the proposed Facility and the transportation of crude oil. Resource-specific impacts from such events are provided in Section 4.6.

8.1 Potential Crude Oil Releases and Associated Environmental Impacts

The Draft EIS addresses the different types of crude oil that would potentially be transshipped through the proposed Facility and their physicochemical properties. According to the Applicant, Bakken crude oil and diluted bitumen (dilbit) would be the two most common crude oils transported to and from the proposed Facility. The potential impacts to environmental resources from spills at the proposed Facility and along associated train and vessel transportation corridors were considered for two scenarios: (1) small to medium spills and (2) large to very large spills (see Table 4-13 in Chapter 4 for details on spill volume scenarios). Impact analysis at the proposed Facility and along associated train and vessel transportation routes also considered potential small fires and large explosion and fire events.

The study area for the spill event impact analysis includes the proposed Facility, rail corridor, and vessel corridor. The rail corridor for this impact analysis also includes the Columbia River from Kennewick to 1 mile downstream of the Port. This rail-Columbia River corridor includes all adjoining side channels, sloughs, and associated wetlands, and adjacent riparian and upland habitats within 0.25 mile of the river shoreline. For each environmental resource studied in the Draft EIS, a discussion of potential impacts from accidental crude oil spills, fires, or explosions is provided, along with identification of particularly sensitive areas or resources that would experience greater impacts. The range of impacts considered for each resource includes the effects of the initial event and the effects of the likely response to that event, as summarized in Table ES-3. In general, the impacts to environmental resources would depend on the adequacy of response plans; the volume of crude oil spilled or extent of fire and/or explosion; the physical, temporal, and environmental factors affecting the event; and the level of response to the incident

8.2 Additional Mitigation Measures to Address the Risks of and Impacts from a Crude Oil Spill, Fire, and/or Explosion

Industry standards and measures committed to by the Applicant to avoid and minimize the risk of a crude oil spill, fire, and/or explosion are presented in Section 4.1.3. Because EFSEC has made no final decisions regarding the adequacy of the current mitigation proposals from the Applicant, additional mitigation could be identified during the site certification process, permitting activities, or further environmental review. EFSEC has identified the following additional mitigation measures for consideration by the state legislature and other federal, state, and local agencies and private organizations to address the risk of and impacts from a crude oil spill, fire, and/or explosion.

8.2.1 Legislative Actions

- Implement the recommendations on prevention-based mitigation of crude-by-rail risks, prevention-based mitigation of crude oil marine transportation risks, and prevention-based mitigation of crude oil terminal facility risks included in the 2014 Washington State Marine and Rail Oil Transportation Study.

8.2.2 Mitigation Measures for the Applicant to Implement

- Provide secondary containment for aboveground crude oil transfer pipelines at the proposed Facility to reduce the risk of spills to the environment.
- Implement the mitigation measures identified in Section 3.1.5 to further reduce risks from seismically induced soil liquefaction.
- Require all tank cars used to transport crude oil to the proposed Facility to meet or exceed DOT-117 (or newer) specifications developed by PHMSA, FRA, or other appropriate regulatory authorities for the life of the Project.

- Coordinate with potentially affected first responder agencies and contribute support to implement a plan that would facilitate:
 - Training for full-time and voluntary first responders with jurisdiction along the delivery rail route in Washington and in the vicinity of the Port in the appropriate methods for combating volatile crude oil fires and explosions. Training should be modeled after or coordinated with similar training programs to be developed by the University of Findlay, the International Association of Fire Chiefs, and The Center for Rural Development (in cooperation with the Security and Emergency Response Training Center in Pueblo, Colorado) using Assistance for Local Emergency Response Training (ALERT) grants awarded by PHMSA.
 - Purchase of additional crude oil spill and crude oil fire and explosion response equipment to be stationed at appropriate locations along the delivery rail route and at the Port.
- Provide comprehensive instruction and training for VFD in the design, operation, and interaction with the proposed Facility's fire protection system. Additional specific training needs include annual training in crude oil transshipment response at a marine terminal, industrial rescue, water response, industrial fire suppression, flammable liquids handling and fire suppression, and foam application in a live fire event.
- Provide support for additional research, technology, and equipment for responding to spills of heavy crude, such as dilbit.
- Develop appropriate response strategies for cleaning up spills of heavy crude oil prior to transporting dilbit on the Columbia River.
- Contribute to all updates of the Lower Columbia River GRP and other applicable Northwest GRPs in partnership with Ecology, ODEQ, USCG, and EPA for the lifetime of the proposed Facility to address the type and amount of crude oil moving to and from the proposed Facility.
- Work with Ecology, ODEQ, and others to develop response strategies for environmentally sensitive areas on the Lower Columbia River and along the rail corridor within the state for inclusion in the Lower Columbia River GRP and reference in the Applicant's oil spill contingency plan.
- Retain a licensed engineer to perform an independent engineering analysis and feasibility study to improve oil recovery in the case of a spill during vessel loading at the dock. The study would determine the number of days it is safe and effective to preboom oil transfers and would identify site-specific improvements to maximize successful prebooming. The Applicant should submit this study to EFSEC. If improvements to allow for prebooming are determined to be unfeasible, the Applicant would be required to implement alternative measures including but not limited to the following measures to mitigate the absence of preventative boom in the water during transfers: stage an appropriate number of dedicated response vessels, deploy additional containment and cleanup equipment, and station trained personnel at the terminal dock and/or at a nearby staging area during oil transfers.
- Conduct a study to identify an appropriate level of financial responsibility for the potential costs for response and cleanup of oil spills, natural resource damages, and costs to state and affected counties and cities for their response actions to reduce the risks and impacts from an oil spill. The study should be conducted prior to commencing operations and address the factors in RCW 88.40.025, Evidence of Financial Responsibility for Onshore or Offshore Facilities, including a reasonable worst-case spill volume, the cost of cleaning up the spilled oil, the frequency of operations at the Facility, prevention measures employed by the Facility that could reduce impacts through spill containment, immediate discovery and shutoff times, and the damages that could result from the spill (including restoration). The study should identify any constraints

related to the commercial availability and affordability of financial responsibility. Based on the study, EFSEC shall determine the appropriate level of financial responsibility and require the Applicant to demonstrate their financial responsibility to the satisfaction of EFSEC. Proof of financial responsibility would be included as documentation in the Applicant's contingency plan.

8.2.3 Mitigation Measures Involving EFSEC, the Applicant, and Other Agencies and/or Private Organizations

- Ecology should verify that the appropriate regulatory contingency spill planning volume used to develop appropriate spill containment at the proposed Facility is “the entire volume of the largest aboveground storage tank on the facility site complicated by adverse weather conditions...” (the largest aboveground storage tank capacity at the proposed Facility is 375,000 bbl) or if “...a larger or smaller volume is more appropriate given a particular facility's site characteristics and storage, production, and transfer capacity” (WAC 173-182).
- The Applicant should coordinate with EFSEC and the City of Vancouver to ensure that an independent technical review of the proposed Facility's fire protection systems is conducted at the 100 percent (final) design stage, consistent with the recommendations in Appendix B.
- The MFSA, with assistance from the Applicant, should update the existing MFSA Vessel Response Plan to:
 - Address a Handymax regulatory worst-case discharge volume of 319,925 bbl (Appendix J, Table 3)
 - Expand the plan's current focus on vessel shipments of refined petroleum products to include shipments of various types of crude oil on the Columbia River.
 - Mandate that all vessels loading at the proposed Facility adopt the MFSA Vessel Response Plan (Appendix D.11).
- The Applicant and EFSEC should coordinate with the USCG, Lower Columbia River Harbor Safety Committee, Ecology, ODEQ, Columbia River Bar Pilots, and Columbia River Pilots to ensure that existing safety procedures and vessel traffic management systems are adequate to accommodate 365 additional crude oil vessels per year, primarily of the Handymax vessel size. These procedures should address at minimum:
 - Safe speeds for laden tank vessels carrying crude oil and other vessels while in the traffic lane.
 - Appropriate capacities with regard for the Columbia River channel for laden tank vessels carrying crude oil.
 - Minimizing of vessel traffic and anchorage maneuvers during outbound transits.
- EFSEC should coordinate with Ecology, the Applicant, and vessel operators to revise Project-related vessel operation requirements based on the findings of Ecology's upcoming Columbia River vessel traffic risk assessment, required by Engrossed Substitute House Bill 1449, as appropriate.
- EFSEC and the Applicant should communicate with Local Emergency Planning Committees (LEPCs) along the rail corridor and in the vicinity of the proposed Facility to determine or update the following information: LEPC contact information (phone, email, and website), county/cities included in the LEPC plans, date of last LEPC plan update, regularity of LEPC meetings, LEPC funding status, LEPC emergency response training status, and components of LEPC emergency plan including dangers and/or responses specifically affecting low-income or minority populations in the LEPC area.

- EFSEC and the Applicant should coordinate with the State Fire Defense Committee to update the Washington State Fire Services Resource Management Plan to ensure that the plan can facilitate provision of adequate mobilization of personnel trained to address crude oil spill, fire, and/or explosion incidents anywhere along the rail and vessel corridors and at the proposed Facility, and to ensure that the plan can facilitate provision of adequate mobilization of personal protective and response equipment for these incidents.
- EFSEC, the Applicant, and the rail transporter of crude oil should coordinate with the State Fire Defense Committee, LEPCs, and local emergency responders along the rail corridor to ensure development of specific evacuation plans for each residential community of greater than 50 residents within 0.25 mile of the rail route and within 1 mile of the proposed Project at the Port. This plan should include written instructions to all residents and emergency communication protocols for them to follow in the event of a crude oil spill, fire, or explosion event.

Crude Oil Transshipment Safety Considerations and Planning

Several federal, state, and local regulations and industry engineering and safety standards apply to every aspect of a crude oil distribution system in recognition of the potential risks of crude oil releases. Accident and spill prevention planning occurs as an important element of regulatory implementation and industry safety standards. Applicable regulations and industry safety standards in effect as of July 2015 have been reviewed in the Draft EIS.

Current regulations provide for hazardous materials incident response planning and implementation procedures to minimize damage to human health and the environment in the event a crude oil spill does occur. A discussion of established response organizations; national, regional, and local response plans; and contingency and response plans drafted for the proposed Facility are provided in this Draft EIS (see Section 4.2) and considered in the assessment of potential environmental impacts in the event of an accidental crude oil release. Appendix D provides the Applicant plans referenced in this Draft EIS including construction and operations spill prevention plans, Facility Oil Handling Manual, and Operations Oil Spill Contingency Plan. An assessment of the capabilities and preparedness of emergency responders along the rail and vessel corridors and near the proposed Facility site was also carried out for consideration in assessing potential environmental impacts in the event of a crude oil release, and to provide information to decision makers.

9 ISSUES TO BE RESOLVED

This Draft EIS analyzes a wide range of issues identified during scoping associated with the Proposed Action. Through the Draft EIS process, some of these issues have been found to require further consideration by the Applicant and decision makers, or require information that is not available during an EIS process (e.g., 100 percent design). The following issues will require the Applicant's and EFSEC's further consideration and/or additional information before being resolved:

- Confirm adequacy of the Applicant's proposed ground improvement program, including numerical modeling and a reassessment of the required depth of penetration of stone columns, and confirm that the design of the transfer pipelines (Area 500) has sufficient strength and flexibility to withstand earthquake-generated ground deformations that could impact the dock and moored vessels during seismic events (see Section 3.1.5).
- Determine the responsible entities for implementing proposed mitigation measures recommended to the governor by EFSEC in the event that an ASC is granted.

- Confirm adequacy of the Applicant's proposed onsite fire protection systems in an independent assessment at the 100 percent design stage.
- Consult with potentially affected tribes to determine impacts to Reserved Treaty Rights for accessing U&A areas for hunting, fishing, and gathering.
- Determine the in-water work window in consultation with the Applicant, EFSEC, and the Washington Department of Fish and Wildlife (WDFW).
- Determine if mitigations identified in the Draft EIS to address seismic and safety upgrades and utility line work at the marine terminal are adequately considered in ongoing discussions between EFSEC and the US Army Corps of Engineers regarding the Applicant's application for a Department of the Army permit and the associated Environmental Assessment.
- Determine through further discussions between the Utilities and Transportation Commission (UTC) and BNSF if at-grade crossings along the rail corridor require modifications or upgrades to address safety and delay issues.

