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Executive Summary

Tesoro Savage Petroleum Terminal LLC, doing business as Vancouver Energy (the Applicant), has submitted an Application for Site Certification[1] ([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). The proposed Facility would be built 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 types of major energy facilities in Washington.

This executive summary explains the purpose of this Final Environmental Impact Statement (Final EIS) in EFSEC's decision-making process, describes the Applicant's proposed Project and why it is being proposed, and summarizes the potential environmental impacts associated with the proposed Project (including associated rail transport of crude oil and transshipment of crude oil 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 Final EIS.

ES-1 PURPOSE OF THIS ENVIRONMENTAL IMPACT STATEMENT

Pursuant to State Environmental Policy Act (SEPA) requirements, this Final EIS was prepared to inform agencies, tribes, and the public about the environmental effects of the proposed Facility and the various measures identified by the Applicant and EFSEC to minimize those impacts.

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 a Draft EIS with the assistance of an independent consultant, as provided for in WAC 463-47-090(2)(b). During preparation of the Draft EIS, EFSEC staff and EFSEC's consultant reviewed all of the Applicant's information and analysis for accuracy and objectivity, and also extensively supplemented this information.

EFSEC will use the Final EIS 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. Adjudication is EFSEC's formal hearing process, similar to courtroom proceedings, during which the Applicant and intervenors present information to support their cases regarding a proposed project. The information in the Final EIS can be used by EFSEC, along with information presented during adjudication, to condition the proposal to reduce impacts or to deny the proposal if significant adverse environmental impacts cannot be mitigated.

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/TesoroApplicationPage.shtml.

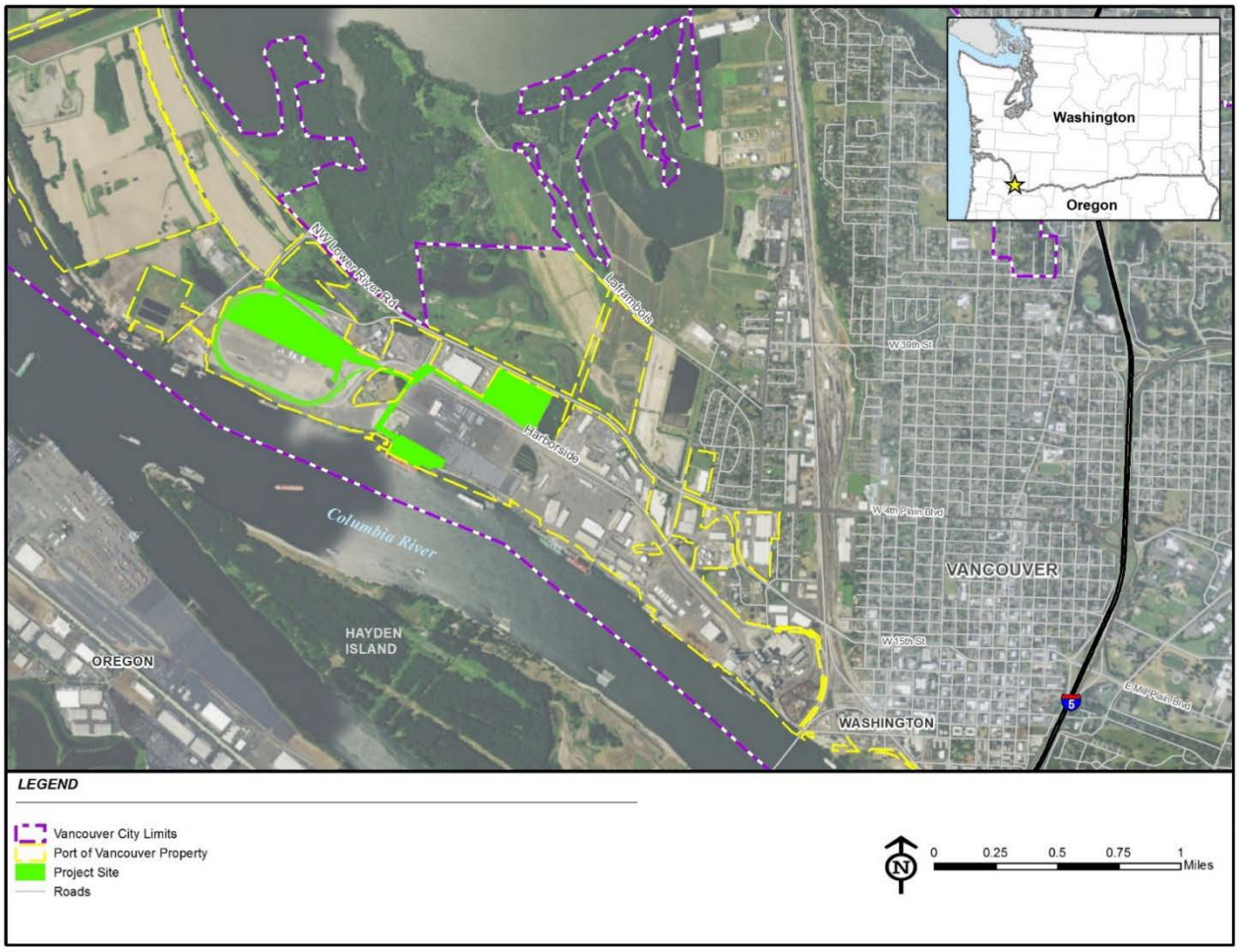

Figure ES-1 Vicinity Map of the Proposed Facility

ES-2 PROJECT PURPOSE AND NEED

The proposed Facility is intended to serve the current and future growing demand of West Coast refineries for mid-continent crude oil. Defining a proposed project's objectives, including the purpose and need to which the proposal is responding, is important because these objectives play a key role in determining the range of alternatives that will be considered and analyzed in an EIS, and in selecting a preferred alternative or eliminating alternatives from further consideration.

The purpose and need for the proposed Facility is to provide the service of trans-loading mid-continent North American crude oil to the West Coast, and to allow shipment of crude oil to refineries located primarily on the West Coast of North America.

ES-3 PROPOSED ACTION AND ALTERNATIVES

ES-3.1 Proposed Action: 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 States[2]. 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 about 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 tank area, 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. If permitted and built, the proposed Project would operate for 20 years.

See Final EIS Sections 2.2 through 2.8 for more details on the Proposed Action.

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.[4] Based on these assumptions, the maximum throughput of crude oil at the proposed Facility would be 131,400,000 bbl per year.

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 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 into the open ocean to marine facilities capable of offloading the crude oil for delivery to receiving refineries.

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 idle upriver from the bar. This requirement would likely result in an actual range of vessel calls of between 345 and 365 per year.

For the purposes of this Final EIS the following percentages of vessel types are assumed to call at the proposed Facility:

- 80 percent of vessels would be Handymax sized (50,000 deadweight tons ([DWT])
- 15 percent would be Panamax or Aframax sized tankers (105,000 to 115,000 DWT)
- 5 percent would be Suezmax sized tankers (160,000 to 165,000 DWT)

The Applicant 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,

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).

4 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 3 trains may arrive within certain 24-hour periods, thus equating to an average of 4 train arrivals per day for a total of 2,920 one-way train-trips (1,460 round trips) per year.

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 the provinces of Alberta and Saskatchewan, Canada. Depending on market conditions and the needs of the 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).

The Port is served by two Class 1 railroads: Burlington Northern Santa Fe (BNSF) and Union Pacific. Both railroads operate numerous rail lines that could be used by trains serving the Facility; however, Union Pacific does not have rail lines directly serving the Bakken formation. EFSEC has assumed that BNSF would be the likely rail transporter of crude oil from the Bakken formation to the proposed Facility.

ES-3.2 Other Alternatives Considered

See Section 2.9 for details on the Alternatives.

SEPA requires that Applicants identify reasonable alternatives to the proposed Project and associated actions, including the No Action Alternative. Several alternatives for the proposed Project were identified and analyzed in the Final EIS, including 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 alternatives for the onsite Facility configurations, operations, and component designs. As each alternative was identified, it was 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?

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.

The comprehensive review of alternatives did not identify any options that were 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 Final EIS were, therefore, the Proposed Action and the No Action Alternative (see below).

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. 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. One train unloading facility in Kennewick (for unloading, aggregation, storage and loading processes), and two vessel transfer facilities (one in Kennewick and one at the Port) would be required. Surface facilities at the two Ports would result in a net increase of 38 acres, for a total of 83 acres of surface impact. This alternative would require construction and operation at two sites rather than one. Also, two transfer pipeline systems would be required, rather than one, increasing vessel transit and loading risks. Therefore, it would not provide a lower environmental cost or decreased level of environmental degradation when compared to the Proposed Action.
Delivery of Crude Oil to the Proposed Facility by Pipeline	Pipelines could be used to transport mid-continent crude oil directly to the Port for shipment to West Coast refineries. Alternatively, pipelines could be used to transport crude oil directly to West Coast refineries. Pipeline alternatives would require either the use of existing pipelines, like the Trans Mountain pipeline from Alberta, Canada, or the construction and operation of new pipelines like the recently proposed crude oil pipeline project of Freedom Pipeline from West Texas. Existing and proposed pipelines in West Coast states are insufficient to reasonably meet the proposal's objectives.
Direct Rail Shipment of Crude Oil to West Coast Refineries	Under this alternative, crude oil from mid-continent sources would be transported exclusively by rail directly to refineries on the West Coast, and the proposed Facility would not be constructed and operated. This alternative could deliver crude oil to 17 of the 25 West Coast refineries that are currently accessible by rail or have proposed new rail connections at their facilities; however, this alternative would not feasibly attain the stated objectives of the Applicant to provide a transfer facility (rail to vessel) because no transfer Facility would be constructed or operated at any Port site.
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. One site met these initial criteria (Longview) and was further evaluated based on site characteristics. Constructing a facility similar to the proposed Facility at the Port of Longview could be feasible based on the initial siting criteria, but would likely result in greater impacts than the Proposed Action due to the requirement for a new marine terminal at the Port of Longview. Rail capacity at the Port of Longview 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.

Alternative Description	Alternative Evaluation
Onsite Alternatives: Storage Tanks Site Alternative, Railcar Unloading Facility Alternative, Industrial/ Sanitary Wastewater Discharge 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 was also considered. While the potential for a major spill from trains or vessels could decrease somewhat under this alternative due to a decrease in the number of project-related trains and vessels, the level of the impact would be the similar and remain severe in both situations should a major spill occur (WAC 197-11-794). Other impacts from a reduced capacity alternative (e.g., the number of rail crossing traffic delays, construction-related impacts) would be similar to those identified in the EIS, though they may be less in some areas.

Port = Port of Vancouver

ES-3.3 No Action Alternative

Under the No Action Alternative, Washington's governor would deny the Applicant's request to construct and operate the proposed Facility at the Port. If this scenario were to occur, it can be assumed that crude oil would continue to be transported from sources in the Bakken region and Western Canada to refineries on the West Coast of North America by pipeline, marine vessels and rail. It can also be assumed that demand for mid-continent North American crude oil would continue to fluctuate based on market conditions and world oil prices.

At the proposed Facility site, two possible No Action Alternative scenarios were identified: a Different Industrial Facility scenario in which an unrelated facility is eventually built on the site, and a No Development scenario in which the site remains in its current condition. This Final EIS uses the No Development scenario for comparison with the Applicant's proposal because currently there is no proposed alternative use at the proposed Facility site. There is also insufficient information to define an alternative that might be developed at the site that would meet the purpose and need of the proposed Facility.

The No Development scenario assumes the following at the proposed Facility site:

- No change occurs in the current use of Port property where the various Project components would be built and operated, including Areas 200, 300, 400, 500, and 600 described in Section 2.2 and shown on Figure 2-1. Current activities in these areas would continue over the proposed 20-year life of the proposed Facility, and no new development would occur on any of the Port–owned parcels covered by the existing land lease agreement between the Applicant and the Port.
- Any permitted projects, or those currently under construction, that may affect the proposed Facility site are completed (e.g., the Port's West Vancouver Freight Access Project, which includes construction of four rail loops at the proposed Facility site).
- Existing rail traffic generated by other Port activities would continue to move on the tracks through the site (with no new rail trips generated at the proposed Facility site). The 5th rail loop proposed for construction by the Applicant at the proposed Facility site would not be constructed.
- No new vessel trips would be generated at the proposed Facility site.

ES-4 PUBLIC AND AGENCY INVOLVEMENT

EFSEC initiated a public involvement program, which included SEPA scoping, inter- agency coordination, and multiple SEPA public comment periods.

See Sections 1.8 and 1.9 for more details on public involvement.

See Chapter 10 for detailed responses to public and agency comments.

Scoping is the first step in the SEPA environmental review process, to identify issues and concerns related to a proposed project, and thus to assist with identifying potential impacts and alternatives to analyze in the EIS. The scoping comment 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/hearings and to submit comments verbally or written on comment forms during scoping meetings or by email or surface mail. EFSEC received approximately 31,000 comments from private citizens, environmental organizations, public agencies, and tribal representatives during the scoping period. EFSEC reviewed and considered these comments when determining the scope of the EIS. The Scoping Report can be found at EFSEC's website.[5]

Once the Draft EIS was completed, it was made available for review and comment to all interested parties and was posted to the publicly accessible EFSEC website. The official comment period for the Draft EIS was 60 days: from November 24, 2015, through January 22, 2016. The public was invited to comment on the document through a dedicated comment website, by email or mail, or at public meetings/hearings in which comments could be provided in either written or oral format. Three public meetings were held in January 2016 – two in Vancouver and one in Spokane, Washington.

