



DEPARTMENT OF  
**ECOLOGY**  
State of Washington

**Washington State**

**Marine & Rail Oil Transportation Study**

**Preliminary Findings & Recommendations**

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## Washington State

### Marine & Rail Oil Transportation Study

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Preliminary Findings & Recommendations

by

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# Executive Summary

In April 2014, the Washington State Legislature directed and funded the Department of Ecology (Ecology), in consultation with the Utilities and Transportation Commission (UTC), Washington Military Department's Emergency Management Division (EMD), the Federal Railroad Administration (FRA), and the Department of Transportation (WSDOT), to conduct a study on marine and rail oil transportation.

In June 2014, Governor Inslee issued an Oil Transport Directive to Ecology to act more swiftly to assess the safety of oil transportation in Washington and to provide recommendations sooner.

The Legislature's and the Governor's action is driven by the rapid changes in how crude oil is moving through rail corridors and over Washington waters, creating new safety and environmental risks. With this in mind, this study has focused on developing recommendations to foster public health and safety, environmental protection, and respect for tribal treaty rights.

The 2014 Washington Marine and Rail Oil Transportation Study is being designed to analyze existing information to determine the best way forward for legislative, regulatory, and budgetary actions that will maximize protection of public safety and the protection of the environment, Tribal Treaty rights, and the State's natural and economic resources, given a continuously changing future pattern of crude oil transport. The Study will identify gaps in information and recommends future analyses to fill those gaps in understanding to better serve the citizens of Washington.

This initial report includes the preliminary findings and recommendations for the Marine and Rail Oil Transportation Study as directed by the Legislature's Budget Proviso (ESSB 6002)<sup>1</sup> and Governor's Directive 14-06<sup>2</sup> (June 11, 2014). The comments received during this process were considered in developing recommendations. A full draft Legislative report will follow on December 1, 2014. A final report is due to the Legislature on March 1, 2015.

Throughout this study process, Ecology will continue hosting workshops, government-to-government meetings with interested tribes and tribal organizations, and public meetings to gather input on the vital issues addressed in this study.

Information on the day-to-day workings of this study can be found on the Ecology website at: (<http://www.ecy.wa.gov/programs/spills/OilMovement/2014MRstudy.html>).

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<sup>1</sup> <http://leap.leg.wa.gov/leap/budget/lbns/2014Omni6002-S.SL.pdf> section 302. (See also Appendix A.)

<sup>2</sup> [http://governor.wa.gov/office/directives/2014/dir\\_14-06.pdf](http://governor.wa.gov/office/directives/2014/dir_14-06.pdf). (See also Appendix A.)

## Washington State's Rapidly Changing Oil Transportation System

Over the last decade and even more so over the last three years, there have been significant changes in the mode of crude oil transportation into the state of Washington. While in the past, 90% of the crude oil for Washington's refineries came by tanker from Alaska and other sources, there is an increasing shift towards other modes of transportation, including by rail and to pipeline. Crude by rail transportation has increased dramatically in the last three years, reflecting the unprecedented trend across the nation and neighboring Canada.

There are particular concerns about the types of oil being transported – Bakken crude – due to its potential volatility and public safety hazards. These hazards came to light in a tragic rail incident in Quebec in which 47 people lost their lives as crude by rail tank cars derailed and burned.

There is also a trend towards more transportation by rail and vessel of diluted bitumen in its various forms. This oil raises particular concern with respect to potential spill impacts and response issues related to its potential propensity to submerge or sink. This oil also has a relatively high content of toxic poly-nuclear aromatic hydrocarbons (PAHs).

A full list of recommendations to date is discussed in detail in this preliminary report. What follows is a shorter list of key legislative or budget recommendations. The recommendations are prioritized based on additional protection provided by the measures; the technological achievability of the measures; and the cost of the measures. Where possible it is noted which actions can be accomplished within current resources and which will require additional funding (with an estimated cost or range of costs)<sup>3</sup>.

## Key Recommendations to the Washington State Legislature for the 2015-17 Biennium

### **Governor Directive Results:**

1. Consider funding options to adequately fund Washington's Spill Prevention, Preparedness, and Response Program.
2. Modify the railroad regulatory fee structure. It should allow the UTC to fund additional inspector positions, including FRA-certified inspectors with increased pay that is competitive with comparable private sector and federal inspectors. As part of this, the certified inspectors

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<sup>3</sup> Numbers are rounded to the thousands per biennium. FTEs are biennialized. These are the agency's best estimates at this time. These numbers will be refined as we move through the budget process.

will increase inspections in the areas of track, hazardous materials, operating practices, motive power and equipment, and crossing signals (8 FTEs, \$2.5 million).