10 AREAS OF CONTROVERSY AND UNCERTAINTY

The proposed development of a crude oil terminal at the Port of Vancouver has been met with support and opposition from different stakeholders. Approximately 31,074 comments were received from private citizens, environmental organizations, public agencies, and tribal representatives during the scoping period. These comments addressed numerous areas of controversy and uncertainty including issues such as climate change, national energy policy, the volatility of crude oils, and the risks of oil spills, fire and/or explosion at the project site or along rail or vessel transportation routes. Many of the comments focused on concerns over the safety and inherent risks associated with transportation of crude oil by rail. Additional comments pertained to possible health effects; geological hazards; response capabilities of police, fire and emergency medical services; and potential impacts to threatened and endangered species and tribal resources.

The assessment of potential impacts from the proposed Facility and associated rail and vessel transportation includes some level of uncertainty because it includes predictions of future events, some with very low probabilities of occurrence. The rail and vessel oil spill risk analyses (the full reports are provided in Appendices E and J respectively) use historical data to predict the likelihood of a future rail or vessel accident and potential resulting oil spill. These predictions used best available data and statistical analyses to estimate potential frequencies and volumes of oil spills. Because the frequency and severity of an actual spill, explosion, or fire in the future cannot be predicted, such analysis includes an unavoidable degree of uncertainty.

Similarly, the seismic risk analysis (Appendix C) used proposed Facility plans (including engineering drawings), site-specific test results, publicly available hazard data, and relevant information from published reports, maps, and websites to estimate the potential impact of a large seismic event at the proposed Facility and along rail and vessel transportation routes. Because the frequency and severity of future seismic events cannot be predicted, such analysis includes an unavoidable degree of uncertainty. One final area of uncertainty is the actual performance of new or retrofitted DOT Specification 117 tank cars and their ability to resist breaching or failure during derailments.

11 PUBLIC AND AGENCY INVOLVEMENT

EFSEC initiated a public involvement program, which included scoping and agency coordination, to assist with identification of impacts to be addressed in the EIS. Scoping is the first step in the SEPA

environmental review process and refers to the act of identifying issues and concerns related to a proposed project. The scoping period for this EIS was October 3 to December 18, 2013. Members of the public, government agencies, tribes, and other interested stakeholders were invited to attend two scoping meetings and to submit comments verbally or written on comment forms during scoping meetings or by email or surface mail. EFSEC received approximately 31,074 comments from private citizens, environmental organizations, public agencies, and tribal representatives during the scoping period. These comments were reviewed by EFSEC in determining the scope of the EIS. The Scoping Report can be found at EFSEC's website.⁸

In addition to scoping, EFSEC invited agency representatives with regulatory authority or special expertise with respect to environmental issues to assist in development of the EIS. Representatives from the following agencies cooperated in developing this Draft EIS:

- WDFW,
- Ecology,
- WSDOT,
- Washington State Department of Archaeology and Historic Preservation (DAHP), and
- Washington UTC.

These agency representatives assisted in evaluating the ASC and Preliminary Draft EIS, participated in meetings with EFSEC staff and contractors during development of the Draft EIS to identify issues and mitigation, and participated in the review of preliminary working sections of the Draft EIS for accuracy and adequacy. EFSEC will continue to work with agency representatives in responding to comments, and these agencies would continue to provide special expertise with respect to environmental issues and regulatory authority during development of the Final EIS.

12 NEXT STEPS

Publication of the Draft EIS is an important element of the public involvement process. Public availability of the Draft EIS initiates a comment period, during which time members of the public, agencies, tribes, and other stakeholders are invited to review and provide comments on the Draft EIS. The public has been given 45 days to comment on the Draft EIS. Comments may be submitted verbally or in written form at one or both of the following scheduled public meetings:

City of Vancouver:

January 5, 2016, 1:00 p.m. until the last speaker Clark County Event Center at the Fairgrounds
Hall B
17402 NE Delfel Road
Ridgefield, WA 98642

City of Spokane:

January 7, 2016 5:00 p.m. until the last speaker Centerplace Regional Event Center
2426 N Discovery Place
Spokane Valley, WA 99216

⁸ The Scoping Report is available at:
http://www.efsec.wa.gov/Tesoro%20Savage/Scoping%20Report/Final%20Draft%20Scoping%20Report%20_electronic_02-20-14.pdf.

Comments may also be submitted online at: <http://www.efsec.wa.gov/Tesoro-Savage/SEPA - DEIS/DEIS PAGE.shtml>. All comments received during the comment period will be considered in preparing a Final EIS. EFSEC will prepare and issue a Final EIS, which will include a list of the comments received and the responses to those comments.

The Draft EIS has been made available for review and comment to all interested individuals, government agencies, tribal members, and members of nongovernmental organizations who have indicated an interest in the proposed Project. In addition, the Draft EIS has been posted to EFSEC's publicly accessible website: <http://www.efsec.wa.gov/Tesoro-Savage.shtml>.

EFSEC will maintain a mailing list throughout the public involvement process that includes attendees at public meetings, commenters during the scoping process, and individuals who have requested to be added to the mailing list. To be added to the mailing list, please contact Kali Wraspir at kwrspir@utc.wa.gov or (360) 664-1365, or email your complete name and postal address to efsec@utc.wa.gov and indicate whether you want to receive notices of future permitting activity for this project by email, surface mail, or both methods of delivery.

13 DECISIONS TO BE MADE

After its evaluation is complete, EFSEC will submit a recommendation to the governor. If EFSEC recommends approval of the proposed Facility, it will submit a draft Site Certification Agreement (SCA) for the governor's signature. An approved SCA typically includes a range of conditions that the Applicant must meet during project construction, operation, and eventual decommissioning. Within 60 days of receipt of EFSEC's recommendation, the governor may approve the Facility, reject the Facility, or direct EFSEC to reconsider the SCA. If an ASC is denied, a proposal cannot be constructed and operated.

14 FURTHER INFORMATION ABOUT THE PROJECT

EFSEC's publicly accessible website for the proposed Project includes documents regarding the ASC, scoping comments, public comments, land use, and adjudication. The website also contains applications for related permits, schedules, transcripts of meetings, and relevant correspondence from the Applicant, EFSEC, and other interested stakeholders on various aspects of the ASC review and EIS process and is regularly updated with such information.

For information or questions concerning this Project please contact:

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Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
Earth Resources	<p>Impacts:</p> <ul style="list-style-type: none"> Negligible to minor impacts to soil during construction and decommissioning due to temporary increased risk of soil erosion. In the event of a massive earthquake, moderate to major unavoidable impacts could result from the liquefaction of susceptible soils underlying elements of the proposed Facility. In the event of a massive eruption, ashfall accumulation on proposed Facility elements could have a negligible to minor impact. <p>Mitigation:</p> <p>EFSEC has identified the following additional mitigation measures to reduce impacts from construction methods and seismic hazards associated with the proposed ground improvements:</p> <ul style="list-style-type: none"> Reassess the required depth of penetration of stone columns in the marine terminal (Area 400) and the western portion of the transfer pipelines (Area 500) near the Columbia River shoreline along the transfer pipeline and at the dock to secure the stone columns in either the nonliquefiable dense sand unit immediately overlying the Troutdale gravel or in the Troutdale gravel itself to greatly reduce the risk of damage during seismic ground motion/shaking. If the depth to the nonliquefiable dense sand unit is greater than the currently proposed depth, the installation depth should be increased accordingly. Additional impacts associated with this mitigation would include more disturbance of existing site soils and some additional construction activity. These additional impacts would be negligible. Install stone column ground improvements beneath the entire secondary containment berm in the storage area (Area 300) to ensure berm stability in the event of earthquake-induced liquefaction. While the Applicant has committed to a seismic stability analysis of the berms in accordance with WAC requirements, they only require designing the 	<p>Impacts:</p> <ul style="list-style-type: none"> Landslides pose a minor to moderate potential impact to rail transportation associated with the proposed Facility. In the rare circumstance in which a landslide-generated wave inundated rail tracks, impacts could be moderate. The impact of ashfall from a massive volcanic eruption could vary from negligible (a light dusting of ash) to moderate (burial of rail infrastructure under ash). The impact of lahars and/or debris flows could vary from negligible (light deposits of mud) to moderate (flooding/burial/damage of rail infrastructure from fast-moving, thick, muddy/rocky debris). A large earthquake could cause moderate to major impacts to rail transportation in areas where seismic ground motions induce soil liquefaction or slope instability. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No impacts identified for earth resources related to the rail corridor or rail operations. A large earthquake could cause moderate to major disruptions to rail transportation in areas along the rail corridor where seismic ground motions induce soil liquefaction or slope instability. 	<p>Impacts:</p> <ul style="list-style-type: none"> Impacts from a local, landslide-generated wave would likely be negligible to minor. In the event of a massive volcanic eruption, impacts from ashfall accumulation onto vessels could be moderate. Fault rupture in the vessel corridor region could result in moderate to major impacts from seismic water waves in the Lower Columbia River or along coastal marine routes, including the capsizing of marine vessels. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No impacts identified for earth resources related to the vessel corridor or vessel operations. In nearshore environments or near river mouths, such as the Lower Columbia River, impacts to vessels from tsunamis could range from moderate to major.

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<p>containment structure to withstand seismic forces and constructing using sound engineering practice. Designing the berm to withstand ground motion/shaking is appropriate but needs to be combined with an assessment of potential liquefaction beneath the berm as well as the requirement to extend the ground improvements deeper into the ground. Additional impacts associated with this mitigation would include more disturbance of existing site soils and some additional construction activity. These additional impacts would be negligible.</p> <ul style="list-style-type: none"> • Conduct more thorough numerical modeling / analyses (e.g., FLAC, PLAXIS) of the ground improvement system in the marine terminal (Area 400) to verify the anticipated performance of the deep soil mix panels supported on top of the jet grout columns. The outcome of the modeling is expected to include revised numbers, dimensions, and geometry of ground improvement elements to demonstrate expected control of ground displacements and lower potential for pipeline damage. If the numerical modeling results do not verify the anticipated performance, redesign the ground improvement system to achieve the anticipated results. • Confirm that the design of the transfer pipelines (Area 500) has sufficient strength and flexibility to withstand earthquake-generated ground deformations that could impact the dock and moored vessels during seismic events. If existing evidence is unavailable or does not support the required strength and flexibility of the transfer pipeline, redesign these Project elements to achieve that result. Alternatively, extend ground improvements into the soil forming the sloping embankment beneath the dock structure. Any ground improvements or dock modifications occurring below the ordinary high water mark (OHWM) would require consultation with the US Army Corps of Engineers (USACE) and other relevant state agencies to assess potential impacts to terrestrial and aquatic species and habitats and water quality. Conduct in situ geotechnical testing (e.g., cone penetrometer tests 		

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<p>[CPT] or standard penetration tests [SPT]) during installation of ground improvements to ensure that the soils have been sufficiently improved to achieve expected reduction in liquefaction potential. If testing determines that the expected level of ground improvement has not been achieved, continue ground improvement activity until the expected level of improvement is achieved.</p> <ul style="list-style-type: none"> • Install sediment control barriers (silt fencing with filtration fabric keyed in at ground surface; possibly straw wattles) at the top of the embankment to prevent flow of silt-laden water from stone column installation from entering the Columbia River. Monitor water on the river side of the sediment control barrier to ensure the expected level of water quality is maintained. If water quality on the river side of the barrier is unacceptable, implement additional sediment control measures until the desired level is achieved. • Install monitoring wells downslope from the stone column and jet grout column installation areas to monitor water quality during installation of these improvements. In the event of unacceptably high pH levels and/or sulfate levels during ground improvements, install additional sheet pile barriers to prevent contaminated water from entering the Columbia River, or halt jet grouting until a modified approach with BMPs can be approved by EFSEC. Additional impacts associated with this mitigation would include more disturbance of existing site soils and some additional construction activity. These additional impacts would be negligible to minor. • Check for possible deformation of the ground surface along the river embankment, using survey measurements of surface markers, or more sophisticated instrumentation, as needed. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • No significant unavoidable impacts identified to earth resources related to construction, normal operation 		

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Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<p>and maintenance, and decommissioning of the proposed Facility.</p> <ul style="list-style-type: none"> If an MCE earthquake (or larger) were to occur along the Cascadia Subduction Zone (CSZ), moderate to major unavoidable impacts could result from the liquefaction of susceptible soils underlying elements of the proposed Facility. 		
<p>Air Quality</p>	<p>Impacts:</p> <ul style="list-style-type: none"> Impacts from emissions and air toxics during construction would be minor. Impacts from criteria pollutants and diesel particulate matter (DPM) from onsite and near-site mobile source operations would be minor to moderate. Impacts to commercial and industrial receptors (including staff at the Clark County Jail Work Center [JWC] and other worksites in close proximity to the proposed Facility) would be moderate. Low annual deposition rate for DPM related to proposed Facility operation would represent a minor impact to the Columbia River. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. However, EFSEC will further assess the adequacy of Applicant-proposed air quality construction impact reduction measures during review of the Notice of Construction permit¹ application. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> Emissions of criteria pollutants and DPM from stationary sources and onsite and near-site mobile sources during operation and maintenance, while below the levels allowed by ambient air quality standards, could result in moderate air quality impacts to and near the proposed Facility site, including at the JWC. 	<p>Impacts:</p> <ul style="list-style-type: none"> Vehicles idling while delayed at at-grade crossings could increase emissions to a level that would represent an additional minor impact to local air quality. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified—a minor increase in rail traffic could be assumed to additionally represent a minor increase in air emissions in the vicinity of the rail corridor. 	<p>Impacts:</p> <ul style="list-style-type: none"> Increased vessel traffic and associated air emissions would have a minor impact to air quality. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified—Increased vessel traffic and associated air emissions would have a minor impact to air quality.