Following the end of the public comment period, EFSEC's independent consultant reviewed over 200,000 submissions that included comments on the Draft EIS. Comments were received from federal, state, and local agencies; nonprofit environmental organizations; and members of the public. All comments received, whether in written or verbal form, were considered equally by EFSEC in preparing this Final EIS. All comments have been reviewed, responses to the comments have been prepared, and additional analysis and changes have been made to the Final EIS to respond to these comments, as described in Section ES-4.2.

EFSEC also 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 Final EIS:

- Washington Department of Fish and Wildlife (WDFW)
- Washington Department of Ecology (Ecology)
- Washington State Department of Transportation (WSDOT)
- Washington State Department of Archaeology and Historic Preservation (DAHP)
- Washington Department of Health (WDOH)
- Washington Utilities and Transportation Commission (UTC)

These agency representatives assisted in evaluating the original ASC and Applicant-prepared Preliminary Draft EIS. They also assisted EFSEC staff and EFSEC's independent consultant during development of

5 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.

the Draft EIS, and by providing data and special expertise with respect to environmental issues and regulatory authority during development of the Final EIS.

Comments received on the Draft EIS include those from nine federally recognized tribes and the Columbia River Intertribal Fish Commission. EFSEC conducted follow-up outreach and coordination with these tribes during preparation of the Final EIS to obtain additional information on treaty rights, including usual and accustomed areas for tribal hunting, fishing, and gathering, as well as cultural resources and Traditional Cultural Properties. The information was used to assess potential impacts of the proposed Project to tribes, as presented in Chapters 3, 4, and 5 of the Final EIS. Section 3.13 contains further information on tribal coordination and Section 3.17 contains information on tribal treaty rights, including usual and accustomed areas. All comments received, whether in written or verbal form, were considered equally by EFSEC in preparing this Final EIS. Chapter 10 provides further detail on public and agency participation involvement in preparation of the Final EIS.

ES-4.1 Areas of Controversy and Uncertainty

The proposed development of a crude oil terminal at the Port of Vancouver has been met with both 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 process for the Draft EIS. These comments addressed numerous areas of controversy and uncertainty, including the following:

- Climate change; national energy policy; and the volatility of crude oils
- The risks of oil spills, fire, and/or explosion at the proposed Facility site or along rail or vessel transportation routes
- Concerns over the safety and inherent risks associated with transportation of crude oil by rail
- Possible health effects
- Geological hazards such as earthquakes or landslides that could affect the project
- Response capabilities of police, fire, and emergency medical services
- Potential impacts to threatened and endangered species and tribal resources

The large body of comments received in response to the Draft EIS include many comments in opposition of the proposed Project and many in support. Many of the Draft EIS comments voiced similar concerns as those received during scoping.

Analysis and assessment of potential impacts contain predictions of hypothetical future events, such as oil spills or earthquakes, some with very low probabilities of occurrence. These predictions used best available data and statistical analyses to estimate the potential frequencies of such events. In response to numerous comments received on the Draft EIS, EFSEC performed additional analyses for the Final EIS, to further improve upon the predictions and related impacts of these hypothetical events. Because of the hypothetical nature of some of the information analyzed a certain level of uncertainty exists regarding assessment of potential impacts.

ES-4.2 Changes from the Draft EIS to the Final EIS

EFSEC issued the Draft EIS in November 2015, and relied upon some of the analysis in that document to develop this Final EIS. However, some information in the Draft EIS has been updated in this Final EIS. Revisions were made to clarify details of the Proposed Action, respond to public and agency comments, provide additional information related

See Section 1.14 for more information on specific changes between the Draft and Final EIS.

to the analysis of impacts, and refine and present additional mitigation measures to address potentially significant impacts.

The Final EIS eliminated the subdivisions of nonsignificant impacts. More details on the factors considered and the revised impact assessment approach are provided in ES-5.1

Additional technical analyses were conducted for several environmental resources/concerns in this Final EIS. The studies related to aquatic species (specifically, pertaining to impacts from vessel wakes) and earth resources (specifically, seismic hazards) and the resulting environmental impact assessment are described further in ES-6. The studies/reports related to cultural resources and air quality (diesel particulate matter and nitrogen dioxide) and the resulting environmental impact assessments are described in Chapter 3 (Sections 3.13 and 3.2, respectively).

In addition, Chapter 4 has been revised substantially since the Draft EIS to more fully address oil spill issues and is described further in ES-6. It has been supplemented with new information, commitments, and studies received from the Applicant in its updated Application for Site Certification (ASC) and disclosed during the EFSEC adjudication process. In addition, the following revisions have been made in Chapter 4:

- More details on emergency response methods, resources, trainings, and planning gaps have been included.
- Both the rail and vessel spill risk analyses have been updated with more recent information.
- The results of crude oil spill fate analyses and trajectory modeling have been incorporated into the analyses of impacts.

ES-5 ENVIRONMENTAL RESOURCES/ISSUES ANALYZED IN THIS FINAL EIS

ES-5.1 Approach to Impact Assessment

This Final EIS describes environmental impacts that could occur from the No Action Alternative and the Proposed Action. Direct, indirect, and cumulative impacts were analyzed 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 within specified rail corridor study areas, and from the proposed Facility to receiving refineries by vessel within a specified vessel corridor study area.

- **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.
- **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 Chapter 3 of this Final EIS are identified and determined to be either **nonsignificant** or **significant**. “Significant” in SEPA means a reasonable likelihood of more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred.

Most of the impacts described in Chapter 3 are considered to have a reasonable likelihood of occurrence. Under SEPA, this Final EIS also weighs the likelihood of occurrence with the severity of an impact

(WAC 197-11-794), and considers several factors when determining the significance of identified potential impacts. These factors include magnitude, duration, and degree (geographic extent) as was specifically discussed in the Draft EIS, as well as other factors in WAC 197-11-330 and WAC 197-11-794.

See Section 3.0 for more discussion of how impacts were determined.

Each impact identified within Chapter 3 was further studied to identify mitigation measures that EFSEC or other parties could impose to reduce or eliminate the impact. Some measures would mitigate impacts to multiple environmental resources; many are discussed as part of a key issues analysis. More on the environmental resources analyzed is presented in ES-5.2, and more on mitigation is presented in ES-5.3. Mitigation as part of a key issues analysis is included in ES-6. Significant unavoidable impacts are those impacts that remain significant, even after all measures committed to by the Applicant or mitigation that could be imposed by EFSEC have been applied.

ES-5.2 Environmental Resources Analyzed

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 EIS. The environmental resources analyzed in the 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
- Noise
- Land and Shoreline Use
- Visual Resources
- Recreation
- Cultural Resources
- Transportation
- Public Services and Utilities
- Socioeconomics
- Tribal Treaty Rights

ES-5.3 Mitigation Identified to Address Impacts from the Proposed Project

See Chapter 2 and Table 2-13 for details on the BMPs the Applicant has committed to or incorporated into Facility design.

The mitigation measures identified in this Final EIS address specific impacts as discussed within each resource section in Chapters 3 and 4. The Applicant proposed design features, best management practices (BMPs), and other actions to avoid or minimize environmental impacts during construction, operations and maintenance, and decommissioning. These actions were considered as part of the Proposed Action (see Chapter 2 of this Final EIS) and were taken into account when identifying the impacts that might require mitigation. The mitigation discussed in the Final EIS includes two categories:

- Mitigation for the Applicant, which could be imposed by EFSEC as part of a site certification agreement (SCA) and is implementable and enforceable. These measures are considered effective towards mitigating the identified impacts.
- Mitigation that could be implemented or required by other parties, and would not be implementable or enforceable by EFSEC. Because these measures cannot be required by EFSEC,

they are not considered effective mitigation for the purposes of this EIS; and for the purpose of this environmental analysis, cannot be credited towards mitigating the impact.

Table ES-2 summarizes direct and indirect impacts to environmental resources from construction, operation and maintenance, and eventual decommissioning of the proposed Facility, as well as from rail and vessel transportation of crude oil to and from the proposed Facility under normal operation. The table does not include all impacts identified in the Final EIS; it describes only those for which related mitigation could be imposed on the Applicant by EFSEC, or that could be implemented or required by other parties, as well as those resources with significant unavoidable impacts that would remain after any proposed mitigation would be applied. See the summary tables at the end of each resource section in Chapter 3 for a complete list of all direct and indirect impacts identified.

Impacts associated with abnormal operations resulting in crude oil spills, fire, and explosion are summarized below in Section ES-6.7.

Table ES-2 Impacts from the Proposed Action for which EFSEC Identified Mitigation and/or Significance

Impacts[1] *(see individual resource chapters in FEIS for complete list of impacts)*	Mitigation[2]	Significant Unavoidable Impacts [3]
EARTH RESOURCES		
Project Facility during Construction: Construction would temporarily disturb surface soils, and temporarily increase risk of soil erosion. Topography modification would be modest, limited in spatial extent, and in most areas, temporary.	Install monitoring wells, and additional sheet pile barriers if needed. Check potential deformation of surface along river embankment. Install inclinometers if necessary to further check deformation.	None identified.
Project Facility: Potential Impacts from Geological Hazards: The facility could sustain damage from ground shaking or liquefaction of susceptible soils during a major earthquake. The MCE (M_w8.9) associated with the Cascadia Subduction Zone could result in riverbank slope failure and 7 to 14 feet of lateral spreading at the dock and at the proposed transfer pipeline near the shoreline. Slope failure along the riverbank could affect the marine terminal. Damage to the dock could result in an oil spill at the facility and into the Columbia River.	Install auxiliary power generators sufficient to operate key Facility elements in the event of a power outage. Conduct an analysis using revised load combinations; determine if revised strengthening schemes (e.g., pile fortifications and/or new piles) are required; If required, implement the final strengthening scheme in final design to further protect the dock.	Yes. Even if specified mitigation is implemented, an MCE along the Cascadia Subduction Zone could cause impacts to the dock due to liquefaction of susceptible soils, and/or from subsequent slope failure. Damage to the dock could result in an oil spill.[4]
AIR QUALITY		
Rail Corridor Trains would be temporary emission sources along the rail corridor. Emissions of criteria pollutants from trains on or near the proposed Facility would not cause or contribute to an exceedance of the NAAQS or WAAQS. Vehicle delays at at-grade crossings would increase due to Project-related trains, thus increasing potential for localized air quality impacts from idling cars.	None proposed.	None identified. However, UTC, WSDOT, and others should coordinate to identify and implement appropriate mitigation measures at high-traffic and operationally sensitive crossings.
Project Facility during Construction and all Project Elements During Operation: During the 18 months of construction the proposed Facility's GHG emissions (4,041 metric tons per year of carbon dioxide equivalents) would represent less than 0.005 percent of the statewide total GHG emissions. During operations, the proposed Facility's GHG emissions (313,295 metric tons per year of carbon dioxide equivalents) represent approximately 0.7 percent of the statewide transportation sector and approximately 0.3 percent of the statewide total GHG emissions.	Eliminate, mitigate, or offset 100% of the GHG emissions from all permitted stationary sources, and all on-site mobile sources (locomotives, vessels tugboats, and mobile equipment). Eliminate, mitigate, or offset 50% of the GHG emissions from all electricity purchased and used at the proposed Facility. Demonstrate annual compliance with GHG emission offsets by preparing an emissions inventory and a report for Council approval.	None identified if specified mitigation is imposed.
WATER RESOURCES		
Project Facility during Construction: Impacts could include temporary increases in turbidity and contaminants in the water column (e.g., during pile installation), and temporary impacts to water quality from small spills and leaks of contaminants.	Sample sediments at Berths 13 and 14 prior to dock modifications. Hire a 3rd party contractor to monitor construction SWPPP compliance.	None identified.

Impacts[1] *(see individual resource chapters in FEIS for complete list of impacts)*	Mitigation[2]	Significant Unavoidable Impacts [3]
Localized impacts could occur if stormwater contains muddy groundwater or jet water brought to the surface and cement mixes that raise the pH and turbidity.		
Groundwater levels could temporarily decrease during construction. Vibroreplacement columns may act as pathways for surface contaminants to reach lower portions of the boring column/probe hole. Localized and temporary impacts could occur to groundwater pH and sediment/metals concentrations.	Install monitoring wells downslope of ground improvement areas and near contaminated areas. Obtain copies of well abandonment forms.	None identified.
Project Facility during Operation: Increases in turbidity could occur from vessel maneuvers at the marine terminal. Small spills or leaks of petroleum products, lubricants, and other chemicals could occur in upland areas or near surface waters. Impacts to water resources could occur from stormwater discharges; pretreatment systems and monitoring would limit the effects.	Hire a 3rd party contractor to monitor SWPPP compliance.	None identified.
Project Facility during Decommissioning: Temporary impacts to water quality could occur from small spills and leaks of hazardous materials.	Hire a 3rd party contractor to monitor SWPPP compliance.	None identified.
Dewatering may be required around demolition site, resulting in temporary impacts on groundwater quantity and quality.	Install permanent cap/seal over subsurface ground improvement columns.	
Vessel Corridor: Wakes from deep-draft vessels have the potential to disturb wetland vegetation or alter sediment patterns.	None proposed.	None identified. However, USCG, Columbia River Pilots, and others could lessen impacts by reducing vessel speed in areas where wetlands and terrestrial vegetation are susceptible to increased erosion and altered sediment patterns (see also Section 3.1.4, 3.4.4, and 3.6.4).
TERRESTRIAL VEGETATION		
Project Facility during Construction: 1.0 acre of upland grass/forb and 0.1 acre of cottonwood stand (about 9 trees) would be removed and replaced with impervious surface or similar. About 3.5 acres of upland grass/forb would be temporarily removed.	Monitor the 2.2 acres of landscape plantings for 5 years and replace any failed plants.	None identified.
Vessel Corridor: The increase in deep-draft vessel wakes will increase overall impacts (erosion, sediment transfer, weed transport) to riparian vegetation.	None proposed.	None identified. However, USCG, Columbia River Pilots, and others could lessen impacts by reducing vessel speed in areas where shoreline vegetation are susceptible to increased erosion and altered sediment patterns (see also Sections 3.1.4, 3.3.4, and 3.6.4).