### **Study Proviso Results:**

3. Amend statutory authority to allow UTC inspectors to enter a private shipper's property to conduct hazardous material inspections related to rail operations. This proposal can be performed within current resources.
4. Ensure permanent ongoing funding for three Ecology planners. This would allow Ecology to develop new and maintain existing geographic response plans for inland and marine areas at risk from oil spills. (3.5 FTEs, \$777,000).
5. Ensure permanent funding for assessing oil transportation risks. This would keep us informed on public health and safety, and environmental protection matters and impacts due to the changing energy picture over time. Additional funding is needed to support the expansion of Vessel Traffic Risk Assessment studies to Grays Harbor, the Columbia River, the outer coast, and changes in Puget Sound; and the development of a Rail Traffic Risk Assessment model to analyze changes to the rail transportation system. (2.3 FTEs for risk assessments \$577,000; and \$300,000 for the VTRA and RTRA studies). Ecology and other agencies need to complete and maintain a Marine and Rail Oil Transportation Study to incorporate the changes that will occur with respect to the energy picture in the nation, the region, and in Washington State (\$200,000).
6. Enhance and provide for a continuous supply of oil spill response equipment and local first responder firefighting equipment. Ecology should develop a grant program for firefighting equipment, working with local responders to develop rules for the administration of the program. On-going funding and staffing should be provided to administer the program, maintain existing equipment and provide periodic training to first responders. (4.6 FTEs, \$4.6 million).
7. Mandate the State Emergency Response Commission modify regulatory authority requiring Local Emergency Planning Committees to submit hazardous materials plans and updates on a four-year cycle basis for compliance reviews. Plan updates will address new hazards not covered in previous plan (10 FTEs, \$1.8 million).
8. Amend statutory authority to allow designated 'first-class cities' to opt-in to the UTC's railroad crossing inspection and enforcement program. The Legislature should also give the UTC jurisdiction to require first class cities inform the UTC when crossings are opened or closed. This proposal can be performed within current resources.
9. Provide funding for the UTC to conduct railroad and road authority diagnostic reviews of high-risk crossings. Amend the statute and provide funding to give UTC jurisdiction over private road crossings on the primary railroad routes including those over which crude oil are transported. This would allow the UTC to establish minimum safety standards, including appropriate safety signage. (2 of the 8 FTEs described in Recommendation Number 2, along with the increase in regulatory fees discussed above).

10. Modify the definition of ‘facility’ in statute to include moving trains carrying oil as cargo. Direct Ecology to develop regulations requiring rail oil spill contingency plans and participation in drills. (1.8 FTEs, \$473,000). Other related legislative amendments include modifying the statute to require railroads to submit advance notice to the state identifying the volume and characteristics of oil being transferred at facilities (this proposal can be performed within current resources); to extend the concept of Best Achievable Protection as a regulatory standard to all facilities handling oil (this proposal can be performed within current resources); and to modify the definition of oil and ensure it captures all types of oil (this proposal can be performed within current resources).
11. Modify statutory authority to extend financial responsibility requirements to rail and mobile facilities, and enable Ecology to modify the regulations on financial responsibility requirements. Issuing Certificates of Financial Responsibility ensure that those transporting oil can pay for cleanup costs and damages resulting from oil spills (8.1 FTEs, \$1.9 million).
12. Direct Ecology and state fire marshal’s office to analyze the continued need for hazardous materials response teams, their composition, how they should be equipped and trained, where they should be located, funding mechanisms, and how they will mutually assist statewide. Part of this analysis should include development of a startup and recurring cost estimates for such teams. (\$300,000).