<p>Water Resources</p>	<p>Impacts:</p> <ul style="list-style-type: none"> • Impacts to water quality from small spills and leaks of hazardous materials would be minor. • Disturbance of the riverbed during temporary pile installation at the proposed marine terminal would cause minor to moderate temporary increases in turbidity of surface water. • Muddy groundwater or jet water brought to the surface and cement mixes that raise the pH and turbidity could enter the Columbia River in stormwater, resulting in minor to moderate impacts to groundwater and surface water. • Impacts to floodplains or impacts to proposed Facility activities from flood events would be minor. • Impacts to water resources from stormwater discharges from the proposed Facility would be minor. <p>Mitigation:</p> <ul style="list-style-type: none"> • Install and maintain an erosion control barrier along the top of the Columbia River embankment for the areas adjacent to stone column installations consisting of silt fencing, filtration fabric, and straw wattles, or similar measures approved by EFSEC. Monitor the water on the river side of the sediment control barrier to ensure the expected level of water quality is maintained. If the water quality on the river side of the barrier is unacceptable, implement additional sediment control measures until the desired level is achieved. • Conduct monitoring of groundwater quality for pH and sulfate content during jet-grouting activities between the columns and the temporary sheet pile wall, in a geographic pattern and at appropriate depths, to determine the magnitude of any elevated levels and the potential for such contaminants to reach surface water under the sheet pile wall. In the event that monitoring revealed excessive pH or sulfate content, halt jet grouting until a modified approach with BMPs can be approved by EFSEC. • Monitor flood predictions, warnings, and the rate of floodwater rise, and in the event of a flood event, temporarily suspend operations at threatened proposed Facility elements prior to the flooding. In the 	<p>Impacts:</p> <ul style="list-style-type: none"> • Project-specific contribution to chronic, low-level sources of water quality impairment from rail transportation use would be minor. <p>Mitigation:</p> <ul style="list-style-type: none"> • No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • No significant unavoidable impacts identified. 	<p>Impacts:</p> <ul style="list-style-type: none"> • The increase in deep-draft vessel traffic and associated increase in vessel wakes would have a minor to moderate impact to wetland vegetation, primarily in the Columbia River estuary. • The incremental impact from vessels associated with the proposed Facility would likely be minor, but possible water quality consequences of resuspended contaminants could be moderate. • Impacts to water quality from discharge of ballast water would be negligible. <p>Mitigation:</p> <ul style="list-style-type: none"> • No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • The increase in deep-draft vessel traffic and associated increase in vessel wakes could have a minor to moderate impact to wetland vegetation, primarily in the Columbia River estuary. While the incremental impact from vessels associated with the proposed Facility would likely be minor, vessel-induced resuspension of existing (legacy) contaminated bed sediments in the Lower Columbia River could cause moderate local effects that could violate water quality standards and beneficial uses; the location, timing, or duration of impact cannot be readily predicted.
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Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<p>event of an expected site inundation, demobilize movable equipment such as railcars and motor vehicles and relocate above the 500-year floodplain to the extent possible. Secure static equipment that cannot be moved.</p> <ul style="list-style-type: none"> • Modify the design of the dock transformer pad, control room/E-house, and fire pump and foam building in the marine terminal (Area 400) to ensure that the floor of these structures is at least 2 feet above the base flood elevation. • Install permanent measures to cap and/or seal areas with subsurface ground improvement columns during decommissioning to prevent surface water from infiltrating and conveying contaminants into areas where vertical columns could facilitate groundwater movement and migration of contaminants. Contain hydrocarbon residuals in existing pipelines during removal. • Obtain copies of all well abandonment forms listed in Ecology's well log database for high-producing wells installed between 1940 and 1967 and associated with the former Alcoa facility to verify that the wells were abandoned during site remediation. • In addition, EFSEC may include additional water quality mitigation measures during water quality permitting. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • No significant unavoidable impacts identified. 		
<p>Terrestrial Vegetation</p>	<p>Impacts:</p> <ul style="list-style-type: none"> • Impacts to vegetation from vegetation removal during proposed Facility construction would be minor. • Adverse effects of dust on vegetation would be minor. • Impacts to vegetation from the inadvertent releases of hazardous materials would be minor. • Impacts due to the spread of noxious weeds from construction activities would be minor. 	<p>Impacts:</p> <ul style="list-style-type: none"> • Incremental increase in rail traffic could contribute to moderate, long-term impacts to vegetation from incremental increases in contamination from small spills and in abundance and distribution of noxious and invasive weeds. <p>Mitigation:</p> <ul style="list-style-type: none"> • No specific mitigation measures identified. 	<p>Impacts:</p> <ul style="list-style-type: none"> • Incremental increase in deep-draft vessel traffic could contribute to moderate, long-term impacts to shoreline vegetation from wake-induced shoreline erosion and spread of invasive wetland and riparian plants. <p>Mitigation:</p> <ul style="list-style-type: none"> • No specific mitigation measures identified.

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<p>Mitigation:</p> <ul style="list-style-type: none"> Complete a weed survey for the proposed Facility site, followed by eradication of any noxious weeds and invasive plants currently established at the site prior to initiation of construction to help prevent the spread of noxious weeds to nearby wetland mitigation and wildlife areas. Include in the Landscaping Plan for the Administrative and Support Buildings (Area 200) the use of native trees and planting trees in groups within the landscape to provide additional mitigation for the loss of trees onsite. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified. 	<p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> The incremental increase in rail traffic from the proposed Facility could contribute to moderate, long-term impacts to vegetation from incremental increases in contamination from small spills and in abundance and distribution of noxious and invasive weeds. 	<p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> The incremental increase in deep-draft vessel traffic could contribute to moderate, long-term impacts to shoreline vegetation from wake-induced shoreline erosion and spread of invasive wetland and riparian plants.
<p>Terrestrial Wildlife</p>	<p>Impacts:</p> <ul style="list-style-type: none"> Impacts to wildlife from possible collisions with construction equipment and vehicles would be minor. Active bird nests could be lost when trees are cut and vegetation is cleared if they occur within trees or vegetation that is to be cleared. Impacts to total forest habitat from Facility construction would be minor. Noise disturbance impacts to wildlife would be minor. Impacts to wildlife from small spills and leaks would be minor. Impacts to wildlife from light and glare at the proposed Facility would be minor. Impacts to wildlife that are attracted to the containment berm around the storage area (Area 300) (during transit, for basking, or for refuge) would be minor. <p>Mitigation:</p> <ul style="list-style-type: none"> Incorporate LED bulbs that fall within optimum wavelengths in area lighting to reduce light pollution impacts where practicable and within safety regulations. 	<p>Impacts:</p> <ul style="list-style-type: none"> Incremental increase in rail traffic could contribute to a minor to moderate increase in wildlife collision mortality. Incremental increases in rail traffic could contribute to minor to moderate long-term impacts to terrestrial wildlife from incremental increases in barrier effects. Impact levels of contaminants from small leaks and spills would be minor. <p>Mitigation:</p> <ul style="list-style-type: none"> BNSF should identify and monitor wildlife-train collision and barrier hotspots along the rail corridor to determine whether current and projected levels of traffic would result in levels of mortality or barrier effects that would jeopardize the status of local wildlife populations. If significant levels of collision mortality and barriers to wildlife movement are identified, suitable wildlife crossing structures and other measures, such as fencing should be considered as appropriate. BNSF should consult with WDFW and USFWS or a Technical Advisory Committee in designing approaches to identify and monitor hotspots, and 	<p>Impacts:</p> <ul style="list-style-type: none"> Impacts to wildlife, including waterfowl and seabirds, from vessel transportation related to the proposed Facility would be minor. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified.

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<ul style="list-style-type: none"> • Use only marine terminal loading area spot lighting during loading operations. • Finalize the Construction Wildlife Monitoring Plan in consultation with EFSEC and WDFW and implement all recommended measures to reduce impacts to wildlife, including development of final noise threshold levels, monitoring distances, and adaptive management actions. • Measure noise levels during construction in Areas 200 (administrative and support buildings), 300 (storage area), and 400 (marine terminal) including impact pile driving and ground improvement installation. If measured noise levels at the established distances exceed the established threshold, perform adaptive management actions, which could include additional noise monitoring at the nearest sensitive resource, using noise dampening strategies for impact pile driving such as placing nylon or wood blocks between the pile and hammer, and using temporary sound barriers (e.g., containers, earthen berms, or stockpiled materials around the ground improvement area). • Retain old wood pilings, or check wood pilings for cavities used by purple martins before removing. The removal of creosote-coated pilings that contain purple martin nest boxes or cavities used by martins should be coordinated closely with WDFW. • Perform tree removal outside of the nesting season (February 15 to September 1) to avoid impacts to active nests of protected migratory birds. If trees are to be removed during the nesting season, complete a preconstruction nesting survey no more than 2 weeks prior to removal to ensure that no active nests are present. If active nests of protected migratory birds are found, suspend tree removal activities until after nests have hatched and young have fledged. • Monitor the approximately 2.2 acres of landscape plantings for 2 years after planting and replace all trees that do not become successfully established. 	<p>identify suitable crossing structures and other measures.</p> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • The incremental increase in Project-related rail traffic would likely contribute a minor to moderate increase in wildlife collision mortality, including to predators and scavengers that may be attracted to the rail corridor by the increased availability of carcasses from animals hit by trains. • The incremental increases in Project-related rail traffic could contribute to minor to moderate long-term impacts to terrestrial wildlife from incremental increases in barrier effects and minor increases of small quantities of contaminants. 	

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Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<ul style="list-style-type: none"> • Incorporate design features such as enclosing structures so that no horizontal top surfaces are accessible, screen openings to prevent access to enclosed spaces for roosting or nesting, and install spikes or wires to prevent perching to avoid attracting birds such as pigeons, gulls, and starlings at the proposed Facility. • Include measures in the waste management plan to control and contain food waste, and educate workers on the risk to native wildlife from supplemental feeding and the importance of disposing of all garbage in secured containers to prevent supplemental feeding of wildlife. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • No significant unavoidable impacts identified. 		
Aquatic Species	<p>Impacts:</p> <ul style="list-style-type: none"> • Habitat effects, including to essential fish habitats (EFHs), associated with modification of the existing marine terminal structure would be minor. • Impacts from an increase in lighting would be minor. • Impacts to aquatic species from the small increase in turbidity would be localized and minor. • Vessel operations at Berths 13 and 14 would have a minor impact to existing aquatic habitat in the area. • The long-term impacts from overwater shading to fish would be minor. • Impacts to aquatic species from small spills and leaks of petroleum products and lubricants would be minor. • Potential for salinity changes during discharge of ballast water to affect fish and invertebrates in the area would be minor. • Hydraulic scouring caused by vessel and tugboat maneuvering activities may cause a localized minor but long-term change in the benthic community. 	<p>Impacts:</p> <ul style="list-style-type: none"> • Accumulation and transportation of caked-on grease on tracks and creosote discharge from old railroad ties could occur, but it is unlikely that the volumes of these materials would disperse outside of the immediate rail tracks and unlikely that they would enter waterways in sufficient quantities to cause adverse impacts to surface water and associated impacts to fish, amphibians, reptiles, and invertebrates, resulting in negligible impacts. <p>Mitigation:</p> <ul style="list-style-type: none"> • No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • No significant unavoidable impacts identified. 	<p>Impacts:</p> <ul style="list-style-type: none"> • Small spills of fuels or lubricants would have a minor impact to aquatic habitat present in the vessel corridor. • Additional vessel trips would increase the potential for entrainment and could result in a minor additional impact to fish. • Impacts to aquatic species from turbidity associated with proposed Project-related vessel traffic would be minor. • Impact of increase in low-frequency noise to fish, marine mammals, and turtles would be minor. • Impacts to marine mammals and sea turtles from vessel disturbance or strikes would be negligible. • Noise impacts to marine mammals and sea turtles would be minor. • Impacts to invertebrates would be negligible. • Increase in deep-draft vessel traffic associated with the proposed Facility could result in a moderate to major long-term effect on nearshore fish in the lower 33-mile portion of the Columbia River.