Impacts[1] *(see individual resource chapters in FEIS for complete list of impacts)*	Mitigation[2]	Significant Unavoidable Impacts [3]
TERRESTRIAL WILDLIFE		
<u>Project Facility during Construction:</u> 1.0 acre of upland grass/forb and 0.1 acre of cottonwood stand (about 9 trees) would be removed and replaced with impervious surface or similar. About 3.5 acres of upland grass/forb would be temporarily removed.	Monitor the 2.2 acres of landscape plantings for 5 years and replace any failed plants.	None identified.
Active bird nests may be lost during tree and vegetation removal (except for protected migratory birds during nesting season).	Survey trees and vegetation for active nests prior to any removal. Postpone removal until after nests are vacated.	
Construction noise, especially during impact pile driving, and lighting during nighttime construction could cause behavioral responses of animals on or near the site (e.g., changes in alertness, avoidance, missed feeding opportunity, nest abandonment, or increased susceptibility to predation; interrupted breeding cycles of insects, turtles, birds, and other wildlife).	Finalize construction wildlife monitoring plan, including noise criteria. Monitor noise levels during construction and implement adaptive management noise reduction measures as indicated. Prohibit nighttime (between the hours of 8 p.m. and 7 a.m.) construction activities (including pile driving) involving equipment or tools emitting noise levels in excess of 70 dBA at 50 feet.	
<u>Project Facility during Operation:</u> Native and invasive wildlife could be attracted to the proposed Facility by unsecured garbage, foraging opportunities, and roosting/nesting opportunities.	Incorporate additional design features that discourage nesting and perching by problem wildlife.	None identified.
<u>Rail Corridor</u>: The increase in trains would increase contaminants from small leaks and spills, and grease. Project-related trains would increase barrier effects and wildlife collision mortality, including outside of Washington where the corridor crosses grizzly bear habitat.	Develop a study to collect data on and evaluate wildlife-train collisions, to inform decisions for installing suitable wildlife crossing structures and other measures.	None identified. However, rail operators should identify and monitor wildlife-train collision and barrier hotspots along the corridor and implement wildlife crossing structures or other measures (e.g., fencing) to reduce impacts to wildlife.
AQUATIC SPECIES		
<u>Project Facility during Construction:</u> Ground improvements and pile installation could increase turbidity and pH levels around the construction area, temporarily reducing available local prey for salmonids which rely on benthic macroinvertebrates.	Install erosion control barriers. Install and use monitoring wells.	None identified.
Fish could be temporarily displaced by underwater noise during in-water and upland pile-driving. Localized water quality changes (turbidity, pH, potential contamination) could occur and could cause the following: physiological stress, interference with gill function, reduced fecundity, increased fish mortality, and limited fish vision which could increase predation. Temporary lighting could be used in nearshore aquatic habitat which could increase nocturnal predation and cause some behavioral changes.	Prohibit nighttime (between the hours of 8 p.m. and 7 a.m.) construction activities (including pile driving) involving equipment or tools emitting noise levels in excess of 70 dBA at 50 feet. Alert authorities if fish kill or distressed fish are observed.	

Impacts[1] *(see individual resource chapters in FEIS for complete list of impacts)*	Mitigation[2]	Significant Unavoidable Impacts [3]
Marine mammals could be disturbed or temporarily displaced by underwater noise during in-water and upland pile driving.	Increase number of marine mammal monitors during pile-driving. Prohibit nighttime (between the hours of 8 p.m. and 7 a.m.) construction activities (including pile driving) involving equipment or tools emitting noise levels in excess of 70 dBA at 50 feet.	
Project Facility during Operation: 920 square feet of terminal would add overwater shading, and docked vessels would also shade habitat, affecting plant growth. Operations lighting could penetrate into adjacent habitats, affecting plant growth or habitat use.	Use grating for deck surfaces. Restrict lighting to spotlights during nighttime loading/unloading.	None identified.
The presence of an overwater structure could disrupt fish access to nearshore habitat, or alter movements through the area. Impacts to water quality could occur from increased turbidity, hazardous material contamination, or salinity and pH changes from ballast water exchange. Lighting could alter fish behavior.	Use grating for deck surfaces. Alert authorities if water quality problems develop. Restrict lighting to spotlights during nighttime loading/unloading.	
Project Facility during Decommissioning: Impacts are similar to those during construction.	Apply in-work window.	None identified.
Vessel Corridor: Juvenile and small fish in the nearshore, including subyearling Chinook during outmigration, could be stranded due to deep-draft vessel wakes.	Develop a fish stranding study in consultation with appropriate agencies to include data on physical river factors, fish behaviors, and the scale at which stranding occurs. Implement mitigation based on study results to include monitoring and which may include measures such as shoreline or beach modification and improved access to off channel habitats	None identified if specified mitigation is implemented and/or USCG, Columbia River Pilots, and other parties reduce vessel speed at areas where there is high risk of wake stranding.
ENERGY AND NATURAL RESOURCES		
Proposed Facility during Operation: NW Natural has identified resource deficiencies in natural gas distribution in the area; if NW Natural solves these deficiencies, no impacts to NW Natural's ability to serve load requirements would be expected.	Coordinate with NW Natural prior to construction to evaluate physical and financial aspects required for NW Natural to serve the proposed Facility with uninterruptable service.	None identified.
ENVIRONMENTAL HEALTH		
The increase in train traffic along the rail route from trains transiting to/from the proposed Facility is not expected to increase the historical rate of accidents and fatalities related to pedestrian trespass or motorists. However, some at-grade crossings with elevated safety risks could have increased risk of an accident with a pedestrian or motorist.	None identified.	Yes. In the event of a rail accident with a pedestrian or motorist or a vessel accident (e.g., collision), injuries or fatalities would be a significant impact.[4] However, the following measures could be implemented by others to reduce but not

Impacts[1] *(see individual resource chapters in FEIS for complete list of impacts)*	Mitigation[2]	Significant Unavoidable Impacts [3]
		eliminate the likelihood of an accident: • A diagnostic review could be conducted by BNSF, UTC and local jurisdictions analyzing potentially vulnerable crossings along the rail corridor to determine if these crossings are appropriately protected to prevent pedestrian and vehicular accidents. • BNSF, UTC, WSDOT, and affected local jurisdictions could coordinate to implement measures to reduce/prevent pedestrian and vehicular accidents, incidents, injuries, and fatalities at passenger stations or at-grade crossings.
NOISE		
<u>Proposed Facility during Construction</u>: Highest combined normal construction equipment noise level at 50 feet would be less than the FTA 90-dBA maximum daytime threshold for adverse community reactions. Noise at the JWC dormitories would exceed the upper end of the current daytime range by 9 dBA. Noise at the Tidewater office building would exceed the upper end of the current daytime range by 11 dBA.	Monitor daytime construction noise and if 90 dBA is exceeded, implement additional mitigation measures. Implement Construction Communications Plan. Operate equipment as far from sensitive receptors as possible. Use specially quieted equipment. Construct noise barriers. Combine noisy operations.	None identified.
Maximum noise levels from impact pile driving and jet grouting would not exceed the FTA daytime noise threshold at Fruit Valley, JWC dormitories and Tidewater office building. Noise at the JWC dormitories would exceed the upper end of the current daytime range by 13 dBA. Noise at the Tidewater office building would exceed the current daytime upper end of the range by 16 dBA.	Avoid use of pile-driver near noise/vibration sensitive areas if possible.	
Vibration from impact-pile driving would be noticeable at the JWC, and annoying at the Tidewater office building but not be above the damage criteria at the Fruit Valley residential area, JWC dormitories, or Tidewater office building.	Avoid use of pile-driver near noise/vibration sensitive areas if possible. Phase vibration-inducing activities to not occur simultaneously.	
Nighttime: typical construction activities • Fruit Valley – 4 dBA above city and state noise threshold • JWC – 22 dBA above city and state noise threshold Jet grouting and concrete batch plant • Fruit Valley – 2 dBA above city and state noise threshold • JWC – 18 dBA above city and state noise threshold Impact Pile Driving: • Fruit Valley – 9 dBA above City and State noise threshold. JWC – 26 dBA above City and State noise threshold	Prohibit nighttime (between the hours of 8 p.m. and 7 a.m.) construction activities involving equipment or tools emitting noise levels in excess of 70 dBA at 50 feet.	None identified if specified mitigation is implemented

Impacts[1] *(see individual resource chapters in FEIS for complete list of impacts)*	Mitigation[2]	Significant Unavoidable Impacts [3]
Proposed Facility during Operation: The modeled sound levels at the residences and office building nearest to the proposed Facility are well below the nighttime noise limits, but may be audible.	During final design, incorporate measures that ensure compliance with the city nighttime noise threshold (e.g., monitor operational noise levels and implement additional mitigation measures).	None identified.
Rail Corridor during Operation: Although an individual train passing by might be noticeable, the overall increases in day-night sound levels are considered minimal. With an increase in the frequency of trains, there would be an increase in associated noise events.	None proposed.	None identified. However, there are a number of measures that could be implemented or required by other parties that would reduce adverse impacts (e.g., horn noise and noise buffers) (see Section 3.9.5 text for details).
LAND AND SHORELINE USE		
Proposed Facility during Construction: Nighttime construction noise would be temporary; however, it would exceed noise thresholds and would be incompatible with adjacent land uses.	Prohibit nighttime (between the hours of 8 p.m. and 7 a.m.) construction activities involving equipment or tools emitting noise levels in excess of 70 dBA at 50 feet.	None identified.
Rail Corridor: The four additional trains per day could indirectly impact existing and future land uses near the rail lines through incremental increases in train noise, emissions, and vehicle delays. Impacts in the West Vancouver study area would be similar, though at-grade conflicts have been eliminated.	None proposed.	None identified. However, there are a number of measures that could be implemented or required by other parties that would reduce adverse impacts (e.g., train noise and vehicle delays); see Sections 3.9.5 and 3.14.4
VISUAL RESOURCES		
No impacts were identified for which mitigation could be imposed.	None proposed.	None identified.
RECREATION		
Proposed Facility during Construction: Temporary access-related impacts have the potential to occur to users of recreation areas located northwest of the proposed Facility site off of NW Lower River Road. Construction of the proposed Facility marine terminal may add congestion within the Columbia River adjacent to the proposed Facility.	Distribute proposed construction schedule to potentially affected recreational sites.	None identified.
Construction noise (3 dBA) could be perceptible to recreationists nearby, including at Shillapoo Wildlife Area – Vancouver Unit. Slightly perceptible ground vibration impacts could occur close to the facility during construction hours, including at Shillapoo Wildlife Area.	Schedule breaks in impact driving during the hunting season.	
Changes to the visual setting near the proposed Facility would occur from the presence of construction workers, equipment vehicles, and partially constructed structures.	Distribute proposed construction schedule to potentially affected recreational sites.	

Impacts[1] *(see individual resource chapters in FEIS for complete list of impacts)*	Mitigation[2]	Significant Unavoidable Impacts [3]
Vessel Corridor: Smaller seasonal commercial / recreational fishing vessels would need to give way to the deep-draft vessels transiting to/from the proposed Facility.	Participate in committee efforts to develop educational outreach on boater safety. Provide financial support for existing boater educational efforts to help avoid boat conflicts during peak fishing seasons.	None identified.
CULTURAL RESOURCES		
Proposed Facility during Construction: No archaeological resources are known onsite. However, the proposed Facility would have potential to impact currently unknown cultural resources.	Develop and implement a sub-surface archeological survey in coordination with DAHP and the Tribes. Additional mitigation measures would be based on the results of this study. Finalize the Inadvertent Discovery Plan in consultation with DAHP, the Tribes, and other interested parties.	None identified.
Vessel Corridor: An increase in wakes and waves could increase shoreline erosion, affecting archaeological resources along the shoreline such as campsites, shell middens, and rock art.	Implement shoreline modification mitigation measures identified in Section 3.6.5 of the Final EIS, in coordination with DAHP.	None identified.
TRANSPORTATION		
Rail Corridor: An increase in vehicle delay caused by gate downtime would be experienced at about 200 at-grade crossings along the 445-mile Columbia River Alignment. Delay to each car from a Project-related train would be 2.5 minutes on average at at-grade crossings within and outside of Washington (4-8 trains per day depending on the rail segment).	None proposed.	None identified. However, UTC, WSDOT, and others may coordinate to identify and implement appropriate mitigation measures at high-traffic and operationally sensitive crossings.
The addition of heavier trains associated with the proposed Facility would likely require more frequent inspections, maintenance, and repair of defects found along the tracks.	The Applicant would obtain a written commitment from BNSF to inspect the Fallbridge Subdivision segment preceding Facility-destined trains; and conduct geometry car inspections along the Gorge rail route 6 times a year.	None identified.
PUBLIC SERVICES AND UTILITIES		
Rail Corridor: Additional trains would increase road traffic delays by 21 minutes per at-grade crossing per day (or by about 14-26% at Columbia River Alignment), which could increase emergency response times.	None proposed.	Yes, unless the following measures are implemented by others: • Activate a GIS-based program to track Project-associated oil transport trains • Address where emergency vehicle access is limited to one at-grade crossing. • Re-route high traffic routes or implement traffic alternatives to reduce delays at rail crossings.