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Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<ul style="list-style-type: none"> • Impacts to fish and marine mammals from underwater noise generated from upland impact and vibratory pile-driving activities would be minor to moderate. • Impacts to water quality from increased turbidity and hazardous material contamination are expected to be minor to moderate. <p>Mitigation:</p> <ul style="list-style-type: none"> • Install erosion control barriers (silt fencing with filtration fabric keyed in at ground surface; possibly straw wattles) during installation of ground improvements at the marine terminal at the top of the embankment to prevent flow of silt-laden water from stone column installation into the Columbia River. • Install monitoring wells downslope from stone column and jet grout column installation areas to monitor water quality during the installation of ground improvements to detect high pH or high sulfate content water that could be generated during installation. • Make immediate notification to the Washington Military Department’s Emergency Management Division and to the WDFW Region 5 Habitat Program Manager if, at any time, as a result of Project activities, fish are observed in distress, a fish kill occurs, or water quality problems develop (including equipment leaks or spills). • Revise the Marine Mammal Monitoring Plan (MMMP) to include two additional observers to assist in monitoring the 6-mile zone where marine mammals could be affected by in-water vibratory pile driving. • Use only spot lighting in the marine terminal loading area during loading operations. • In the event that a Site Certification Agreement (SCA) is granted for the proposed Facility, EFSEC would coordinate with appropriate agencies to review and revise the MMMP before construction begins to minimize impacts to marine mammals. 		<ul style="list-style-type: none"> • Increase in deep-draft vessel traffic and associated increase in vessel wakes could result in a moderate to major long-term change to tidal wetlands, shallow water, and tidal flats EFHs and thus the species that rely on these habitats as well as wake stranding of small or juvenile fish. <p>Mitigation:</p> <ul style="list-style-type: none"> • Develop mitigation for wake stranding and wake effect impacts in consultation with appropriate state and/or federal agencies. Examples might include addition of fine-scale beach features such as strategically placed logs or vegetation in susceptible areas to provide refugia from wakes for habitat types important to juvenile fish. • Reduce vessel transit speeds in areas that are more susceptible to wake stranding of juvenile fish due to shoreline geomorphology (e.g., near Sauvie Island). • Make immediate notification to the Washington Military Department’s Emergency Management Division and to the WDFW Region 5 Habitat Program Manager if at any time as a result of project activities, fish are observed in distress, a fish kill occurs, or water quality problems develop (including equipment leaks or spills). <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • The increase in deep-draft vessel traffic associated with the proposed Facility could result in a moderate to major long-term effect on nearshore fish including listed salmonids and eulachon species in the lower 33-mile portion (16%) of the Columbia River. • The increase in deep-draft vessel traffic and associated increase in vessel wakes could reduce vegetation communities, resulting in a moderate to major long-term change to the resource, indirectly affecting fish species that rely on these habitats to complete their life cycle. The increase in deep-draft vessel traffic and associated increase in vessel wakes

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Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • Overall, noise impacts to aquatic species (fish and pinnipeds) from noise generated by pile driving would be temporary and moderate. • Impacts to water quality from increased turbidity and hazardous material contamination during construction are expected to be minor to moderate. 		<p>could result in a moderate to major long-term change to tidal wetland, shallow water, and tidal flat EFHs.</p> <ul style="list-style-type: none"> • The approximately 223% increase in deep-draft vessel traffic associated with the proposed Facility could result in a moderate to major long-term effect to nearshore fish in the lower 33-mile portion of the Columbia River.
<p>Energy and Natural Resources</p>	<p>Impacts:</p> <ul style="list-style-type: none"> • Construction of the proposed Facility would have a negligible impact to local electricity supplies and regional supplies of gasoline and diesel fuel, natural gas, and construction materials. <p>Mitigation:</p> <ul style="list-style-type: none"> • Coordinate with NW Natural to perform a site-specific evaluation to determine the actual physical and financial aspects required for NW Natural to serve the proposed Facility. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • No significant unavoidable impacts identified. 	<p>Impacts:</p> <ul style="list-style-type: none"> • Negligible impacts from small maintenance work, fuel required for locomotives, and existing utilities to power rail line signals and lights. <p>Mitigation:</p> <ul style="list-style-type: none"> • No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • No significant unavoidable impacts identified. 	<p>Impacts:</p> <ul style="list-style-type: none"> • The one vessel (two trips) per day associated with the proposed Facility would not likely impact the availability of bunker fuels in the region, resulting in negligible impacts. <p>Mitigation:</p> <ul style="list-style-type: none"> • No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • No significant unavoidable impacts identified.
<p>Environmental Health</p>	<p>Impacts:</p> <ul style="list-style-type: none"> • Impacts to occupational health and safety during construction of the proposed Facility would be minor. • Impacts to onsite workers and the general public from releases of previously contaminated areas during construction of the proposed Facility would be minor. • Impacts to workers and the public from exposure to hazardous materials would be minor. • In the unlikely event of a boiler or steam pipeline explosion, environmental health impacts to workers would be moderate to major if persons are present in the event vicinity. <p>Mitigation:</p> <ul style="list-style-type: none"> • No specific mitigation measures identified. 	<p>Impacts:</p> <ul style="list-style-type: none"> • Impacts from accidents involving railroad employees or members of the public along the rail corridor currently occur, but the rail traffic generated by the proposed Facility would represent a small fraction of the overall number of trains using the entire rail system. Impacts to environmental health from rail transportation are expected to be minor for most crossings but may be moderate for crossings with existing elevated safety risks. <p>Mitigation:</p> <ul style="list-style-type: none"> • Further coordination should occur between EFSEC and BNSF, UTC, and affected local jurisdictions to determine if crossings along the rail corridor are protected at the appropriate level. • Appropriate measures should be implemented to prevent pedestrian and vehicular accidents, incidents, 	<p>Impacts:</p> <ul style="list-style-type: none"> • Impacts from a collision could result in injuries or fatalities, which are considered to be moderate to major impacts. <p>Mitigation:</p> <ul style="list-style-type: none"> • No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • Impacts from a vessel accident (e.g., collision) would depend on the unique circumstance of the event and may include, but would not necessarily result in, injuries or fatalities, which are considered to be moderate to major impacts.

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Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> In the unlikely event of a boiler or steam pipeline explosion, environmental health impacts to workers would be moderate to major if persons are present in the event vicinity. 	<p>injuries, and fatalities at passenger stations or at-grade crossings along the inbound rail route in consultation with EFSEC. Such measures include installing signs, signals, or other visual devices to warn of approaching trains; installing infrastructure at pedestrian and vehicular crossings to improve the safety of crossing railroad tracks; potential closures of at-grade crossings and/or grade separation, and installing fences to prohibit access to railroad tracks.</p> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> Impacts from a rail accident (e.g., collision) would depend on the unique circumstance of the event and may include, but would not necessarily result in, injuries or fatalities, which are considered to be moderate to major impacts. 	
Noise	<p>Impacts:</p> <ul style="list-style-type: none"> Noise impacts during construction at the Tidewater Office Building would be moderate to major and temporary. Noise impacts at the JWC dormitories from pile driving and jet grouting would be moderate and temporary. Noise impacts to sensitive receptors from operation of the proposed Facility would be negligible to minor. <p>Mitigation:</p> <ul style="list-style-type: none"> Develop and implement a Construction Communications Plan to inform the public and commercial operators of construction activities. Limit outdoor construction activity, including construction staging, to between 7:00 am and 8:00 pm, 7 days a week. House compressors and electric motors in metal-framed and -sided buildings with sound insulation designed into the wall thickness, as practicable. Construct noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receptors. 	<p>Impacts:</p> <ul style="list-style-type: none"> Noise impacts from trains associated with the proposed Facility would be minor to receptors located along the rail lines. Vibration impacts from trains associated with the proposed Facility would be negligible to minor to receptors located along the rail lines. <p>Mitigation:</p> <ul style="list-style-type: none"> Establish quiet zones where conditions allow and close or replace at-grade crossings with grade-separated crossings to eliminate the need to sound horns to provide a warning of the approaching train. However, only the FRA can grant a quiet zone (BNSF 2015). Reconstruct at-grade crossings to provide a grade separation between rail and vehicular traffic to eliminate noise from horns. See Section 3.14.5 for a discussion on mitigation for at-grade crossings. Use wayside horns at the intersection instead of the louder locomotive horn to substantially reduce noise. A wayside horn causes less noise impact by focusing the warning sound only on the area where it is needed, such as near residential areas. 	<p>Impacts:</p> <ul style="list-style-type: none"> Impacts from vessel traffic to noise receptors present within and along the shoreline of the Columbia River would be minor. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified.

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Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<ul style="list-style-type: none"> • Operate earth-moving equipment and site equipment on the construction lot as far away from vibration- and noise-sensitive sites as possible. • Operate stationary construction equipment (e.g., air compressors, portable or backup generators) as far away from vibration- and noise-sensitive sites as possible. • Combine noisy operations to occur over the same time period. The total noise level produced would not be substantially greater than the level produced if the operations were performed separately. • Avoid use of an impact pile driver where possible in noise- and vibration-sensitive areas. Drilled piles or sonic or vibratory pile drivers are quieter and cause lower vibration levels where the geological conditions permit their use. • Use specially quieted equipment such as quieted and enclosed air compressors and properly working mufflers on engines. • Phase construction clearing, earth-moving, and ground-impacting operations so they do not occur in the same time period within the same vicinity. Unlike noise, the total vibration level produced could be substantially less when each vibration source operates separately. • Effective barriers can break the line of sight between the noise source and the receiver and are most effective when they are closest to either the source or the receiver. If possible, acquire limited property rights for the construction of sound barriers at the receiver. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • Noise impacts at the Tidewater Office Building from construction and decommissioning of the proposed Facility are anticipated to be moderate to major and would exceed the regulatory limit for a commercial receiving property, but would be short term. Note, however, that commercial area is not considered a sensitive receptor for this study. 	<ul style="list-style-type: none"> • Use ballast on a guideway to reduce train noise 3 dB at grade and up to 5 dB on aerial structures. • Install effective barriers to break the line of sight between the noise source and the receiver which are most effective when they are closest to either the source or the receiver. If possible, acquire limited property rights for the construction of sound barriers at the receiver. • Specify equipment for grade-crossing signals that sets the level of the warning signal lower where ambient noise is lower, that minimizes the signal duration, and that minimizes signal noise in the direction of noise-sensitive receivers. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • No significant unavoidable impacts identified. 	

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<ul style="list-style-type: none"> Noise impacts at the JWC from construction and decommissioning of proposed Facility elements are considered moderate but would be typical of a heavily industrialized area (as the JWC is located within an industrialized area classification). Noise impacts would exceed the regulatory limit for a residential receptor, but would be short term. 		
<p>Land and Shoreline Use</p>	<p>Impacts:</p> <ul style="list-style-type: none"> The overall impact to land and shoreline use from the proposed Facility would be minor. Impacts within the riparian management area and frequently flooded area would be minor. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified. 	<p>Impacts:</p> <ul style="list-style-type: none"> Because no additional land would be acquired along the rail corridor for new or expanded rail facilities directly related to the proposed Facility, land use impacts would be negligible. Minor impacts from the four trains per day that would serve the proposed Facility could affect existing land uses located along the rail corridor due to increased rail traffic and associated noise. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified. 	<p>Impacts:</p> <ul style="list-style-type: none"> Negligible impacts since the navigation channel and adjacent land uses are not expected to change as a result of the shipping traffic associated with the proposed Facility. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified.
<p>Visual Resources</p>	<p>Impacts:</p> <ul style="list-style-type: none"> Minor visual impacts during construction from changes to the visual setting near the proposed Facility would result from the presence of construction workers, equipment, vehicles, lighting, and partially constructed structures. The proposed Facility would create little contrast to the existing altered environment; therefore, the impacts to visual resources from the proposed Project would be minor. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified. 	<p>Impacts:</p> <ul style="list-style-type: none"> Increase in the frequency and the length of time that viewers see rail traffic would be a minor impact. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified. 	<p>Impacts:</p> <ul style="list-style-type: none"> Increase in the frequency and the length of time that viewers see vessel traffic would be a minor impact. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified.

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
Recreation	<p>Impacts:</p> <ul style="list-style-type: none"> Roadway traffic impacts due to proposed Project construction are not expected to create noticeable delays, resulting in minor impacts to access to nearby recreation areas. Construction noise impacts from impact pile driving to hunters and other recreationists at Shillapoo Wildlife Area – Vancouver Unit (closest to the proposed Facility) would be minor. Visual impacts to recreational resources within the proposed Facility study area during construction would be minor and temporary. Impact from changes in the quality of recreation due to odors or noise may be experienced by some recreationists and would be minor. <p>Mitigation:</p> <ul style="list-style-type: none"> Distribute the proposed schedule of construction activities to all potentially affected recreational sites within the proposed Facility study area, so recreationists are aware of construction-related disruptions and can schedule activities accordingly to avoid disruption. Schedule quiet times (breaks in impact driving construction activities) to occur during some periods that correspond to hunting seasons at Shillapoo Wildlife Area – Vancouver Unit and make hunters aware of these quiet times. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified. 	<p>Impacts:</p> <ul style="list-style-type: none"> Delay experienced by visitors to recreation areas caused by at-grade crossings would be minor. Minor increase in air emissions to Class I Wilderness Areas close to the rail route (e.g., Glacier National Park) would result in minor impacts to recreationists using these areas. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified. 	<p>Impacts:</p> <ul style="list-style-type: none"> Visual impacts to recreationists from additional vessels associated with the proposed Facility, including an increase in the frequency and length of time that viewers see vessel traffic, would be minor. Minor impacts from seasonal commercial / recreational fishing vessel conflicts are expected. <p>Mitigation:</p> <ul style="list-style-type: none"> Provide financial support for existing boater educational efforts being conducted by organizations such as USCG Auxiliary – Buoy 10 Task Force and the numerous sheriff department marine patrols along the vessel corridor to help avoid commercial vessel / recreational boat conflicts during peak fishing seasons. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified.
Historic and Cultural Resources	<p>Impacts:</p> <ul style="list-style-type: none"> The proposed Facility study area has no known recorded archaeological resources, historic resources, so no impacts would occur. Potential impacts to U&A areas may occur through reduced access to tribal fishing areas near the 	<p>Impacts:</p> <ul style="list-style-type: none"> Impacts to Traditional Cultural Properties (TCPs) and historic resources inside and outside of Washington would be minor. Minor impacts caused by an increase in rail traffic could impact treaty rights if it were to reduce access to U&A areas. 	<p>Impacts:</p> <ul style="list-style-type: none"> Impacts to TCPs and historic resources inside and outside of Washington would be minor. Minor impacts may include a temporary halt to fishing by tribal members in the vicinity when vessels are moving through the area, which could lead to a minor reduction in a day's catch volume.

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
	<p>proposed Facility marine terminal, resulting in minor impacts.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> In the event of an unanticipated discovery during construction activities, the Cultural Resources Inadvertent Discovery Plan (Flint 2015) would be followed. The steps outlined in the plan serve to minimize damage to any inadvertently discovered archaeological resources during ground-disturbing activities, which may include small, deeply buried, and/or widely dispersed historic or precontact cultural materials. Steps included in the plan outline applicable state laws and regulations, previous data collected, stop-work and notification protocols for inadvertently discovered archaeological resources and human remains, discovery protection measures, documentation by professional archaeologists, monitoring of operations and emergency response activities, and notification contact list. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified. 	<p>Mitigation:</p> <ul style="list-style-type: none"> EFSEC will work with Indian tribes to determine access points and travel routes to U&A fishing grounds along the rail routes. This information will be used to assess whether unit train or vessel timing restrictions should be or could be implemented to reduce impacts to U&A access points and travel routes during certain times of the year. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified. 	<ul style="list-style-type: none"> Vessel traffic could reduce access to nearshore marine fisheries because tribal fishers may not be able to cross the bar at the time of a vessel moving into or out of the navigation channel, resulting in minor impacts. <p>Mitigation:</p> <ul style="list-style-type: none"> EFSEC will work with Indian tribes to determine access points and travel routes to U&A fishing grounds along the vessel routes to and from the Port from the Washington-Idaho border to the mouth of the Columbia River. This information will be used to assess whether unit train or vessel timing restrictions should be or could be implemented to reduce impacts to U&A access points and travel routes during certain times of the year. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified.
<p>Transportation</p>	<p>Impacts:</p> <ul style="list-style-type: none"> Impacts to roadways are expected to be minor. During the relocation process of Terminal 5 racks, impacts to rail transportation would be negligible. During operation of the proposed Facility, the impact to rail transportation would be negligible. The use of Berth 13 is expected to result in minor impacts to vessel traffic in the vicinity of the marine terminal facility. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified. 	<p>Impacts:</p> <ul style="list-style-type: none"> The addition of rail traffic associated with the proposed Facility would cause some segments of rail lines to approach or exceed capacity, resulting in moderate to major impacts. Impacts to motorists from delays at at-grade crossings resulting from rail transportation associated with the proposed Facility could be moderate to major. Approximately 26 existing state highway locations along inbound and outbound rail routes are operationally sensitive to increases in train traffic and would experience increases in rail traffic as a result of proposed Facility operation. New tank cars would be heavier than existing tank cars due to the added weight of safety features, 	<p>Impacts:</p> <ul style="list-style-type: none"> The projected future volume of vessel traffic is substantially below the capacity of the navigation system, and the impact is considered to be minor. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified.

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
		<p>which could increase the rate of maintenance and repairs for rail tracks.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • BNSF, UTC, WSDOT, and affected local jurisdictions should coordinate to identify the need for, and feasibility of, constructing new grade-separated railroad crossings in areas along the proposed rail routes where excessive gate downtimes and vehicular delays are anticipated. • UTC, WSDOT, and affected local jurisdictions should coordinate to evaluate railroad crossing locations that are considered by WSDOT to be operationally sensitive to increases in train traffic to identify appropriate mitigation measures, possibly including upgrading passive crossings to active safety crossings, rerouting high-traffic routes to use existing grade-separated crossings, adding U-turns to allow drivers to easily access alternate routes, and/or installing grade-separated crossings (bridge or underpass). • Both of these studies should be modeled after and coordinated with the study to be undertaken by the Washington State Legislature’s Joint Transportation Committee (JTC) to investigate road-rail conflicts in Washington cities. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • Rail transportation associated with the proposed Facility would result in incremental additional delay caused by gate downtime at 200 roadway-railroad at-grade crossings along the 445-mile Columbia River Alignment. The total duration of gate downtime delay caused by a single train at each crossing, including the time needed to raise and lower the gate, is just over 5 minutes. When accounting for all of the proposed trains, the combined gate downtime delay at each at-grade crossing would be between 21 and 41 minutes per vehicle each day if a single vehicle encountered all trains in the same day. This amount represents an increase of between 15% and 26%, as 	

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
		<p>compared to existing gate downtime delay at at-grade rail crossings caused by existing rail traffic.</p> <ul style="list-style-type: none"> An increase in train traffic may cause some rail segments to approach or exceed capacity, particularly in areas of high freight movements. For these rail segments, similar impacts, including rail congestion, resulting in delays and/or queues may occur, resulting in moderate to major impacts to rail transportation. However, in the event that mitigation measures implemented to address rail congestion are effective, this level of impact could be reduced to minor or negligible levels. 	
<p>Public Services and Utilities</p>	<p>Impacts:</p> <ul style="list-style-type: none"> Fire or worker injury would result in minor impacts to emergency and fire protection services. Impacts to security services from operation of the proposed Facility would likely be minor, and no impacts to police services are anticipated. Impacts to communication utility infrastructure and service interruptions would be minor. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified. 	<p>Impacts:</p> <ul style="list-style-type: none"> Increase in vehicle delays at at-grade crossings would cause a major impact to emergency and public services. <p>Mitigation:</p> <ul style="list-style-type: none"> Encourage BNSF to make SECURETRAK (a real-time GIS tracking program for crude-by-rail trains for use by state and/or regional fusion centers) available to emergency response vehicles in areas with at-grade crossings along the proposed rail route in Washington. BNSF should provide grants to those jurisdictions that would require technology upgrades and training in order to effectively use SECURETRAK. Investigate the need for and feasibility of constructing new grade-separated railroad crossings in cities along the proposed rail route to reduce impacts to emergency response times from increased train traffic and excessive gate downtimes. Such studies could be funded in part by BNSF as is currently being done for a mayor-appointed task force conducting a similar investigation in Edmonds, Washington (My Edmonds News 2015). Study participants should include BNSF, UTC, WSDOT, and affected local jurisdictions and emergency responders. See Section 3.14.5 for a discussion on mitigation for at-grade crossings. This study should be modeled after and 	<p>Impacts:</p> <ul style="list-style-type: none"> Vessels associated with the proposed Facility would result in no impacts to public services and utilities. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified.

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
		<p>coordinated with the JTC study to investigate road-rail conflicts in Washington cities scheduled to be completed by December 1, 2016.</p> <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> Delays to emergency responders (including fire protection, emergency medical service, and police protection) could occur along the rail corridor from trains associated with the proposed Facility in areas with at-grade crossings when a train is passing. The additional four unit trains per day associated with the proposed Facility would increase gate downtime by between 15% and 26% along the Columbia River Alignment. This increase in vehicle delays could constitute a major impact to emergency responders. 	
<p>Socioeconomics</p>	<p>Impacts:</p> <ul style="list-style-type: none"> Creation of approximately 320 jobs during construction and 91 jobs during operations. It is expected that most employees would come from areas within a 1-hour drive of the proposed Facility, and housing impacts would therefore be negligible. Tax revenue, sales and use tax, property tax, income tax, and other taxes would be generated in Washington and Oregon. No disproportionate effects were identified for environmental justice populations. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified. 	<p>Impacts:</p> <ul style="list-style-type: none"> Incremental increase of four additional trains per day could reduce property value within a mile of the rail corridor by not greater than 1.5%, which is considered to be a minor impact. The addition of rail traffic associated with the proposed Facility would cause some segments of rail lines to approach or exceed capacity, with some shipments experiencing delays, costing rail carriers and shippers a combined \$409.07 for each hour of train delay time accrued. Increased delay at at-grade crossings is anticipated to create costs for personal and business travelers, which can be translated into an annualized economic cost of approximately \$220,660. Increased gate downtime resulting from unit trains associated with the proposed Facility could have disproportionate effects on environmental justice populations in communities along the rail corridor study area. 	<p>Impacts:</p> <ul style="list-style-type: none"> Employment and income effects for the vessel corridor would be negligible to minor. No disproportionate effects were identified for environmental justice populations. <p>Mitigation:</p> <ul style="list-style-type: none"> No specific mitigation measures identified. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> No significant unavoidable impacts identified.