Impacts[1] *(see individual resource chapters in FEIS for complete list of impacts)*	Mitigation[2]	Significant Unavoidable Impacts [3]
SOCIOECONOMICS		
Project Facility during Construction: Nighttime construction noise impacts could disproportionately impact minority or low-income populations.	Prohibit nighttime (between the hours of 8 p.m. and 7 a.m.) construction activities involving equipment or tools emitting noise levels in excess of 70 dBA at 50 feet.	None identified if specified mitigation is implemented.
Rail Corridor: 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.	None proposed.	None identified However, rail operators could schedule shipments to reduce congestion and delays for other rail traffic.
Increased delay at at-grade crossings is anticipated to create costs for personal and business travelers, which can be translated into a conservative annualized economic cost of approximately $220,660.	None proposed.	None identified However, rail operators could schedule shipments to avoid peak traffic times.
Disproportionate effects were identified for minority or low-income populations from the following: • Decrease in property value from 0 to 1.5 percent • Gate downtime increase along the Columbia River Alignment, which would impact motorists and emergency responders • Increased noise from rail traffic during operations	None proposed.	Yes, unless effective measures are implemented by others for impacts to emergency response. For example: 1) create a real-time GIS tracking program (see also Section 3.15.4) and 2) re-route high traffic routes or implement traffic alternatives to reduce delays at rail crossings (see also Section 3.14.4) No other significant unavoidable impacts identified. However, other parties could implement measures that would reduce noise impacts to adjacent minority or low-income populations (see also Section 3.9.5)
TRIBAL TREATY RIGHTS		
No impacts were identified for which mitigation could be imposed.	None proposed.	None identified.

Notes:

1 Design features, best management practices (BMPs), and other actions proposed by the Applicant to avoid or minimize environmental impacts were assumed to be part of the Proposed Action and were taken into account when identifying the impacts.

2 Mitigation measures listed here are additional actions that EFSEC can impose to further reduce the impacts.

3 Significant unavoidable impacts are those that remain even after all mitigation measures imposed on the Applicant by EFSEC have been applied.

4 Likelihood of this impact would be very low. However, should it occur, the consequences would be severe. Under SEPA WAC 197-11-794, impacts with a low likelihood but severe consequences would be considered significant impacts.

MCE = maximum credible earthquake; DPM = diesel particulate matter; GHG = greenhouse gas; SWCAA = Southwest Clean Air Agency; SWPPP = stormwater pollution protection plan; USCG = US Coast Guard; BNSF = Burlington Northern Santa Fe (railroad); UTC = Washington State Utilities and Transportation Commission ; WSDOT = Washington State Department of Transportation; dBA = A-weighted decibels; FTA = Federal Transit Administration; JWC = Clark County Jail Work Center; DAHP = Department of Archaeology and Historic Preservation; GIS = geographic information system.

ES-5.4 Cumulative Impacts

In addition to the evaluation of direct and indirect impacts in Chapter 3, the Final EIS includes an analysis of the cumulative effects of the proposed Project in Chapter 5. 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.

In this analysis, the direct and indirect impacts that were identified for each resource listed in ES-2 were then considered when combined with potential impacts from the following projects:

- Other past, current, or possible development projects at the Port (18 were identified within a 3-mile radius, and considering a 20-year lifespan for the proposed Project).
- Projects in the region that may contribute additional rail traffic to the systems the proposed Project would use, including Class I railroads in Washington.
- Projects in the region that may contribute additional vessel traffic to the waters used by the proposed Project. (Twenty-four projects were identified that could contribute rail and/or vessel traffic to the project corridors.)

The cumulative analysis examined impacts from the proposed Project to environmental resources discussed in Chapter 3. In some cases, mitigation identified by EFSEC for the proposed Project was considered to reduce an impact to less than significant; in other cases, mitigation was considered that would fully mitigate the impact (see Table ES-2). Unavoidable impacts from the proposed Project were considered in combination with other foreseeable future actions or projects to determine if there would be a cumulative impact.

Proposed Facility

The analysis of direct and indirect impacts did not identify any significant unavoidable impacts related to construction, normal operations and decommissioning of the proposed Facility, assuming that the proposed mitigation measures shown in Table ES-2 are applied. EFSEC identified the following cumulative impacts considering the direct and indirect impacts of the proposed Facility alongside other existing or proposed projects within 3 miles:

See Sections 5.2 through 5.18 and Table 5-4 for specific cumulative impacts identified for each environmental resource.

- Construction-related traffic, noise and vibration, and air emissions could result in some temporary cumulative impacts to recreation, businesses, and facilities nearby, including the following:
  - Cumulative noise and visual impacts to recreationists.
  - Cumulative impacts to air quality and greenhouse gases (see discussions on diesel particulate matter and greenhouse gases in Section ES-6).
  - Noise from construction activities could be audible to sensitive receptors, including the Clark County Jail Work Center (JWC), Fruit Valley residential neighborhood, and other tenants of the Port. Elevated construction noise levels would be temporary and intermittent and would occur only during daytime hours if specified mitigation for the proposed Facility is implemented.
- Cumulative effects could occur to terrestrial and aquatic habitats. Terrestrial vegetation at the Port would be affected by tree removal, preservation, stormwater planning, and wetland mitigation. Aquatic habitat at the site has already been altered by industrial developments such as marine terminals and berthing structures, but would be further altered by temporary or permanent structures, from removal of existing structures, or from additional shade or lighting created under the proposed Facility and from future projects.

- Cumulative effects could occur to soils and water quality despite best management practices and stormwater pollution prevention plans. Localized increases in soil erosion susceptibility could occur in upland and river environments. Other foreseeable future projects at the Port could also contribute to cumulative impacts to earth resources, including additional dust emissions or sediment particles in stormwater runoff.
- Localized, temporary cumulative impacts to recreational boaters could occur if dredging occurred in areas close to Terminal 5 at the Port, or if other marine terminals were constructed during the same time period as construction of the proposed Facility.

Rail Corridor

The direct and indirect impact analysis determined that some significant impacts could be unavoidable, related to rail accidents, emergency response delays resulting from additional train traffic, and environmental justice impacts to minority or low-income populations along the rail corridor (see Table ES-2). These impacts, and other impacts determined nonsignificant during the direct impact analysis, were then analyzed in light of the other proposed or permitted projects that could contribute additional rail traffic to the rail system.

If all the currently proposed projects identified in the cumulative analysis are permitted and operated, about 89 unit trains per week would be added to the current traffic load on the rail lines. The Proposed Action would add to that number; the Proposed Action and the other projects would add about 136 trains per week (or 6,837 a year) to the rail system in Washington State (See Section 5.1.3.2 for more on these increases). EFSEC identified the following cumulative effects as a result of this rail traffic increase:

- Cumulative, temporary increases in noise, vibrations, air emissions, visual presence of trains, and traffic congestion would occur. An increase in the number of trains would not add a new type of impact to the existing rail corridor, but would affect the setting of land and shoreline use, recreation, and cultural areas along the rail corridor.
- Historic resources such as bridges and tunnels within the rail system would experience more frequent vibrations, and thus more repairs and limitations on use during repairs.
- A cumulative increase in locomotives would result in cumulative impacts to air quality in nonattainment or maintenance areas. Increases in air emissions from increased rail transportation could have impacts on the health of the general population and vulnerable populations.
- Increases in gate downtime delays could create the following cumulative impacts:
  - Significant impacts to public services and emergency responders. Delays at roadway-railroad at-grade crossings would be worse during peak commuting times, particularly in urban areas. These delays could have disproportionate impacts to minority populations identified as living close to the rail corridor. Mitigation measures identified in Section 3.15.5 and ES-6 could partly mitigate this impact but cannot by imposed by EFSEC. See the discussion on emergency response in Section ES-6.
  - Vehicular delays. These delays would affect local transportation, access to recreation areas (20 recreation areas within the rail corridor study area are expected to experience an average of 2.5 minutes of delay per vehicle), and access to tribal treaty areas. The cumulative impact of increased rail operations on gate downtime delay is anticipated to be substantial.
  - Delays in moving goods to market and passengers to their destinations on time on the rail system.
- Increased rail traffic may increase the risk of spills or accidents that release transported materials into waterways, or affect vegetation communities. Facilitated movements of noxious weeds and invasive plants would also increase, which could affect vegetation communities along rail lines.

- Cumulative increase in wildlife impacts could occur, including wildlife collision mortality along rail lines and impacts from increased small spills and leaks.
- Cumulative impacts such as injury or fatality associated with trespassing and from at-grade crossing conflicts could occur from increased rail transportation.

Vessel Corridor

The analysis of direct and indirect impacts did not identify any significant unavoidable impacts along the vessel corridor, assuming that the proposed mitigation measures shown in Table ES-2 are applied. EFSEC did identify cumulative impacts that could occur when the direct and indirect impacts are considered in combination with other projects that could contribute vessel traffic to the Lower Columbia River.

An estimated 365 vessels per year would call at full operating capacity of the proposed Facility. This vessel traffic in combination with existing and foreseeable future actions would increase the number of deep-draft vessels using the river's navigation channel. Current vessel traffic on the Columbia River fluctuates, and future traffic may include more deep-draft vessels (see Section 5.1.3.3). The other past, present and future projects identified in the cumulative analysis (see Table 5-2) represent a substantial increase (approximately 500 percent) in deep draft vessel traffic within the vessel corridor.

The cumulative impacts EFSEC identified as a result of the increase in deep-draft vessels are as follows:

- Cumulative noise and visual impacts to recreational watercraft users and other nearby receptors could occur. Vessels are currently part of the visual setting of the area, but additional vessels would be an increase in the frequency and the length of time viewers see and hear vessel traffic.
- An increase in vessel traffic would not likely exceed the capacity of the river's navigation system, but could result in some congestion during periods of bar closure, resulting in cumulative impacts to vessel transportation. Some users, including users of tribal treaty fishing areas, could experience impacts during narrow fishing seasons when they need to give way to larger Project vessels.
- Although vessel collisions as a result of cumulative vessel traffic are considered unlikely, in the event of an accident, injury or fatality could occur, depending on the unique circumstances of the event.
- An increase in ambient noise could mask marine mammals' vocalizations and interfere with typical behaviors. While vessel strikes are unlikely for seals and sea lions, as they are typically able to avoid collisions, increased disturbance from an increase in vessel traffic in the Columbia River could result in behavioral effects such as changes in foraging behavior.
- The potential for entrainment (when aquatic organisms are pulled into vessel water intakes due to the suction field around these intakes) would increase, and may result in additional impacts to the reproduction, population size, or distribution of fish species present in the vessel corridor.
- Potential cumulative air emissions could occur, which could result in cumulative human health impacts.
- The magnitude and frequency of vessel wakes could increase, particularly along 33 miles of non-contiguous, unshielded sections of shoreline along the vessel corridor most susceptible to erosion. This could lead to the following:
  - Localized increases in turbidity and water quality effects, resulting in chronic cumulative impacts.
  - Localized disturbance to riparian vegetation and shoreline wildlife habitat.
  - Increased erosion, which could degrade and destroy some shoreline archaeological resources already experiencing erosion effects.

The cumulative increase in vessel wakes could also affect wake stranding of subyearling Chinook within a portion of the vessel corridor, with potential long-term, cumulative impacts during outmigration. EFSEC identified measures the Applicant could implement to mitigate this impact, which was considered a significant impact from the proposed Project unless specified mitigation is imposed (see discussion and identified mitigation in ES-6 below). These mitigation measures would also reduce effects to soils, cultural resources, and habitat from wake effects.

ES-6 KEY ISSUES

This section addresses the following key issues addressed in the impacts analysis:

- Significant impacts that remain significant even if identified mitigation within EFSEC's jurisdiction is imposed.
- Impacts that may not have been identified significant by the end of the analysis but are issues of concern that warrant a discussion.
- Impacts on multiple resources and any identified mitigation that may also affect multiple resources.

The following discussion is intended to provide a better understanding about these issues, how they are interconnected, and conclusions including the value of the mitigation.

ES-6.1 Nighttime Construction

The Applicant has requested the ability to perform some facility-related construction at night. Nighttime construction would include impact pile driving, jet grouting, noise related to a concrete batch plant, and typical construction activities. These actions would create noise and light.

See Section 3.9 for more discussion on nighttime noise thresholds and noise impacts.

Under EFSEC's governing statutes, EFSEC determines the noise threshold that the proposal must meet. The EIS discusses the environmental impacts of nighttime noise and refers to the state and local codes as part of that analysis. The State of Washington and City of Vancouver essentially have the same noise limits[6]. Under WAC 173-60-040 and Vancouver code VMC Environmental Noise 20.935.030, construction noise is exempt from regulation during the day from 7:00 a.m. to 8:00 p.m.[7] but not at night. At night, construction noise would be required to meet the thresholds that are set in WAC and City code.