Table ES-2. Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Impacts of the Proposed Project

Environmental Resource	Construction, Operation/Maintenance, and Decommissioning of the Proposed Facility	Transportation by Rail / Rail Corridor	Transportation by Vessel / Vessel Corridor
		<p>Mitigation:</p> <ul style="list-style-type: none"> • Coordinate with BNSF to schedule shipments to reduce congestion and delay for other trains using the Spokane to Pasco segment of the Columbia River Alignment to the extent possible. • Coordinate with BNSF to schedule rail shipments to avoid travel through populated areas during peak traffic times to the extent possible to reduce unequable burden to environmental justice populations. <p>Significant Unavoidable Impacts:</p> <ul style="list-style-type: none"> • The addition of rail traffic associated with the proposed Facility would cause some segments of rail lines to approach or exceed capacity, with some shipments experiencing delays. • Trains traveling to the proposed Facility would increase gate downtime delay at all roadway-railroad at-grade crossings resulting in costs for personal and business travelers. • Increased gate downtimes from increased train traffic associated with the proposed Facility would have moderate to major impacts for some minority and/or low-income populations within the rail corridor study area from motorist delays and delays in response times for emergency responders. 	

Notes:

1 The Notice of Construction permit is required for installation of a new source of air pollution or for modification of an existing source of air pollution.

BMP = best management practice, BNSF = Burlington Northern Santa Fe, City = City of Vancouver, CPT = cone penetrometer tests, CSZ = Cascadia Subduction Zone, DPM = diesel particulate matter, Ecology = Washington State Department of Ecology, EFH = essential fish habitat, EFSEC = Energy Facility Site Evaluation Council, FRA = Federal Railroad Administration, GIS = geographic information system, JWC = Clark County Jail Work Center, LED = light emitting diode, MCE = maximum considered earthquake, MMMP = Marine Mammal Monitoring Plan, OHWM = ordinary high water mark, Port = Port of Vancouver, SPT = standard penetration tests, TCP = Traditional Cultural Property, U&A = usual and accustomed, USACE = US Army Corps of Engineers, USCG = US Coast Guard, USFWS = US Fish and Wildlife Service, UTC = Washington Utilities and Transportation Commission, WDFW = Washington Department of Fish and Wildlife, WSDOT = Washington State Department of Transportation

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
Earth Resources	<ul style="list-style-type: none"> No impacts to bedrock geology or soils from a small to large crude oil spill. Potential impacts to soils (e.g., contamination or disruption) from explosion debris would likely be negligible to minor. 	<ul style="list-style-type: none"> A small to large crude oil spill would likely have a negligible to minor impact to bedrock geology. Potential impacts to soils from a crude oil spill could range from minor to moderate; remediation requiring excavation could result in minor impacts to local topography. A fire or explosion inside a hard rock tunnel or near a hard rock outcrop could cause rock to fragment, creating a minor to major impact depending on the structural integrity of the bedrock. 	<ul style="list-style-type: none"> A crude oil spill could coat some shoreline bedrock and contaminate shoreline soils and sediments resulting in minor, moderate, or major impacts depending on spill size. If remediation is required, contaminated shoreline soils could be excavated and removed or treated in place, leading to moderate additional impacts. Potential impacts to earth resources from a crude oil fire or explosion would likely be minor.
Air Quality	<ul style="list-style-type: none"> Impacts from small to medium spills at the proposed Facility would likely be minor. Impacts to air quality from a large spill could be moderate due to the volume of air pollutants released to the atmosphere. Impacts from a small fire at the proposed Facility could be minor to moderate. Impacts from a large explosion and fire would likely be moderate to major due to the volume of air pollutants released to the atmosphere. 	<ul style="list-style-type: none"> Impacts from spills, fires, and/or explosions along the rail route would likely be similar to those listed for the proposed Facility. 	<ul style="list-style-type: none"> Impacts from spills, fires, and/or explosions along the vessel route would likely be similar to those listed for the proposed Facility.
Water Resources	<ul style="list-style-type: none"> Impacts from small to large spills on surface water could be minor to major depending on the location of the spill and the presence or absence of secondary containment. Impacts from small to large spills on groundwater would likely be minor to major depending on the location of the spill and the presence or absence of secondary containment, the presence of preferential contaminant migration pathways (e.g., in areas where permeable stone columns are installed), and the presence or absence of subsurface impermeable barriers (e.g., sheet pile wall). A small to medium crude oil spill could produce minor impacts to Port water supply wells and other local wells if contamination migrates vertically into a portion of the unconfined Troutdale Aquifer System (TAS). Groundwater contamination resulting from a large spill could produce moderate to major impacts to 	<ul style="list-style-type: none"> Impacts to surface water from small to very large spills along the inland portions of the rail corridor would likely be moderate to major where spills could occur immediately over or adjacent to surface water features. Spills along portions of the rail corridor adjacent to the Columbia River could produce moderate to major surface water quality impacts. Impacts to groundwater quality from small to medium spills along the inland portions of the rail corridor would likely be minor to moderate in areas with GRP response strategies (along the Spokane and mid-Columbia rivers). Impacts from large to very large spills would likely be moderate since larger volume spills would have greater spatial spread and temporal persistence. A crude oil spill near any unconfined aquifer could, if not completely cleaned up, allow contaminant migration into the unconfined aquifer and produce 	<ul style="list-style-type: none"> Impacts to surface water quality along the Columbia River could extend up to 2 river miles (RMs) for a small to medium vessel spill event and to or beyond the mouth of the Columbia River for a large to very large vessel spill event. Depending on the location and duration of the spill event, impacts from a small to medium spill would likely be minor to moderate; impacts from a large to very large spill could be major. A crude oil vessel spill at the mouth of the Columbia River or along the open-ocean portion of the vessel corridor could also impact surface water quality in the marine and estuarine environments, as well as along affected shorelines depending on the type and volume of crude oil spilled, the spill location, water temperature, waves/currents, weather conditions, and the timing and effectiveness of initial response.

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
	<p>Port water supply wells and other local wells if unconfined aquifer contamination or surface water contamination migrates vertically into a portion of the unconfined TAS.</p> <ul style="list-style-type: none"> • A large crude oil spill that reaches the Columbia River could impact water intakes located within 7 RMs downstream of the proposed Facility. • A large spill, particularly from the rail unloading transfer pipeline, could spread to existing wetlands located less than 1,000 feet away, including the wetland mitigation bank. This could produce moderate to major impacts. • Wetlands or floodplains along the Columbia River channel less than 1 RM downstream could experience minor impacts from a small to medium spill. Columbia River channel wetlands or floodplains within 7 RMs downstream could experience moderate to major impacts in the event of a large spill. • Impacts to water resources from a large explosion and fire event could be moderate to major depending on the spread of the fire and the size of the explosion debris field. 	<p>moderate to major localized impacts to drinking water quality.</p> <ul style="list-style-type: none"> • Impacts to surface water supplies from small to very large spills along the inland portions of the rail corridor could be negligible to major depending on the location and duration of the spill. • Impacts to surface water supplies along the mid-Columbia River portions of the rail corridor could be negligible to major depending on location and persistence of spill-related contamination. • Impacts to wetlands and floodplains from large to very large spills would likely be moderate to major depending on the location and duration of the spill event and response activities. • Impacts to water resources from fire and explosion events would likely be minor to major depending on the spread of the fire and the size of the explosion debris field. 	<ul style="list-style-type: none"> • Depending on the location and duration of a spill event, impacts from a small to medium spill would likely be minor to moderate, and impacts from a large to very large spill could be major. • A vessel crude oil spill along the lower Columbia River could pose a risk to groundwater in the unconfined alluvium along the main river channel and tributary confluence, with impacts from a small to medium spill likely to be minor to moderate, and impacts from a large to very large spill likely to be moderate. • Impacts to surface water and groundwater supplies along the Lower Columbia River vessel corridor from small to very large spills would likely be moderate to major depending on the number of water intakes and wells affected, resulting interruptions of water diversions and/or well pumping, and the persistence of water quality degradation. • Impacts to wetlands and floodplains along the vessel corridor from small to very large spills could be minor to major depending on location and persistence of spill-related contamination. • Impacts to water resources from a small fire event along the vessel corridor would likely be minor assuming that it is quickly controlled. Impacts to water resources from a large explosion and fire event along the vessel corridor could be moderate to major depending on the size of the fire and the extent of the explosion debris field.
<p>Terrestrial Vegetation</p>	<ul style="list-style-type: none"> • Impacts from small to medium spills would likely be negligible to minor because most spills would be contained and would not be likely to reach vegetated areas. • Impacts from a large spill could be moderate because these spills and the associated response actions could reach and damage vegetation in surrounding areas. 	<ul style="list-style-type: none"> • Impacts from small to medium spills along the rail corridor would likely be negligible to minor because in most cases spills on land would not migrate extensively outside the immediate developed rail corridor, limiting exposure of sensitive vegetation communities. • Impacts from large to very large spills would likely range from moderate to major because a potential exists for spills to produce both short-term and long- 	<ul style="list-style-type: none"> • Impacts from small to medium spills along the vessel corridor would likely be minor assuming these spills would be contained within a limited area and would not reach sensitive vegetation communities. • Impacts from large to very large spills would likely be moderate to major since the spill could spread extensively and affect special-status plants and

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
	<ul style="list-style-type: none"> Impacts from a large explosion and fire event would likely be moderate if the event and associated response activities extended into vegetated areas. 	<p>term effects on special-status plants and sensitive vegetation communities.</p> <ul style="list-style-type: none"> Impacts from a small ground fire or surface fire would likely be negligible to minor assuming the fire could be controlled. The impacts to the most common vegetation covers would likely be short term. Impacts from a large explosion and fire event could range from moderate to major, especially if the fire extends into forest and woodlands including special-status plants and sensitive vegetation. 	<p>sensitive vegetation communities, resulting in short- and long-term effects on vegetation communities.</p> <ul style="list-style-type: none"> A large fire and/or explosion could damage or destroy some shoreline vegetation if the event occurred near shore, producing minor impacts.
Terrestrial Wildlife	<ul style="list-style-type: none"> Impacts from small to medium spills would likely range from negligible to minor assuming the spills are contained within the proposed Facility, although any small to medium spill that reaches the Columbia River could produce moderate localized impacts to terrestrial wildlife and wildlife habitat up to 1 RM downstream. Impacts from a large spill could produce moderate to major impacts depending on the volume and location of the release, the season in which the release occurs, and whether the spilled oil migrates outside of the proposed Facility site. Impacts from a large explosion and fire event would likely be minor to moderate depending on the size of the explosion, extent of the fire, and the season in which the event occurred. 	<ul style="list-style-type: none"> Impacts from small to medium spills would likely range from negligible to minor assuming the spills are quickly contained and do not spread beyond the immediate rail bed, although any small to medium spill that reaches the Columbia River could migrate 1 RM downstream and produce moderate localized impacts to terrestrial wildlife and habitat, including priority habitats. Impacts from large to very large spills could produce moderate to major impacts depending on the volume and location of the release, the season in which the release occurs, and whether the spilled oil migrates into priority habitats, such as Wildlife Management Areas. Impacts from a small fire event along the rail corridor would likely be negligible to minor because the event would likely be contained, and effects to wildlife and wildlife habitats would likely be short-term. Impacts from a large explosion and fire event could be moderate to major because the event and associated response activities may damage special-status wildlife and priority wildlife habitats and could result in long-term effects on wildlife habitats. 	<ul style="list-style-type: none"> Impacts from small to medium spills along the vessel corridor could be minor to moderate if spills make contact with wildlife and wildlife habitats up to 2 RMs from the spill source. Impacts from large to very large spills could be moderate to major as numerous special-status wildlife and priority wildlife habitats could be affected from the spill source to beyond the mouth of the Columbia River. A large fire and/or explosion along the vessel corridor could damage or destroy some terrestrial wildlife habitat if the event occurred near shore, producing minor impacts.