Impacts

- **Land use compatibility (Section 3.10).** Nighttime construction would violate the local land use code for noise thresholds and would not be compatible with adjacent residential land uses (Fruit Valley neighborhood and Clark County JWC dormitory)
- **Noise impacts on residential and commercial properties (Section 3.9).** Three properties were of particular concern as noise receivers. The EIS analysis identified nighttime construction noise levels exceeding the local and state codes by up to 9 dBA at Fruit Valley, up to 26 dBA at the JWC dormitory, and up to 24 dBA at Tidewater office building. Because Tidewater is a commercial property, it would not be expected to be impacted by nighttime construction noise.

6 Except that for the City the "maximum noise levels shall be reduced by 10 dBA between the hours of 10:00 pm and 7:00 am for all types of receiving properties as opposed to the state WAC which reduces maximum noise levels at night for only Class A (residential) receiving properties.

7 State WAC extends the exemption for construction to 10:00 p.m.

- **Noise impacts on environmental justice communities (Section 3.16).** The Fruit Valley neighborhood is an environmental justice community, the nighttime construction noise would represent a disproportionate impact on environmental justice communities.
- **Pile driving impacts on aquatic species (Section 3.6).** The Applicant has committed to monitor marine mammals during pile driving, to avoid disturbance to these species (e.g., vibratory in-water pile driving would be stopped if listed marine mammals are observed within 6 miles). However, if pile driving occurred at night, marine mammal monitoring by observation would not be feasible. Nighttime light and glare would also impact aquatic habitat.
- **Light and glare impacts on visual resources and terrestrial wildlife (Sections 3.11 and 3.5).** Although of lesser concern than noise or impacts to aquatic species, light and glare from nighttime construction at the site would impact human views and nearby wildlife populations, particularly at three mitigation sites nearby. Although the mitigation measure was not identified specifically for light and glare impacts, it would reduce these impacts.

Mitigation

One mitigation measure is identified to address nighttime construction impacts:

- Prohibit nighttime construction activities involving equipment powered by internal combustion engines, impact equipment, or other equipment or tools emitting noise levels in excess of 70 dBA at 50 feet (this would include pile driving, jet grouting and operation of the concrete batch plant at night).

This measure would effectively mitigate significant impacts from nighttime construction to a nonsignificant level. If unrestricted nighttime construction were to occur, there would be significant noise impacts to two nearby residential areas (one with an environmental justice population), and marine mammal monitoring would not be possible during pile driving (leading to potential disturbance or temporary displacement of marine mammals).

ES-6.2 Vessel Wakes

See Sections 3.0.7 and 5.1.3.3 for historical data and future predictions of vessel traffic in the Lower Columbia River.

The proposed Facility would add deep-draft vessel traffic to the Lower Columbia River. One vessel would travel upriver and one would travel downriver each day to and from the facility, 365 days a year. These vessels would create large wakes more frequently than currently occur in the Lower Columbia River. As these wakes wash onto the shorelines, they would impact soils, vegetation, and aquatic species in some locations. These impacts are of particular concern on unmodified shorelines along the lower 33 miles of the Columbia River. Much of the Columbia River shoreline is armored (e.g., modified through riprap, marinas, or other manmade structures), so the limited sections of natural shoreline remaining also provide ecological functions and values in support of lost important fish habitat, such as providing habitat for small fish.

As noted in the cumulative analysis, vessel wakes could also see a cumulative increase, if, as predicted, more deep-draft vessels begin traveling on the Columbia River. Prior to 2012, an average of 5 deep-draft vessels traveled the Columbia River. More deep draft vessels are anticipated to transit on the Columbia River in the future.

Impacts

- **Wake stranding impacts on aquatic species (Section 3.6).** Deep draft vessels cause large wakes and are documented for stranding fish along the shore of the Columbia River. Some studies and data are available and are sufficient to document that:

  - Aquatic species stranding can occur from wakes of deep draft vessels,
  - Some shoreline areas are more susceptible to wake stranding than others.
  - Among those fish stranded, the Columbia River subyearling chinook, an Endangered Species Act (ESA) listed ESU,[8] are known to be particularly susceptible, making up 82% of all documented fish strandings by deep draft vessel wakes.

  The current information does not answer all the questions needed to determine the proposed Facility's contribution to this impact. For example, it does not identify all the species that could be impacted by wake stranding. Eulachon are also ESA listed and their larvae and eggs may also be stranded. The previous studies were not designed to detect them.

- **Wake impacts on essential fish habitat (Section 3.6).** Localized reductions of existing vegetation, prey, and overall essential fish habitat (EFH) functions could occur from wakes during vessel transit. EFH features represent a small, but naturally functioning portion of the overall EFH in the Columbia River, and provide important ecological functions that modified (e.g., riprapped) shorelines no longer provide.
- **Wake impacts on soils, water resources, and shoreline vegetation (Sections 3.1, 3.3, and 3.4).** Deep draft vessel wakes can cause soil erosion where the bank has not already been armored. Erosion can impact water quality (e.g., turbidity) in the river, and impact wetlands and other riparian vegetation communities by breaking or uprooting wetland vegetation or by altering sediment patterns and erosion.
- **Shoreline disturbance near cultural resources (Section 3.13)**. Shoreline erosion from vessel wakes could impact archaeological resources located along the shoreline. Additionally, the mitigation proposed below for wake stranding impacts (such as modifications to the shoreline) could have an impact on archeological resources by also disturbing the shoreline where archaeological resources could be located.

Because more deep draft vessels are expected to transit the Columbia River, this proposal's impacts to at-risk species and populations from wake stranding would be even more significant, if the proposed mitigation is not imposed.

Mitigation

These measures are specifically designed to deal with the impacts associated with wake stranding. They would also reduce turbidity, impacts to essential fish habitat, and erosion to soil and vegetation:

- Prior to construction, develop a fish stranding study in consultation with appropriate state and/or federal agencies to better understand where and when fish stranding occurs along the vessel corridor; and how these wake effects impact listed ESA species, particularly subyearling Chinook.

See Section 3.6.4 for details on mitigation measures for wake stranding.

- Develop measures to avoid and reduce the potential for fish stranding (e.g., using dredged materials to modify beaches to reduce stranding, or adding fine scale features such as logs or vegetation). These would be implemented in coordination with the Department of Archaeology and Historical Preservation (DAHP) to protect cultural resources.

8 ESA listing means these evolutionarily significant unit (ESU) are at risk of extinction and means that any impacts to them are of great concern and potentially significant.

- Design monitoring programs to follow-up on the fish stranding study results and to assess the effectiveness of mitigation measures.

An alternative, effective form of mitigation would be to reduce deep-draft vessel speeds at locations identified as highly susceptible to wake stranding for listed ESA species. It is valuable information for the public and those who would have the authority to implement or require it (e.g., US Coast Guard, Columbia River Pilots) even though it cannot be required by EFSEC and therefore not considered to be effective mitigation for reducing impacts identified in the EIS.

ES-6.3 Emergency Response and Traffic Delays at Rail Crossings

Environmental review of the proposed Project includes rail transport of the crude oil from Williston, North Dakota to the proposed Facility site in Vancouver, Washington (four round trip trains per day). The routes analyzed for the proposal would see 4 to 8 one-way train trips per day from the proposed Project.

See Section 3.14 for details on current and future rail traffic and delays at at-grade crossings. Effects of these delays are also covered in Sections 3.2, 3.8, 3.15 and 3.16.

Gate downtime from rail traffic at at-grade crossings (rail/roadway intersections) is recognized as a serious problem delaying traffic across the state. Along the 445-mile oil delivery route in Washington (known as the Columbia River Alignment) there are about 200 at-grade crossings that Project-related trains would use. Potential alternate routes also contain many at-grade crossings. Gate downtime increases vehicle trip times, could cause air quality impacts from stopped vehicle emissions at a crossing, and can affect traffic safety and emergency response. Eight train trips in a day would obstruct each at-grade crossing about 41 minutes in a 24-hour period; the average gate downtime at each of these crossings would be about 5 minutes per train. Individual vehicles delayed at an at-grade crossing would experience an average delay of 2.5 minutes with a maximum delay of about 5 minutes. It is possible some vehicle routes could result in delays to the same vehicle at multiple at-grade crossings.

At least eight crossings along the Columbia River route are identified to have an annual average of vehicle trips per day (AADT) of more than 2,500 vehicles. WSDOT has identified 26 along the project's rail route as operationally sensitive, which means there are current or impending impacts to safety, traffic circulation, vehicle delay, or emergency response capability. These crossings would be more affected by increased rail travel.

Impacts

- **Potential delays for emergency responders (Sections 3.8 and 3.15)**. A response time delay for an emergency response vehicle is a significant impact because it can mean the difference between life and death. If that emergency response vehicle also has to transport a person to the hospital along a route with tracks, that is another opportunity for rail traffic delays.
- **Increase in vehicle delays at crossings (Section 3.14).** An increase in vehicle delay caused by gate downtime would be experienced at a high number of at-grade crossings. Delays at operationally sensitive crossings could cause safety issues (e.g., traffic backing up onto a highway or freeway). Although not identified as a significant impact of the proposed project, it is still substantial and part of a larger problem associated with at-grade crossings and crossing closures.

  The cumulative impact of increased rail operations on gate downtime delay is anticipated to be substantial.
- **Air Quality impacts from idling vehicles at crossings (Sections 3.2 and 3.8)**. Traffic delays at each road-rail crossing generate vehicle engine emissions. Vehicles idling at these crossings would temporarily increase emissions, which could adversely impact local air quality, particularly at those crossings with large numbers of vehicle trips. Although not considered a significant impact, there would be some adverse impact.

Air quality is of concern to the specific communities along the rail corridor. The communities along the rail corridor have increased rates of the following health conditions:

- The Pasco to Vancouver rail segment has the most elevated cancer rate, approximately 189 per 100,000 people, compared to the statewide population rate of 166 per 100,000.
- The cardiovascular mortality rate along the entire rail route (delivery and return) is 233 per 100,000 people as opposed to the statewide population rate of 197 per 100,000.
- Washington's Department of Health (WDOH) calculated that communities along the rail route have a significantly increased risk for respiratory hospitalizations.

- **Disproportionate effects on environmental justice populations (Section 3.16).** Impacts to emergency response, vehicular travel, and environmental health from delays at the at-grade crossings would disproportionately affect environmental justice populations along the rail route. Of the 96 Census Tracts (CTs) located within the rail corridor study area, 79 have meaningfully greater concentrations of minority or low-income populations. Environmental justice populations can be more sensitive to impacts than the average population due to additional factors associated with income, health and safety. The impacts of train-related increases in air emissions may be greater in low-income populations and lacking health insurance, as these individuals may experience higher exposure and have less access to health care. For example, the environmental justice population along this proposed project's rail route have a higher percentage of people (16%) without health insurance (versus 13% for other populations), which translates to less preventative health care and can lead to more health issues and a greater demand for emergency response.
- **Vehicle train accidents (Section 3.8)**. An increase in trains would result in a higher number of vehicle train accidents and increase the number of annual deaths from this type of accident. There were 7 motorist fatalities at at-grade crossings along BNSF rail lines in Washington from 2011 to 2015.

Mitigation

EFSEC has identified three measures that could be implemented by others; no mitigation was identified that EFSEC could impose on the Applicant. Because there are no measures that an agency with jurisdiction (EFSEC) could implement that would effectively reduce the identified impacts, the impacts to emergency response and disproportionate effects on environmental justice populations would remain significant. Other identified impacts would also remain.

Creating grade-separated crossings (e.g., constructing bridges at road-rail crossings) would be the most effective measure for mitigating the identified impacts; however, grade-separation projects cannot solve every road-rail conflict because these projects can cost $20 to $30 million per crossing, with some more complex crossings costing up to $150 million or more.

The following measures, if implemented by others, would to varying degrees mitigate impacts associated with emergency response delays and gate downtime (vehicle delays and air quality impacts), which would also reduce impacts to environmental justice populations.

- Create a real-time GIS tracking program for crude-by-rail trains that can be used by emergency response services and would assist with emergency response delays. (Sections 3.8.4, 3.15.4, 3.16.4).
- Identify and implement appropriate mitigation measures at high-traffic and operationally sensitive crossings to address impacts related to safety, traffic circulation, vehicle delay, or emergency response capabilities. Possible measures could include 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). (Sections 3.8.4, 3.14.4, 3.15.4, 3.16.4).

Gate down time from this proposal is part of an increasingly more substantial impact in the future. For emergency response and environmental justice populations, the cumulative impact is also significant.

ES-6.4 Seismic Events at the Project Facility

Earthquakes are unlikely events but their consequences can be severe (e.g., at an oil facility, a large earthquake could cause failure of structures that contain oil, leading to an oil spill). For that reason, the EIS analyzes seismic events, and considers whether their impacts would be severe and therefore significant as defined by SEPA.

See Section 3.1.2.4 for types of seismic hazards that could affect the proposed Facility.

See Sections 3.1.3 and 2.3.2.2 for ground improvements and other elements of the Applicant's design that minimize risk of damage during a seismic event.

The largest earthquakes capable of occurring in the Pacific Northwest are magnitude M8-9, on the Cascadia Subduction Zone. These events are estimated to occur every several hundred years on average, and they could cause severe damage to structures not properly designed to resist their effects. The Applicant considered the risk of such seismic events and other potential regional earthquakes in their design. The Applicant's design would adhere to applicable industry seismic standards for all proposed Facility elements, including buildings, storage tanks, pipelines, and the marine terminal (see Section 3.1.3.4) to minimize the risk of damage from earthquakes. The design includes a protective berm around the storage tank area to contain potential spills. The Applicant has also proposed ground improvements to resist the effects of soil liquefaction[9] (i.e., ground settlement and lateral spreading[10]), which are expected should a very large earthquake occur.