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
<p>Aquatic Species</p>	<ul style="list-style-type: none"> • Impacts from small to medium spills at the proposed Facility that reached the Columbia River would likely be minor assuming the spill is contained within secondary containment booms. If a small to medium spill escaped secondary containment it could impact aquatic habitats within 1 RM downstream of the proposed Facility. • Impacts from a large spill could be moderate to major depending on the location of the spill and on the volume of oil, if any, that escaped containment systems. An uncontained large spill from the proposed Facility could impact aquatic habitats within 7 RMs downstream of the proposed Facility. • Impacts from small to medium spills to the aquatic environment could be minor to moderate if the spilled oil were to reach the Columbia River. • Impacts to aquatic species from a large spill could be moderate to major in the event that the spilled oil reached the Columbia River and spread to aquatic habitats up to 7 RMs downstream from the proposed Facility. • Impacts to aquatic species from a large explosion and fire event would likely be minor to moderate as debris could enter the Columbia River and cause short-term, localized degradation of water quality (e.g., water temperature and quality) and species injury or disturbance. 	<ul style="list-style-type: none"> • Impacts to aquatic species from small to medium spills along the rail corridor would likely be minor to moderate depending on the location of the spill. If a spill occurred near a waterbody, aquatic habitats could experience degradation and aquatic species could be adversely affected. • Impacts to aquatic species from large to very large spills could be moderate to major, with widespread and long-lasting effects depending on the amount of oil that entered the aquatic ecosystem. • Impacts to aquatic species from a small fire event would likely be minor due to the limited area affected, unless the fire were to occur adjacent to a pristine stream that is fish bearing and is functioning as spawning or rearing habitat at the time of the event. • Impacts to aquatic species from a large rail explosion and fire event could be moderate to major, depending on the location of the event. 	<ul style="list-style-type: none"> • Impacts to aquatic habitats and aquatic species from small to medium spills along the vessel corridor would likely be moderate to major, and impacts to aquatic habitats from large to very large spills would likely be major. In both cases, the level of impact would depend on the location, quantity, extent, duration, and timing of the spill event. • Impacts to aquatic species from a large explosion and fire event could be minor to moderate depending on species presence, noise, and ejected debris.
<p>Energy and Natural Resources</p>	<ul style="list-style-type: none"> • If response to an oil spill required excavation activities or temporary shutdown of electric power, negligible to minor impacts to local energy supply could occur. • A large explosion or fire could result in substantial damage to onsite crude oil storage and transfer infrastructure, potentially leading to minor to moderate short-term reduction in the total amount of oil destined for refineries on the West Coast. • A large fire and/or explosion could produce substantial damage to onsite energy infrastructure, 	<ul style="list-style-type: none"> • Impacts to natural resources from a crude oil spill along the rail corridor would likely be minor, depending on the location, extent, and response activities. Nearby power lines could be damaged or destroyed during a derailment resulting in minor energy impacts from short-term interruptions in electricity supply. • Impacts to energy and natural resources resulting from a large fire and/or explosion could be minor to moderate depending on the location of the event and the spread of the fire. 	<ul style="list-style-type: none"> • A large to very large crude oil spill from a vessel could result in a minor to moderate short-term impact to the refinery or refineries that would have received the crude oil. • A small crude oil fire within the vessel corridor would likely have negligible to minor impacts to energy and natural resources.

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
	potentially leading to temporary shutdowns of natural gas pipelines and some local electrical power supply, resulting in moderate, short-term impacts to energy and natural resources.		
Environmental Health	<ul style="list-style-type: none"> Impacts from a large crude oil spill would likely be minor if the spill were contained onsite. If a large spill migrated outside of the proposed Facility boundary, impacts could be minor to moderate since other persons could be affected in the release area, short-term dermal exposures to crude oil could occur, and the VFD currently considers itself undertrained and underequipped to address a crude oil spill response. In the event of a large fire and/or explosion at the proposed Facility, workers or members of the public could be at risk of injury or death; the impacts would be major. The extent of risk would depend on the unique circumstances of the event, including the spread of fire and the severity of the explosion. 	<ul style="list-style-type: none"> Delays in emergency response along the rail corridor caused by a derailed or stopped unit train blocking access could result in major impacts to human health, especially if evacuation or time-sensitive emergency response is required. Impacts from a small to medium crude oil spill along the rail corridor would likely be negligible to minor, except for incidents that led to direct injury or fatality. Impacts from a large to very large crude oil spill along the rail corridor would likely be negligible to moderate, depending on the location and extent of the spill, with greater impact in more heavily populated areas. In the event of a crude oil fire or explosion along the rail transportation corridor, train operators and the general public in the vicinity of the accident could be at risk of injury or fatality from blast wind, heat, burns, smoke, and fumes; the impacts would be major. 	<ul style="list-style-type: none"> Impacts from a small crude oil spill from a vessel would likely be minor assuming the spill was contained within a small area. If a large to very large spill from a vessel occurred, impacts could be moderate to major depending on the location and duration of the incident. If a small fire results in severe injury, fatality, or chronic illness from harmful levels of exposure, the impacts would be major. Impacts to human health, particularly the health of the vessel crew, from a large fire and/or explosion could result in severe injury, fatality, or chronic illness; the impacts would be major.
Noise	<ul style="list-style-type: none"> Noise from small to very large crude oil spills would be associated with emergency response efforts and equipment (e.g., trucks, helicopters, response vessels) and would result in negligible to moderate short-term increases in noise levels depending on receptor sensitivity and distance from the noise source. Noise impacts from a large fire would likely be minor; however, impacts from an explosion event at the proposed Facility could be moderate to major depending on the size of the explosion and the severity of auditory injuries. 	<ul style="list-style-type: none"> Noise impacts from small to very large spills along the rail corridor would likely be short-term and negligible, although the sounds associated with a derailment could produce minor, temporary impacts to noise receptors in the immediate vicinity. Noise impacts associated with a large fire and/or explosion along the rail corridor would likely be similar to those addressed for a large fire and/or explosion at the proposed Facility and could range from minor to major depending on size and number of explosions and distance from the blast. 	<ul style="list-style-type: none"> Noise impacts from a large fire and/or explosion along the vessel corridor would likely be similar to those described for a large fire and/or explosion along the rail corridor: short-term and negligible.

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
<p>Land and Shoreline Use</p>	<ul style="list-style-type: none"> • Impacts to land and shoreline use from a large spill at the proposed Facility would likely be minor to moderate depending on duration and season of occurrence. • Impacts from a large fire and/or explosion would likely be minor to moderate, and short-term (until completion of response and restoration efforts). 	<ul style="list-style-type: none"> • Impacts to land and shoreline use (temporary loss of use, damage) from a small to medium spill along the rail corridor would likely be short-term and minor to moderate depending on the location and timing of the incident. • Impacts to land and shoreline use from a large to very large spill along the rail corridor would likely be moderate to major depending on the size, location, timing of the incident, and the length of time required to restore previous land and shoreline uses (if possible). • Impacts to land and shoreline uses from a small fire along the rail corridor would likely be negligible to minor, depending on the location and duration of the fire. • Impacts to land and shoreline use from a large fire and/or explosion along the rail corridor could be moderate to major depending on the location of the event, extent of the fire, and the size of the explosion. 	<ul style="list-style-type: none"> • A small to medium crude oil spill along the vessel corridor could produce minor to moderate impacts to land and shoreline uses up to 2 RMs downstream from the source, depending on duration of the incident and season of occurrence. • Impacts to land and shoreline uses from a large to very large spill along the vessel corridor could be moderate to major depending on the location and duration of the spill and response efforts, the timing of the spill, and the specific land and shoreline uses impacted. • Impacts to land and shoreline use from a large fire and/or explosion in the vessel corridor could be moderate to major if the event occurred close to shore, leading to damage or destruction of nearby shoreline facilities and short-term disruption of land and shoreline uses.
<p>Visual Resources</p>	<ul style="list-style-type: none"> • A large to very large spill at the proposed Facility site requiring longer duration response activities and more personnel and equipment would likely produce minor visual impacts due to the potential to be observed only from more distant sensitive visual resources. • A major fire and/or explosion at the proposed Facility would likely produce short-term moderate to major visual impacts, including flames, smoke, and destroyed property, that could be observed a considerable distance from the site. 	<ul style="list-style-type: none"> • Visual impacts from large to very large oil spills along the rail corridor, including visible oil slick, sheen, or pool and oiling of vegetation, buildings, and/or structures, could be moderate to major depending on the location relative to sensitive viewsheds. • A large fire and/or explosion along the rail corridor could produce moderate to major visual impacts from smoke and flames depending on the location and extent of the fire and/or explosion and duration of the event and cleanup response. 	<ul style="list-style-type: none"> • Visual impacts of small to medium spills from observable oil slicks or sheens on water surfaces, oiling of vegetation or sediment along shorelines and adjacent floodplains and wetlands, and oiling of structures along the vessel corridor could be minor to moderate depending on the number of sensitive receptors in the spill area and depending on the presence of nearby important visual resources. • Visual impacts from large to very large oil spills could be moderate to major depending on the spread of the oil slick or sheen and the extent of damage to natural areas, parks, or significant/historically important buildings and structures requiring an extended cleanup and restoration process. • Impacts to visual resources from a large fire and/or explosion would likely be similar to those described the rail corridor, including major visual impacts from smoke, flames, and possible damage to natural

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
			areas, parks, or significant buildings and structures, depending on the location and extent of the fire and/or explosion and duration of the event and cleanup response.
Recreation	<ul style="list-style-type: none"> Impacts to recreation sites and activities from a small to medium crude oil spill that enters the Columbia River could be minor to moderate and include loss of access to recreation areas and reduction in the real and/or perceived value of the recreational resource (e.g., loss of recreational fish, real or perceived reduction in recreational fish value, damage to swimming water quality). Impacts to recreation from a large crude oil spill at the proposed Facility would likely range from moderate to major for up to 7 RMs downstream of the proposed Facility. Oil response activities would likely cause moderate impacts for the duration of the response activities. Longer-term impacts to hunting and sport fishing could occur if a crude oil spill reduced local populations of wildlife, waterfowl, or fish. Impacts from fire and/or explosions could result in heat, smoke, ejected debris, noise, blast force, and disruption that deters or prevents use of nearby trails and recreation areas and would likely range from moderate to major, depending on the duration and extent of the fire and/or explosion. 	<ul style="list-style-type: none"> The impact of a small to very large crude oil spill and associated response efforts to recreational sites and activities along the rail corridor would likely be similar to those described for spills at the proposed Facility, and could be minor to major. A small fire and response along the rail corridor could deter recreationists and damage buildings and facilities in recreation areas, resulting in minor to major impacts depending on the sensitivity and recreational value of the area damaged. A large fire and/or explosion and associated response efforts would likely produce similar minor to major impacts and could also lead to more extensive damage from ejected debris, noise, and blast force or larger and faster-spreading fires. 	<ul style="list-style-type: none"> The impacts to recreational sites and activities from a small to very large crude oil spill and associated response efforts along the vessel corridor would likely be similar to those described for spills at the proposed Facility and along the rail corridor and could be minor to major depending on the location, size, and timing of the spill and response activities, as well as the types of recreation areas/uses affected. Impacts to recreational sites and activities from a small fire affecting only the vessel would likely produce negligible impacts to recreation. However, if the fire occurred near the shore, nearby shoreline recreational sites and uses could be impacted, and impacts could range from minor to major depending on the sensitivity and recreational value of the resource(s) damaged. Impacts from a large fire and/or explosion event along the vessel corridor would likely be similar to those from an event at the proposed Facility or along the rail corridor and could range from moderate to major, depending on the sensitivity and recreational value of the resource(s) affected.
Historic and Cultural Resources	<ul style="list-style-type: none"> If a spill of any size at the proposed Facility reached the Columbia River, the spilled crude oil could produce minor to major impacts to submerged and shoreline archaeological resources 1 to 7 RMs downstream. Impacts of a spill of any size that reached the Columbia River could include oil contamination of fish and shellfish, and damages to fisheries that could have a moderate to major impact to cultural, traditional, and economic uses of fish for many tribes, depending on the extent and duration of the crude oil spill and response event. 	<ul style="list-style-type: none"> A crude oil spill of any size and associated cleanup activities could impact important tribal lands and fishing and hunting areas within and adjacent to the rail corridor and in the Columbia River if the spill were to enter the river, resulting in moderate to major impacts. A large fire and/or explosion could have moderate to major impacts to historic and cultural resources depending on the location, extent of fire, and force of explosion. If a large fire and/or explosion were to occur near important tribal lands and fishing and hunting areas, 	<ul style="list-style-type: none"> Impacts to submerged and shoreline historic and cultural resources from a small to medium crude oil spill along the vessel corridor would likely be similar to those described for a spill from the proposed Facility. Impacts to submerged and shoreline historic and cultural resources from a large to very large crude oil spill along the vessel corridor would likely be similar to those described for a spill from the proposed Facility that reached the Columbia River, and could occur from the source of the spill to the mouth of the Columbia River.