Prior to publication of the Draft EIS, EFSEC commissioned an independent analysis of the seismic hazards related to the proposed Facility, and an independent peer review of the Applicant's proposed ground improvements (Appendix C) to mitigate the hazards. The hazards analysis identified a concern that the storage tanks and oil transfer lines at the proposed Facility could fail during a Maximum Considered Earthquake (MCE) ground motion, defined as motion occurring, on average, once every ~2,500 years. The failures could be caused by the ground motion and/or earthquake-induced liquefaction and settling or lateral spreading of soils underneath the project structures. Any spills from the proposed storage tanks (if not contained due to failure of the protective berm), or from the oil transfer lines could reach the Columbia River, resulting in an oil spill that would affect the terrestrial, aquatic, and human environments.

The professional peer review team examined the proposed ground improvements and foundation designs for the oil storage tanks, protective berm, oil transfer lines, and the dock. After publication of the Draft EIS, the review process continued, to answer questions such as whether the proposed structures would remain structurally sound during the MCE ground motion. As a result of the process, the Applicant and the Applicant's consultants performed additional work and analyses, and the Applicant developed and submitted a refined ground improvement design to EFSEC.

Peer Review of Proposed Ground Improvements

The peer review determined that the Applicant's design of the storage tank area (Area 300) and pipeline support system (Area 500) is sufficient to mitigate the risk from the MCE ground motion. In Area 300, the ground improvements under the storage tanks would mitigate the potential for soil liquefaction and thus limit

9 Soil liquefaction is a phenomenon whereby a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied vibratory stress, usually from earthquake shaking or other sudden changes in stress condition, causing the soil to behave like a liquid.

10 Lateral spreading is the finite, lateral movement of gently to steeply sloping, saturated soils caused by earthquake-induced liquefaction.

the settlements of the tank foundations from ground shaking to acceptable levels. The tanks themselves would be designed to resist the MCE ground motion. Therefore, the risk of spills from a tank failure would be mitigated, or, should a spill occur, the Applicant's analysis indicated that the containment berm would not fail and hence would be able to contain the assumed quantity of leaked crude oil. (See Appendix C.2, Section 5.2.1.) In Area 500 the Applicant's analysis demonstrated the pipeline and its support system would withstand the amount of differential settlement that could occur from liquefaction during the MCE and would not lead to stresses within the pipeline that would impair its structural integrity.

The peer review concluded that the ground improvements at the dock abutment and adjacent transfer pipeline in Area 400 appear to be appropriate to withstand lateral spreading and ground shaking near the shoreline during the MCE (see Section 3.1.3.2, and Section 2.3.3.5 – Dock Modifications). Thus, the infrastructure in this area is expected to remain intact. However, further analysis is needed prior to final Facility design to confirm that the pile-supported dock structure is designed to withstand earthquake-induced slope instability of the river embankment. The Applicant proposed strengthening schemes for selected piles and checked that their capacity was not exceeded for several combinations of loads derived from slope failure and ground shaking. However, those load combinations may underestimate the actual loads; thus, additional analysis by the Applicant is needed prior to final Facility design (if a site certificate agreement is executed) to evaluate the load combination percentages and to modify the design if needed (e.g., increasing the outside diameter and/or thickness of additional piles inserted into existing piles, and/or expanding the proposed strengthening schemes to include more existing piles). See Appendix C.2.

Impacts

- **Damage to dock structures from earthquake**. Structures at the dock (Area 400) that may otherwise withstand ground motion could be damaged if underlying soils liquefied or slopes failed. Any spills from this area could result in an oil spill reaching the Columbia River. As noted in the peer review results, the dock design may need additional modifications to further reduce the risk of infrastructure damage and resulting impacts from a spill, should the MCE occur.

Mitigation

Implementation of the following mitigation measure would reduce the risk of structural damage:

- At the dock, including the dock piles and at the adjacent transfer pipeline within the marine terminal (Area 400):
  - finalize details of the design (e.g., length, width, and strength of deep soil mix panels, anchor embedment, and connections to the panels at ground level); and
  - confirm that the dock structure is designed to withstand slope failure that could be triggered by an earthquake (see Section 3.1.4).

Implementation of these additional measures would further reduce risk of structural damage. It is important to note that regardless of the design and construction methods used at a site, no mitigation measures are available that eliminate the risk of structural damage from soil liquefaction.

ES-6.5 Air Quality – Diesel Particulate Emissions

Introduction

See Section 3.2.4 for more discussion of DPM.

See Figures 3.2-4 through 3.2-6 show the range and level of cancer risk from exposure to predicted DPM concentrations.

Pollutant emissions can impact air quality and human health. Diesel particulate matter (DPM) is one of the most common air toxics found in ambient air, resulting from the combustion of diesel fuel, either in stationary sources or mobile sources. Operations at the facility site would generate DPM. Diesel exhaust is implicated as a cause of lung cancer. Short- and long-term exposures to PM2.5, which is composed in part of DPM, have

been shown to be associated with increased cardiovascular disease; pulmonary inflammation in asthmatic children, decreased pulmonary function, and exacerbation of allergic responses; and mortality. Individual members of vulnerable populations (e.g., elderly, asthmatic children, smokers) would be at increased risk of experiencing health effects related to DPM emissions.

Additionally, environmental justice populations exist near the facility (e.g., Fruit Valley). Environmental justice populations can be more sensitive to impacts than the average population due to additional factors associated with income, health and safety. For example, two environmental justice populations with meaningfully greater minority and low-income populations are located near the proposed Facility: the Fruit Valley neighborhood and Hayden Island in Oregon.

DPM is considered to be a carcinogen with the primary route of exposure being inhalation. Risk for carcinogens is expressed as a probability of an individual contracting cancer out of one million people who are exposed to the same concentrations of the same pollutant over a lifetime (often defined as 70 years); this risk is referred to as lifetime excess cancer risk (LECR).

Rules and permitting thresholds for DPM exist at the national and state level; these are designed to protect human health, including the health of vulnerable populations. The Washington Department of Ecology has a multi-tiered permitting process for toxic air pollutants like DPM (WAC 173-460-080 through 173-460-100). The program begins with a Tier I comparison of DPM emissions to small quantity emission rates (SQERs). If that comparison estimates emissions in excess of the SQER, then a more refined Tier II assessment is required; this assessment involves air dispersion modeling (WAC 173-460-090). The Tier II analysis identifies a threshold of one additional cancer case in 100,000 (10 additional cancer cases in 1 million) as one of the criteria for determining approval of a proposal. The analysis of the proposed Facility compared stationary and mobile DPM emissions to this 10-cases-in-1-million criterion.

The extent and concentrations of DPM in the air resulting from emissions at and around the site were modeled from stationary and mobile sources to determine the range and level of cancer risk from exposure to DPM near the proposed Facility. Four receptor types near the proposed project site were assessed for cancer risk (residential, commercial including Jail Work Center (JWC) employees, JWC inmates, and short-term visitors to the area). See Section 3.2.4 and Figures 3.2-4 through 3.2-6.

Impacts

- **Human health impacts to residential and commercial receptors**. Two receptor types were identified with higher probabilities for cancer: residential receptors (6.9 additional cases of cancer per million) and commercial (5.7 additional cases of cancer per million). A Tier II analysis determined that the predicted risk resulting from exposure to DPM emissions would not exceed the approval criterion used in the analysis for lifetime excess cancer risk (10 in 1 million); however, they are nonetheless an adverse impact on human health including increased cancer risk and compromised respiratory health of vulnerable populations.
- **Disproportionate DPM impacts to environmental justice communities**. The DPM emissions would generate a rate of 6.9 additional cases of cancer per million at Fruit Valley and would disproportionately impact minority or low-income populations at Fruit Valley.

Mitigation

The analysis demonstrates that adverse impacts from DPM are not significant and no mitigation has been identified. However, DPM concentrations could further increase if future actions were constructed and operated at the same time as and within the same airshed of the Proposed Action, which could result in cumulative impacts to human health.

ES-6.6 Greenhouse Gas Emissions

See Sections 3.2.4.5 and 5.19.1 for more discussion of greenhouse gas analysis.

The majority of climate scientists are in agreement that increasing greenhouse gases (GHGs) are affecting the climate and are the key factors causing the climate to change the earth is presently experiencing. Greenhouse gases from many human activities (e.g., burning of fossil fuels) and natural processes (e.g., biodegradation) enter the atmosphere and cumulatively affect the climate around the planet. It is believed that GHG levels in the air/atmosphere are at levels high enough that climate is changing at a very rapid rate as compared to geologic history, and may be too fast for the environment (plants and animals) to adapt. Additionally, climate change impacts such as rising sea levels and changing weather patterns are impacting humans. The effects of GHG levels have a long-term effect on the climate. Because the long-term changes that are expected will be challenging to many regions, environments, species, and populations, it is important that GHG production levels are reduced in order to minimize their effect on the climate. For this analysis, project-related and cumulative GHG emissions are considered to have an adverse environmental impact on climate and the natural and built environment.

The crude oil that would be transported by the proposed Project is currently being extracted and transported by rail and pipeline to refineries, processed into fuels and synthetics, transported, and used/burned. Although there are a number of steps in the life cycle of crude oil where GHG emissions are released into the atmosphere; this proposal would add a new component to the life cycle which is the transfer facility. The transfer facility would generate GHG emissions during construction, operation, and decommissioning. EFSEC considered emissions from the Applicant and from a separate air quality technical analysis, as described in Section 3.2 of the Final EIS.

Impacts

- **Greenhouse gas emissions.** The facility would generate GHG emissions during construction (18 months) from purchased electricity, heavy-duty diesel equipment, highway vehicles, and marine engines: 4,041 metric tons per year of carbon dioxide equivalents (CO_2e). Decommissioning at the end of the operational life, would generate a similar amount of GHG emissions.

  The facility would generate direct and indirect GHG emissions during operations (approximately 20 years) from:

  - Stationary sources (e.g., boilers, MVCUs, component leaks, tanks, and fire pumps) – 86,441 metric tons per year (CO_2e)
  - Purchased electricity – 32,388 metric tons per year (CO_2e)
  - Mobile sources and rail and vessel engines (including hoteling) on and near the site – 9,688 metric tons per year (CO_2e)
  - Rail crude transport within Washington (round trip) – 158,711 metric tons per year (CO_2e)
  - Vessel crude and escort tug transport within Washington's 3 nautical miles (nmi) boundary (round trip) – 26,067 metric tons per year (CO_2e)

  Electricity GHG emissions would not be generated at the site. Rail crude transport GHG emissions would occur along the delivery and return rail routes within Washington State. GHG emissions from vessel crude transport and escort tugs would occur along the Columbia River and out to Washington's 3-nmi boundary.

- **Other pollutants to air quality**. Many sources of GHG emissions can also be sources of other air pollutants. For example, burning diesel in engines also generates diesel particulate matter (DPM) which can be a health hazard (respiratory) for people and other mammals. Minimizing sources of DPM by purchasing electricity would be beneficial to air quality and human health at and near the proposed Facility.

Mitigation

EFSEC has identified mitigation for the portions of the project that are directly connected to operation at the facility.

- Eliminate, mitigate or otherwise offset 100% of the stationary and mobile sources at and near the facility site annually.
- Eliminate, mitigate, or otherwise offset 50% of the GHG emissions from purchased electricity used by the Facility.

This mitigation would address the majority of emissions associated with the facility.

ES-6.7 Crude Oil Spills

Almost every aspect of this proposal and its connected actions involve the handling of large quantities of crude oil. Although unlikely, accidental oil spills occur and can vary from small volumes (e.g., gallons to a few barrels) to much larger volumes (e.g., tens of thousands of barrels). The risk of a spill is present along the rail routes between Williston, North Dakota and the Port, at the proposed Facility during storage and transfer of oil, and along the vessel corridor as tankers transport the oil to refineries.

See Chapter 4 for in-depth discussion of crude oil spills and their impacts.

This includes behavior of crude oil during spills (4.2, 4.4), current prevention and response (4.3, 4.5) and impacts to environmental resources from potential release scenarios (4.6 through 4.9).

When a spill occurs, the terrestrial, aquatic, and/or the human environments can be severely impacted. Spills in the aquatic environment can be the most challenging to clean up and typically result in larger amounts of damage. In water, clean-up after an oil spill has a lower rate of success when compared to on-land releases; experience indicates that it is rare to recover more than 10 to 15 percent of oil spilled into aquatic environments even under optimal circumstances. Lower recovery rates of 3 to 5 percent are more common. Thus, it is important to focus on preventing oil spills as well as responding to spills.

Each component of the proposed Project has its own risks of a spill, potential volumes of oil in a spill, and opportunities for additional mitigation. Oil type can also affect the impacts and potential for collection following a spill. Generally, any oil type can either sink or mix within the water column based upon different behaviors in the environment. However, the two different oil types modeled—Bakken crude oil and diluted bitumen—have different chemical and physical characteristics that can result in different behavior in water. The low viscosity of Bakken crude oil allows it to entrain more easily into the water column and form small droplet sizes that may interact with sediments, resulting in the potential for sinking oil. The higher viscosity of diluted bitumen makes entrainment less likely and leads to the formation of larger droplet sizes. However, the bitumen's greater density results in less buoyancy, so less sediment interactions are required to result in sinking oil. The Columbia River tends to be turbulent and turbid; therefore, both oils have the potential to become mixed into the water column, interact with sediments, and ultimately have a portion sink to the bottom.

Two broad categories of crude oil release events are considered and analyzed in this EIS:

- Minor drips and leaks that would be expected to occur during construction and normal operations at the proposed Facility or during normal operations along the transportation corridors. Minor drips and leaks and their impacts are addressed as direct impacts in Chapter 3 of the EIS.
- Larger crude oil releases that create environmental impacts associated with the spread of crude oil on land, water, and biota. Larger crude oil releases are addressed in Chapter 4. These larger events would have a low likelihood of occurrence, but could result in severe environmental impact if they did

occur. Thus, under SEPA (WAC 197-11-794), impacts with a low chance of occurrence but with potentially severe consequences would be considered significant.

To analyze impacts related to potential large spills, and potential fires or explosions related to these spills, the Applicant and EFSEC prepared analyses of risks, potential scenarios, and the adequacy of current infrastructure for preventing or responding to crude oil spills.

Methods of Analyzing Oil Spill Risk and Effects

Given the complexity of the proposed Project and the challenge of predicting hypothetical events, EFSEC commissioned several technical analyses to support the SEPA impact analysis of potential crude oil spills. The impact analysis also considered the current framework of prevention and response.

Crude Oil Spill Risk Analyses

EFSEC supplemented the Applicant's analysis of spill planning volume and spill risk by commissioning independent analyses of spill potential at the proposed Facility during vessel loading (see Section 4.7.3; Appendix E), and from rail and vessel traffic associated with the proposed Facility (see Sections 4.8.3 and 4.9.3; Appendices E and J). These independent analyses 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 if a spill reached the Columbia River. Table ES-3 lists risk analyses provided by the Applicant and commissioned by EFSEC.

Table ES-3 Crude Oil Spill Risk Analyses

Analysis	Description	Cross-references within the Final EIS
Facility Siting Study and Quantitative Risk Analysis *(Baker Engineering and Risk Consultants)*	A study prepared for the Applicant examined failure rates for onsite storage tanks and associated pumps by grouping common equipment types and applying historical failure rates. The risk analyses found that the possibility for a large crude oil spill at the proposed Facility is very low; however, smaller spills could be expected to occur within the Facility's lifetime (e.g., small transfer spills). Note that because there are no documented rail accidents or large spills resulting from rail crude oil transfers at similar facilities, it was not possible to calculate the likelihood of larger rail spills at the proposed Facility based on the historical record. This study included an analysis of the risk of injury or fatality from a fire and/or explosion event at the proposed Facility. Flash fires were determined to be the major hazard in the railcar unloading facility, and explosions were the primary hazard in the boiler building. The analysis indicated that for credible accident scenarios, the total risk (0.0007 fatality per year) for workers is within typical industry criteria for risk tolerance. Offsite personnel risk would be 10,000 times less than the risk to onsite personnel.	Sections 4.7.3.2, 4.7.5.2; Appendix S
Spill Risks at Proposed Facility *(see Vancouver Energy 2016)*	A study prepared for the Applicant found that loading hoses would pose the greatest spill risk at the marine terminal, with a calculated frequency of one 145-barrel accidental release every 9 years. The replacement of these hoses every 5 years (as required by state and federal regulations) reduces the likelihood of these releases. A spill of tens of thousands of barrels resulting from a complete rupture of the largest marine transfer pipeline has a calculated frequency of 1 event every 39,000 years or more.	Section 4.7.3.2
Crude-by-Rail Spill Risk Analysis *(ERC)*	This analysis determined the annual spill frequency of any volume from loaded trains traveling to the proposed Facility is estimated to be 0.021 crude oil spill per year (i.e., a spill return period of 1 spill every 48 years, or a 1 in 48 chance of a spill each year). In addition to crude oil spills, 0.0137 diesel spill per year (from the locomotives) is also projected (i.e., a diesel spill return period of 1 diesel fuel spill every 73 years, or a 1 in 73 chance of a spill each year). The CBR-SpillRISK-V model was used to estimate the likelihood of occurrence for a range of spill volumes. The results suggest that for 30 percent of all spills associated with trains bound for the proposed Facility, the released volume would be 5,705 bbl or less, and for 90 percent of all spills, the released volume would be 22,830 bbl or less. Currently, an estimated 24.5 weekly crude oil unit trains transit through Washington. If rail traffic associated with the proposed Facility were added to this traffic, 52.5 crude oil unit trains would transit per week. Overall, the net increase in crude by rail spill potential for a spill of any size over the current background crude by rail spill potential for a spill of any size would be 72 percent.	Section 4.8.3; Appendix E

Analysis	Description	Cross-references within the Final EIS
Vessel Spill Risk Analysis *(ERC)* and Quantitative Vessel Traffic Risk Assessment *(DNV GL)*	Two analyses were performed to assess risk associated with vessel transportation to and from the proposed Facility. Both analyses used historical data, as crude oil is not currently being transported through the Columbia River. The analyses confirm that large to very large spills are very uncommon but can occur, and the worst-case discharge (WCDs) for such events can be substantial. EFSEC supplemented spill planning volume and spill risk analyses performed by the Applicant with a commissioned independent analysis of spill potential at the proposed Facility marine terminal during vessel loading (Appendix J). This analysis used data from transfer operations in other states, and concluded that typical spills during vessel transfer operations tend to be small: over 99 percent of transfer-related spills are less than 100 bbl. The effective WCD[11] varied by vessel type: 1,152 bbl for Handymax vessel loading, 2,212 bbl for Aframax vessel, and 2,626 bbl (Bakken crude) or 2,287 bbl (dilbit) for Suezmax vessels.	Section 4.9.3; Appendices J and T

Crude Oil Spill Trajectory and Fate Modeling

Two-dimensional over-land and on-water simulations were performed for the entire Project-related rail corridor within Washington using the OILMAPLand modeling tool (Section 4.6.3). The results include maps of predicted trajectory and the minimum associated travel time it took the modeled oil to reach the farthest modeled extent of the spill. This information was used in combination with Ecology's Geographic Response Plan (GRP) Gap Analysis to identify areas of concern for emergency response preparedness (Section 4.8).

The OILMAPLand and SIMAP models are further described in Sections 4.6.2 and 4.6.3.

Modeled results, including simulation maps, are found in 4.7.4.2 (proposed Facility), 4.8.4.2 (rail corridor), and 4.9.4.2 (vessel corridor).

See Appendix F for complete details on this modeling.

Site-specific, three-dimensional simulations were performed using the SIMAP modeling tool (Section 4.6.2). Simulations were run for three locations: the marine terminal of the proposed Facility, the rail corridor near Kennewick, and the outbound vessel corridor near Cathlamet. The model estimates the distribution of whole oil and oil components (as mass and concentrations) on the water surface, on shorelines, in the water column, evaporated to the atmosphere, and in sediments. SIMAP modeling was applied to both a conditioned Bakken crude oil and a representative dilbit (Cold Lake Winter Blend diluted bitumen) release, for spills occurring in various seasons (with corresponding hydrodynamic and environmental conditions), and for the two hypothetical spill locations downstream of Bonneville Dam during both flood and ebb tides.

Analysis of Current Prevention and Response Framework

The impact analysis in the Final EIS also covers how efficiently the current prevention and response programs could handle the emergency of a crude oil spill or related fire or explosion.

Prevention is the most effective means to reduce risk of a crude oil spill. Federal and state policies and programs are in place to regulate the handling and transportation of hazardous materials such as crude oil with the goal of preventing accidental releases from occurring (see Section 4.5). Ecology's Spill Prevention, Preparedness, and Response Program is one of the most effective spills programs in the nation. If spill prevention fails and crude oil is released into the environment, an effective spill response protects people, minimizes the spread of oil, protects natural resources, and removes oil from the environment, to the extent

[11] The "effective" WCD is the most credible or realistic volume for a WCD based on the amount of oil that would effectively be released in the event of a vessel incident based on maximum possible outflow as determined by modeling (Appendix J).

possible. If damage occurs, later phases of response operations include rehabilitation of the affected environmental, cultural, and economic resources. A response effort includes, first and foremost, preventing injuries and fatalities, and minimizing human and environmental exposures to hazardous materials. If a crude oil release were to occur related to the Proposed Action, an organized network of federal, state, and local agencies, tribes, and industry representatives would respond to the extent necessary, likely resulting in a timely and coordinated response (see Section 4.5).

Geographic Response Plans (GRPs) are an important first step in incident response. They are intended for use during the initial 24- to 48-hour response effort to protect sensitive resources from being reached by a spill (cleanup and recovery would use relevant contingency plans). However, GRPs have not been prepared for all areas and/or may be out of date. An additional gap associated with GRPs is that they are designed to address impacts to selected environmental resources, not all environmental resources that can be impacted by an oil spill. If the proposed Facility were permitted, plans such as GRPs and the Maritime Fire & Safety Association's Vessel Response Plans would be updated to address new risks and response planning considerations associated with the Proposed Action.

For the rail and vessel corridors, the transporting company (e.g., BNSF) is primarily responsible for the required prevention and response measures governed by federal law. However, in August 2016, the Washington State Department of Ecology adopted WAC 173-185 designed to "protect public safety and the environment by establishing notification requirements and procedures that inform emergency response agencies and the public of all crude oil shipments to facilities by rail and crude oil transport by pipeline in the state." Effective October 1, 2016, Washington State adopted a ruling (WAC 173-186) that establishes oil spill contingency plan (OSCP) requirements, drill and equipment verification requirements, and provisions for inspection of records for owners and operators of railroads. This new rule addresses training and equipment for possible crude oil spills along rail lines.

BNSF, the expected primary carrier of crude oil to the proposed Facility, has also voluntarily adopted operating standards beyond federal requirements to improve the safety of crude oil rail transportation. BNSF has voluntarily adopted the following operating standards that exceed federal requirements:

- Increasing the frequency of track inspections above Federal Railroad Administration requirements on crude oil routes,
- Increasing their use of trackside safety technology, and implementing nationwide speed restrictions.
- Providing emergency response training and community outreach including tuition reimbursements to train emergency responders
- Using a geographic information system (GIS)–based tracking application (SECURETRAK) that allows federal, regional, state, and local emergency responders to access crude oil unit train locations in near real time.

Concerns exist about the adequacy of the current response framework, should a crude oil spill occur. To help determine current preparedness in the Project vicinity, EFSEC contacted fire departments in these areas (see Section 4.5.5). Their comments indicated the need for additional resources and staff to respond to one or more spill event scenarios, particularly scenarios of a larger spill and associated fire and/or explosion.

The Vancouver Fire Department (VFD) would likely be involved in responding to potential incidents at the proposed Facility. The VFD has identified the need to fully assess the risks involved in crude oil transportation and transshipment within the city of Vancouver and throughout their regional response area. In response to VFD concerns, the Applicant has committed to the following: consulting with the Port, City of Vancouver, fire officials, and public fire and emergency

See Section 4.5.5.4 for more details on the ability of fire districts in the area.

responders to develop an Operations Fire Prevention and Control Program, and funding backup staffing for the VFD and the Clark County fire department while their employees attend emergency response training.

Crude Oil Spills at the Proposed Facility

Impacts

Spills at the proposed Facility could occur during railcar unloading, along transfer pipelines, at the storage tank area, and during vessel crude oil loading. Chapter 4 of the EIS includes analysis of two hypothetical spill sizes at the proposed Facility:

See Sections 4.7.1 and 4.7.2 for facility-specific safety standards.

See Sections 4.7.4 through 4.7.6 for full descriptions of impacts from a potential spill at the proposed Facility.

- **Small to medium crude oil spill (Section 4.7.4.1)**. An onsite spill of 250 bbl (storage tank overflow) to 700 bbl (contents of one railcar). The release is assumed to be contained within secondary containment on land and by booms in water. Facility staff would be considered the first responders, and would be expected to be able to handle such a spill without assistance. Should the spill reach the Columbia River outside of containment booms, it could spread up to 1 river mile and affect many environmental resources in and near the river. Staff, training, and equipment for both upland and aquatic spills would be provided by and stationed at the facility.
- **Large to very large crude oil spill (Section 4.7.4.1)**. A 5,505 bbl release (entire contents of the marine transfer pipeline) reaching the Columbia River. A spill reaching the Columbia River would have more substantial impacts and the oil would be much more difficult to remove. Facility staff would be considered the first responders, but such a spill would also require a response from local, state and/or federal entities. A large spill, as well as the activities during the related response effort, would affect almost every environmental resource along the vessel corridor, as described in Section 4.7.4.
- **Fire and/or explosion (Section 4.7.5)**. The analysis in the EIS looked at small fire events (assumed to be controlled within the proposed Facility boundaries) and large fires and/or explosions not so easily controlled. The larger events could project debris or spread fire beyond the site boundaries, including to a small wooded area that would be vulnerable to fire (see Section 4.7.5 for impacts).

Concerns raised in the EIS about such a spill include a substantial lack of staff, training and resources at the local and district level (e.g., fire and rescue agencies) to respond to a spill. Also, the adjacent community (Fruit Valley) and the JWC dormitory may not have an evacuation plan in case of an emergency such as an oil spill or fire/explosion at the facility.

Mitigation

Commitments made by the Applicant for the proposed Facility's safety features and plans are important and considered to be part of the proposal. (See Section 4.7.2). EFSEC identified further prevention and response measures to mitigate risk and to reduce the consequences from an accidental crude oil spill, fire, and/or explosion at the proposed Facility. All measures identified are those that EFSEC could impose on the Applicant; none were identified that could be implemented or required by other parties. The measures are presented in order of effectiveness: (1) prevention measures and (2) response preparedness measures.