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
	<ul style="list-style-type: none"> • A large fire and/or explosion that affected areas beyond the proposed Facility site could have minor to major impacts to surrounding archaeological and historic resources and important tribal lands and fishing and hunting areas depending on the amount of physical damage and/or destruction. 	<p>moderate to major impacts to tribal culture, tribal community subsistence harvest, and tribal treaty rights could occur.</p>	<ul style="list-style-type: none"> • If a large fire and/or explosion event occurred close to shore, impacts to nearby historic and cultural resources would likely be similar to those described for a large fire and/or explosion along the rail corridor.
<p>Transportation</p>	<ul style="list-style-type: none"> • A small to medium spill could require temporary closure of onsite roadways and rail loops at the Port causing short-term, minor impacts to other Port tenants that use the affected roadways and rail loops. • A large to very large spill would likely impact onsite roadways and rail loops at the proposed Facility and may require full or partial closure of Lower River Road (SR 501) resulting in temporary detours and/or delays to vehicular and rail traffic and increased congestion on the roadway and rail networks. • A large to very large spill that reached the Columbia River could result in closures to the Columbia River navigation channel that would delay or disrupt vessel traffic in both directions for the duration of the spill and response effort, resulting in minor to moderate impacts. • A small crude oil fire at the proposed Facility would likely have similar impacts to transportation as a small to medium crude oil spill at the proposed Facility. • A large fire and/or explosion at the proposed Facility could damage onsite transportation infrastructure (roads, railways), and ejected debris could also damage nearby offsite transportation infrastructure (such as SR 501) resulting in reduction in roadway and rail capacity and the diversion of vehicle and rail trips to other routes, which would constitute a moderate transportation impact until the infrastructure were cleared or repaired. 	<ul style="list-style-type: none"> • A derailment and associated small to medium crude oil spill along the rail corridor could temporarily disrupt rail traffic and impact at-grade roadway crossings and parallel roadways, resulting in short-term, negligible to minor impacts. • A large to very large crude oil spill along the rail corridor involving the derailment of many railcars could result in longer closures of the rail corridor, and could cause damage that leads to the closure of nearby transportation infrastructure including bridges and highways. Impacts would likely be minor to major, depending on the extent and duration of damage to the transportation system. • If a large to very large spill were to reach the Columbia River, the impacts would likely be similar those described for a similarly sized spill at the proposed Facility. • A small fire along the rail corridor would likely be associated with, and likely produce similar impacts as, a small to medium spill along the rail corridor. • A large fire and/or explosion along the rail corridor would require closure of the rail corridor and nearby roadways, and potentially cause closure of nearby waterways. A large fire and/or explosion along the rail corridor could also damage bridges, tunnels, and nearby vessel infrastructure (piers and berths) that could lead to lengthy closures and transportation disruptions, resulting in moderate to major impacts depending on the location, spread of fire, size and force of the explosion, and duration of the response and repair efforts. 	<ul style="list-style-type: none"> • The impacts of a small to medium crude oil spill along the vessel corridor would likely be similar to those from a small to medium spill at the proposed Facility that reached the Columbia River. • Impacts from a large to very large crude oil spill along the vessel corridor could include temporary closure of marine terminal facilities, anchorages, and/or portions of the navigation channel for the duration of emergency response and cleanup operations. These closures could increase river traffic congestion and congestion outside the mouth of the Columbia River, resulting in short-term, moderate to major impacts to vessel traffic for the duration of response efforts. • A small crude oil fire along the vessel corridor would likely have minor, temporary impacts to vessel traffic in the vicinity of the event, depending on the distance of the burning vessel from shoreline infrastructure and nearby vessels. • A large fire and/or explosion along the vessel corridor would result in severe damage to and grounding or sinking of the vessel, and a requirement for salvage to clear the navigation channel during or after response efforts. A large fire and/or explosion could also damage nearby vessels and shoreline or in-river infrastructure (e.g., marine terminal facilities, anchorages) and cause closures of portions of the navigation channel during emergency response operations, resulting in short-term, moderate to major impacts to vessel traffic for the duration of response efforts.

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Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
<p>Public Services and Utilities</p>	<ul style="list-style-type: none"> • A small to medium crude oil spill at the proposed Facility would require response by the VFD but would likely not require large numbers of personnel, resulting in minor impacts to VFD's capacity to address other emergencies in their jurisdiction. • A large to very large spill could cause delays in the provision of emergency medical services and fire protection to other parts of VFD's service territory resulting in moderate impacts. • Small fires that remain within the proposed Facility site could have minor to moderate impacts to VFD's capability to provide services in the event of other emergencies requiring response. • A large fire and/or explosion could place a high demand on VFD's resources, requiring multiple engines, trucks, and special response equipment, supporting rope rescue, hazardous materials response, and marine fire response that could result in moderate to major impacts to VFD's ability to provide fire protection to other parts of VFD's service territory. • A large fire and/or explosion event could also cause human injury and a high demand for emergency medical response and police services that could result in moderate to major impacts to these service providers. 	<ul style="list-style-type: none"> • A small to medium crude oil spill along the rail corridor could result in minor to major impacts to fire and police services depending on the location of the spill and the available resources of the responding service agencies and the railroad operator (BNSF). • A large to very large crude oil spill could strain fire agencies beyond current personnel, training, and equipment levels and preclude appropriate response to other calls for service within their service area resulting in major impacts. • A small fire along the rail corridor could have a minor to moderate impact to public services and utilities as fire departments, police departments, and medical personnel work to control the fire, protect public safety, and treat any injuries while also providing service to other areas and individuals. • A large fire and/or explosion along the rail corridor could require extensive response, resulting in moderate to major impacts to public services and utilities depending on the location, extent of the fire, force of the explosion, potential for additional fire and/or explosions, need for evacuation, and number of injuries requiring medical services. • If the local fire agency's resources are engaged in an extended response operation, delays to fire protection and emergency medical response for other needs in the service area could occur, resulting in major temporary service impacts. Similarly, if local police are required to coordinate an evacuation and maintain a restricted area, delays in response to other needs in the service area could occur, resulting in major temporary service impacts. • If a train derailment occurred in an area that restricted or delayed access to other areas potentially requiring fire, police, or medical services, moderate to major temporary impacts to service provision could occur in these areas. 	<ul style="list-style-type: none"> • Because most fire agencies (including VFD) have agreements with the MFSA that limit their equipment and personnel commitments for shipboard firefighting, most fire agencies could provide these resources with negligible impacts to their ability to respond to other calls for service within their jurisdiction. • Depending on the level of need for emergency medical services resulting from a large fire and/or explosion along the vessel corridor, the impact to emergency medical services could be minor to major. • Depending upon the location and size of the area affected, along with the level of risk to human safety, impacts to police and security services could be negligible to moderate.

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Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
<p>Socioeconomics</p>	<ul style="list-style-type: none"> • If a large crude oil spill at the proposed Facility escaped secondary containment and extended beyond the site boundary, some evacuation and relocation of nearby populations could be necessary. This could produce minor, short-term impacts to nearby population and housing. • A crude oil spill of any size from the proposed Facility that reached the Columbia River could have adverse impacts to employment and income of fishermen if fishing in the vicinity were temporarily restricted. A temporary (a few hours to a few days) restriction/closure of fishing in the area could result in short-term minor impacts to employment and income, whereas a longer (months) fishing restriction/closure could result in longer-term moderate to major impacts to employment and income of fishermen. • If a small to large spill from the proposed Facility reached the Columbia River, vessel diversions could potentially occur from 1 to 7 RMs downstream, producing moderate to major short-term impacts to business profit and wages for workers on vessels and at ports affected by the diversions. Short-term minor impacts could also result from lost incomes of crews for vessels delayed or unable to leave port for the duration of the event and response. • Depending on the location, timing, and duration of the spill event, the impact of a spill to marinas could be minor to major. • A crude oil spill of any size from the proposed Facility that extended beyond the boundary of the proposed Facility could have moderate impacts to industrial land within and near the Port. If the crude oil spill reached the Columbia River, minor to moderate shoreline property value impacts could occur from 1 to 7 RMs downstream, although the duration of property value effects resulting from 	<ul style="list-style-type: none"> • A small to medium spill along the rail corridor could necessitate some temporary evacuation and relocation of nearby populations, leading to minor, short-term impacts to nearby population and housing. • Major, long-term impacts to population and housing could result from a large to very large crude oil spill that required a prolonged response effort. A large to very large crude oil spill along the rail corridor could produce major impacts to recreation- and tourism-related employment and income. • A large to very large oil spill in the rail corridor along the Columbia River mainstem could also produce major impacts to employment and income by jeopardizing some of the estimated \$46.6 million of annual expenditures by recreational salmon and steelhead fishermen in that reach of the Columbia River, and by adversely affecting commercial and subsistence fishing and fish populations. • A small to very large crude oil spill along the rail corridor would likely produce similar impacts to affected property values as those described for a similar-sized crude oil spill at the proposed Facility that extended beyond the proposed Facility boundaries and also reached the Columbia River. • A small to very large crude oil spill along the rail corridor could produce minor to major impacts to nearby low-income/disadvantaged and minority populations depending on the size and extent of the crude oil spill. • The potential impacts to population, housing, property values, and environmental justice from a large crude oil fire and/or explosion along the rail corridor would likely be similar to those for a large crude oil spill along the rail corridor, and a large crude oil fire and/or explosion at the proposed Facility. • The socioeconomic impacts from a small to medium crude oil spill along the vessel corridor would likely 	<ul style="list-style-type: none"> • The socioeconomic impacts from a small fire along the vessel corridor would likely be negligible assuming the fire were controlled within the affected vessel. • The potential socioeconomic impacts from a large crude oil fire and/or explosion along the vessel corridor would likely be similar to the impacts described for a large crude oil fire and/or explosion at the proposed Facility or along the rail corridor that occurred near the Columbia River shoreline. However, these impacts could be felt by nearshore populations (including low-income/minority populations), businesses, and property owners along the vessel corridor near the location of the vessel fire and/or explosion.

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
	<p>contamination has been generally found to be temporary.</p> <ul style="list-style-type: none"> • Two census tracts within 0.5 mile of the proposed Facility have meaningfully greater concentrations of minority and low-income residents that could experience some short-term minor impacts from a crude oil spill at the proposed Facility (e.g., odor, noise, air quality, evacuations) depending on the size and extent of the crude oil spill. • A large fire and/or explosion could produce minor, short-term impacts to nearby populations including temporary evacuation and relocation. • A large fire and/or explosion at the proposed Facility could also produce major impacts to nearby populations and housing. These impacts could include injury to or death of local residents, and housing damage or destruction. • A small fire at the proposed Facility would likely have negligible impacts to employment and income assuming the fire were contained within the proposed Facility boundary. • A large fire and/or explosion at the proposed Facility could necessitate the closure of recreational fishing grounds or the delay/diversion of vessels around the proposed Facility, leading to similar impacts as those described for a spill from the proposed Facility that reached the Columbia River. • A small fire at the proposed Facility would likely produce negligible impacts to property values assuming the fire were contained within the proposed Facility boundary. • A large fire and/or explosion would likely produce similar impacts as those described for a spill from the proposed Facility that reached the Columbia River. • The two census tracts within 0.5 mile of the proposed Facility with meaningfully higher minority or low-income populations could experience moderate to major impacts from a fire or explosion 	<p>be similar to the impacts described previously for a small crude oil spill that reached the Columbia River either along the rail corridor or from the proposed Facility.</p> <ul style="list-style-type: none"> • The potential socioeconomic impacts from a large to very large crude oil spill along the vessel corridor would likely be similar to those for a large crude oil spill at the proposed Facility that reached the Columbia River and a large to very large crude oil spill along the rail corridor that reached the Columbia River. However, these impacts could be felt by populations (including low-income/minority populations), businesses, and property owners along the vessel corridor from the location of the spill to beyond the mouth of the Columbia River. 	

Table ES-3. Summary of Potential Environmental Impacts from a Crude Oil Spill, Fire, and/or Explosion

Environmental Resource	Proposed Facility	Rail Corridor	Vessel Corridor
	at the proposed Facility if fire or explosion debris reached their neighborhoods resulting in impacts including injury, death, and property damage or destruction. Additional minor to moderate impacts include air quality concerns from smoke and particulates if prevailing winds blow toward these areas.		

BNSF = Burlington Northern Santa Fe, Ecology = Washington State Department of Ecology, GRP = geographic response plan, MFSA = Maritime Fire Safety Association, ODEQ = Oregon Department of Environmental Quality, Port = Port of Vancouver, RM = river mile, TAS = Troutdale Aquifer System, USCG = US Coast Guard, VFD = Vancouver Fire Department