See Section 4.7.2 for facility-specific accident prevention and response plans.

See Chapter 2 for details on each facility element's safety features.

See Section 4.7.7 for complete mitigation measure language.

Prevention Measures

- Install backup auxiliary power generators that would be sufficient to operate key proposed Facility safety elements (e.g., automatic pipeline shutoff valves) in the event of a power outage.

- Provide secondary containment for certain sections of the aboveground crude oil transfer piping at the proposed Facility to prevent spills from reaching the environment. Secondary containment in the form of dikes, berms, earth embankments, and concrete containment walls are usually used for storage tanks, but may be used for certain sections of piping in some circumstances.
- Implement mitigation measures as discussed in Section 3.1.5 to confirm that the dock structure is designed to withstand slope instability that could be triggered by a seismic event.

Response Preparedness Measures

- Coordinate with the City of Vancouver and VFD (first responders) consistent with 4.5.3.2 and the recommendations in Appendix B.
- Coordinate regularly with the Fruit Valley neighborhood community to ensure adequate evacuation procedures are in place.
- Contribute to all updates of the Lower Columbia River GRP and other applicable Northwest GRPs for the lifetime of the proposed Facility to ensure plans address the types and volumes of crude oil stored or transferred at the proposed Facility.

Crude Oil Spills along the Rail Corridor

Impacts

Spills along the rail corridor could occur during a derailment or other accident. Chapter 4 of the EIS includes analysis of two hypothetical spill sizes along the rail corridor, as well as fires or explosions associated with the potential spills:

See Section 4.8.1, 4.8.2 for rail-specific safety standards and response framework.

See 4.8.4 through 4.8.6 for full descriptions of impacts to each resource from a potential spill or related fire/explosion along the rail corridor.

See Section 4.8.7 for complete mitigation measure language.

- **Small to medium crude oil spill (Section 4.8.4.1)**. A spill of 100 bbl (1 percent of the contents of 1 railcar) to 700 bbl (contents of 1 railcar). The potentially affected area is assumed to be the entire rail corridor study area (0.5 mile on each side of the rail line) and a spill slick of crude oil on the Columbia River is assumed to spread 1 river mile.
- **Large to very large crude oil spill (Section 4.8.4.2)**. A 2,200 bbl release (entire contents of 3 railcars) to 22,830 bbl (entire contents of approximately 35 railcars). The area of potential impacts is based on the results of modeled spill trajectories from the three-dimensional SIMAP™ modeling.
- **Fire and/or explosion (Section 4.8.5)**. An oil spill from a train derailment could also lead to a fire or an explosion. The EIS analysis examined hypothetical small fire events (from accidents involving one railcar, in which the fire could be controlled within the immediate area) and larger fires and/or explosions (from accidents involving multiple railcars, with debris and fire that spread beyond the immediate area if not contained; see Section 4.7.5).

A majority of the modeled spill scenarios reached lakes or rivers, including the Columbia River, and a small portion of the modeled Bakken crude oil spills reached the Pacific Ocean. GRPs along the rail corridor do not currently cover certain Water Resource Inventory Areas (WRIAs) that were modeled to be at risk of being affected by a Project-related spill, including the Palouse, Lower Crab, and Esquatzel Coulee watersheds. Crude oil unit trains currently use this rail corridor, so this is an existing gap in preparedness; however, the unit trains destined for the proposed Facility would increase the risk of a spill over current risk levels (see Section 4.8.3).

Mitigation

Commitments made by the Applicant are important and considered to be part of the proposal so are not discussed as mitigation here. The transporting company (e.g., BNSF) is primarily responsible for the required prevention and response measures governed by federal law. EFSEC identified the following additional measures to mitigate risk and to address the impacts from a crude oil spill, fire, and/or explosion along the rail corridor:

See Section 4.8.2 for rail-specific accident prevention and response plans.

See Section 4.8.7 for complete mitigation measure language.

Prevention Measures. No mitigation was identified that could be imposed by EFSEC on the Applicant or implemented or required by other parties to prevent an accidental crude oil spill, fire, or explosion along the rail corridor.

Response Preparedness Measures. No measures were identified to mitigate the impacts of a crude oil spill, fire or explosion that could be implemented or required by other parties. EFSEC did identify mitigation that EFSEC could impose upon the Applicant to address the impacts:

- Sponsor three initial emergency response training exercises in Vancouver, Spokane, and the Columbia River Gorge, and fund regular emergency response training so that the training is maintained throughout the life of the proposed Project and coordinated with the training and drills required by Ecology WAC 173-186.
- Provide training for full-time and voluntary first responders who would respond to an incident along the rail delivery route corridor in the appropriate methods for combating crude oil spills with the risk of fire and explosions, such as the trainings described in Section 4.5.5.5.
- Coordinate with potentially affected first responder agencies, and contribute support to implement a plan for training responders and purchasing response equipment.
- Coordinate with Ecology to update the Lower Columbia River Geographic Response Plan (GRP) to identify response strategies and capabilities associated with a release from the proposed Facility, including response strategies for environmentally sensitive areas on the Lower Columbia River along the rail corridor.
- Communicate with local emergency planning committees (LEPCs) along the rail corridor and in the Project vicinity to determine or update the following information: LEPC contact information, county/cities included in the LEPC plans, date of last plan update, regularity of meetings, status of LEPC funding and emergency response training, and components of LEPC emergency plans.
- Coordinate with the State Fire Defense Committee to update the Washington State Fire Services Resource Mobilization Plan to ensure that the plan can facilitate adequate mobilization of response equipment and response crews trained to address crude oil spill, fire, and/or explosion incidents anywhere along the rail and vessel corridors and at the proposed Facility.
- Coordinate with transporters of crude oil (BNSF), the State Fire Defense Committee, LEPCs, and local emergency responders along the rail corridor to support the development of specific evacuation plans for each residential community of greater than 50 residents within 0.25 mile of the rail route and for each residential community within 1 mile of the proposed Project at the Port.

Crude Oil Spills along the Vessel Corridor

Impacts

Spills along the vessel corridor could occur during a collision between vessels or a grounding incident. Chapter 4 of the EIS includes analysis of two hypothetical spill sizes along the vessel corridor, as well as fires or explosions associated with the potential spills:

- **Small to medium crude oil spill (Section 4.9.4.1)**. A spill of 50 bbl to 2,500 bbl that is assumed to be largely contained within booms, although some oil could escape containment and as a result a spill slick of crude oil on the Columbia River is assumed to spread up to 2 river miles.

  Impacts could include contamination and/or oiling of shoreline sediments, shoreline vegetation, and wildlife; disturbance of shoreline habitats, including estuaries, during cleanup efforts; closures or delays along the river affecting other transportation, tribal treaty fishing, and recreation in the area. Such a spill could require local and regional first responders to assist in containment and clean-up.

See Sections 4.9.1 and 4.9.2 for vessel-specific safety standards and response framework.

See Sections 4.9.4 through 4.9.6 for full descriptions of impacts to each resource from a potential spill or related fire/explosion along the rail corridor.

See Section 4.9.7 for complete mitigation measure language.

- **Large to very large crude oil spill (Section 4.9.4.2)**. The effective worst-case discharge (WCD) from a Handymax vessel, 89,554 bbl (Bakken crude oil) to 87,403 bbl (dilbit). The area of potential impacts is based on the results of modeled spill trajectories from the three-dimensional SIMAP™ modeling (see Section 4.9.4.1 and Appendix F).

  The SIMAP model estimated that worst case scenarios of oil would travel as far as 53 miles downstream from the spill location, varying with season, oil type and tides. In the modeled Bakken crude oil spills, a substantial portion of the oil is predicted to evaporate within 1 day, and most of the remaining oil is stranded on shorelines by the third day (varying by season). In the modeled dilbit oil spills, evaporation was not predicted to occur as quickly as the lighter Bakken crude oil, and a substantially larger portion is predicted to strand on shorelines within 1 day (in spring and summer some of the oil would remain afloat in the river over the 7 days modeled).

  A worst-case discharge of oil would likely have all of the effects of a small to medium spill, but over a greater area and at greater magnitude of effect. A large spill, as well as the activities during the related response effort, would affect almost every environmental resource along the vessel corridor, as described in Section 4.9.4.

- **Fire and/or explosion (Section 4.9.5)**. A small fire could be quickly controlled; this event would affect the immediate area surrounding the vessel. Potential impacts include firefighting foam entering the water, danger to onboard workers or responders, or damage to property or nearby shoreline habitat (if the event occurs near shore). No outside responders would be required. A larger spill-related fire may not be easily controlled. Potential impacts include firefighting foam entering the water, danger to onboard workers or responders, physical damage to property or nearby shoreline habitat (if the event occurs near shore), localized decreases in air quality, and possible delays to other along the vessel corridor during the response.

Mitigation

Commitments made by the Applicant are important and considered to be part of the proposal so are not discussed as mitigation here. The following additional prevention and response measures to mitigate risk have been identified to address the impacts from a crude oil spill, fire and/or explosion along the vessel corridor. The measures are presented in order of effectiveness (1) prevention measures and (2) response preparedness measures.

Prevention Measures. EFSEC has not identified mitigation measures to prevent an accidental crude oil spill, fire, or explosion that could be implemented or required by other parties. EFSEC has identified mitigation that EFSEC could impose upon the Applicant:

- Coordinate with the USCG, Lower Columbia River Harbor Safety Committee, Ecology, Oregon Department of Environmental Quality (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.

Response Preparedness Measures. EFSEC has not identified response measures that could be implemented or required by other parties. EFSEC has identified mitigation that EFSEC could impose upon the Applicant to address impacts from a crude oil spill, fire, or explosion in the vessel corridor:

- Provide training for full-time and voluntary first responders who would respond to an incident along the outbound vessel corridor in the appropriate methods for combating crude oil fires with the risk of fire and explosions, such as the trainings described in Section 4.5.5.5.
- With Ecology, ODEQ and others develop response strategies for environmentally sensitive areas within the state on the Lower Columbia River and along the rail corridor for inclusion in the Lower Columbia River GRP and reference in the Applicant's OSCP.
- Coordinate with Ecology and vessel operators to revise Project-related vessel operation requirements based on the findings of Ecology's upcoming Columbia River vessel traffic safety assessment, required by ESHB 1449, as appropriate.

A crude oil spill, fire, and/or explosion could result in significant adverse impacts, depending on the size, location, and extent (e.g., duration or intensity) of the incident. Some of the measures identified in this chapter to mitigate risk are intended to reduce the likelihood of a spill (and/or a spill-related fire or explosion), because prevention is the best form of mitigation. Some or all of the other mitigation measures, if implemented, are intended to reduce the extent of significant adverse impacts should a crude oil spill, fire, and/or explosion occur. However, the potential for unanticipated events resulting from factors occurring alone or in combination, cannot be totally eliminated.

ES-7 ISSUES TO BE RESOLVED

This Final EIS analyzes a wide range of issues associated with the Proposed Action identified during scoping and during the Draft EIS comment period. Some of these issues require further consideration by the Applicant and decision makers, or require information that was not available prior to publication of the Final EIS (e.g., 100 percent design), but is not necessary for identifying significant adverse environmental impacts, mitigation for those impacts, and for comparing alternatives as required by SEPA.

- **Final Design and Plans including mitigation plans**. The proposal is currently at about 65% design. A number of required plans are either in draft form or not yet in draft form. If the proposal were approved, final plans would be developed along with the final design as each have an effect on the contents of the other. The proposal analyzed in the Final EIS, and any conditions included in the approval, would direct the development of final plans and final design prior to construction.
- **Volume of crude oil carried by vessels**. Although the proposal requests the ability to use ships large enough to transport an average of 360,000 barrels a day, there is a current planning standard which limits crude oil volumes on ships traveling in the Lower Columbia River. No ship is allowed to carry more than approximately 300,000 barrels of oil. This volume limitation may be changed by Ecology in the future. However, until a change occurs and the maximum allowed volume increases, vessels would still be limited to no more than 300,000 and the facility would not operate at the proposed capacity in the application; or the average number of vessels/day could be more than one unless specifically limited in an approval (e.g., eight vessels per week; see Chapter 2.7 for additional discussion).

In the event that the ASC is denied, these issues would not require resolution.

ES-8 DECISIONS TO BE MADE

EFSEC will use this Final EIS along with other sources of information to inform its decision on whether to recommend approval or denial of the proposed Project to the governor. The Final EIS will inform the governor's ultimate decision. If EFSEC determines the Project should be recommended for approval, it will develop a recommendation report and a draft Site Certification Agreement (SCA) to be signed by the governor. The SCA would contain all requirements and any other conditions the Applicant must meet for construction and operation throughout the Project's life, and for eventual decommissioning of the Facility. If EFSEC determines the Project should not be recommended to the governor for approval, the recommendation will explain EFSEC's decision.

The governor has 60 days to consider EFSEC's recommendation and can take one of the following actions:

1. Approve EFSEC's recommendation to approve the application and execute the draft SCA.
2. Approve EFSEC's recommendation to deny the application and reject the application.
3. Direct EFSEC to reconsider certain aspects of the Project and draft SCA.

ES-9 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:

Sonia Bumpus, EFSEC Siting and Compliance Manager
Energy Facility Site Evaluation Council
1300 S Evergreen Park Dr. SW
PO Box 43172
Olympia, WA 98504-3172
(360) 664-1363
sbumpus@utc.wa.gov

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