# The Changing Oil Transportation Picture

## National Changes in Oil Transportation

Over the last decade, there has been an unprecedented boom in crude oil extraction in North America due primarily to the extraction of shale oil in Texas, and from the Bakken formation in North Dakota and Montana, and Manitoba and Saskatchewan across the border in Canada. North Dakota crude extraction increased more than 11 times between 2003 and 2013 – from 3.4 million gallons per day to 37.8 million gallons daily.<sup>4</sup>

During this same time period, production of oil sands oil, which is converted to diluted bitumen (sometimes referred to as “dilbit”) from Alberta and Saskatchewan, Canada, has increased 2.5 times, from 36.2 million gallons per day to 73.5 million gallons per day.<sup>5</sup> With new technologies for extracting shale oil, additional crude oil extraction is occurring or being planned or evaluated in Utah, Colorado, Wyoming, Arizona, New Mexico, Pennsylvania, and New York.

This increased production of Bakken and oil sands oil (which is converted to diluted bitumen) has led to increased shipments of these oils to refineries in Washington State, as well as to refineries in California, Illinois, Texas, Louisiana, and New Jersey.

This rapid increase in production has strained the capacity of existing oil pipeline infrastructure. Much of the oil is transported by rail containing exclusively oil tank cars (called “unit trains”)<sup>6</sup>. In 2013, nationally over 12.7 billion gallons were transported by rail (Figure 1). By the end of 2014, 650,000 carloads carrying 19.5 billion gallons of crude oil are expected.<sup>7</sup>

On a national level, the number of carloads of crude oil-containing rail tank cars has increased nearly 44 times in the last six years – from 9,500 carloads in 2008 to 415,000 carloads in 2013.<sup>8</sup>

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<sup>4</sup> Energy Information Administration [http://www.eia.gov/dnav/pet/pet\\_crd\\_crpdn\\_adc\\_mbb1\\_a.htm](http://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbb1_a.htm)

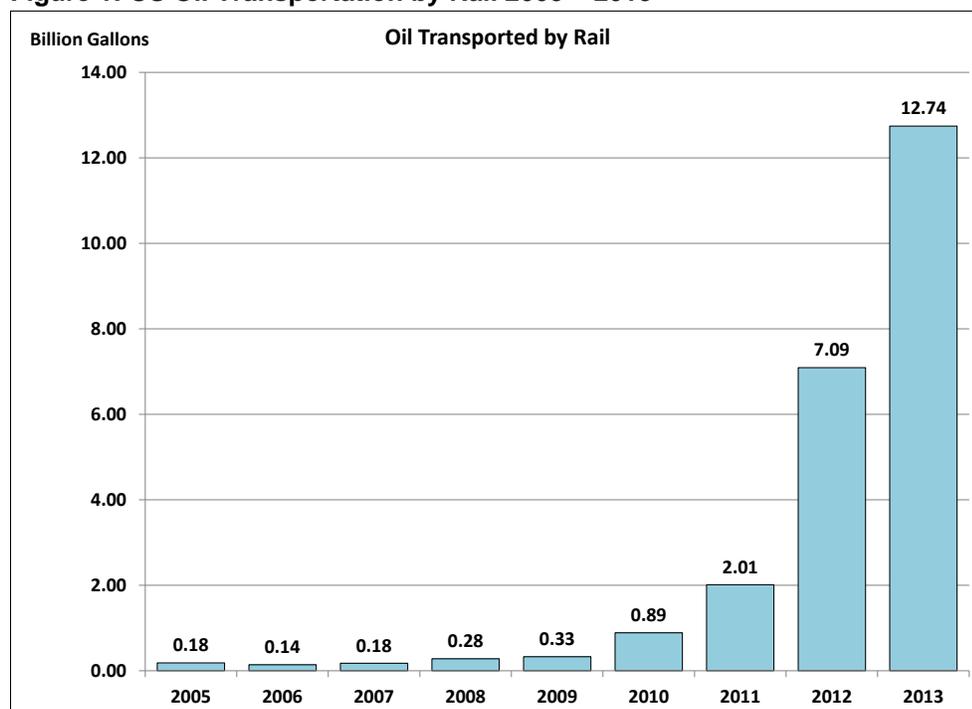
<sup>5</sup> Statistical Handbook for Canada’s Upstream Petroleum Industry, Canadian Association of Petroleum Producers, [www.capp.ca/GetDoc.aspx?DocId=241200&DT=NTV](http://www.capp.ca/GetDoc.aspx?DocId=241200&DT=NTV).

<sup>6</sup> The term “unit trains” can also be used for other single-commodity freight trains.

<sup>7</sup> Hamberger, E.R., and A.J. Black. 2013. Freight rail and pipelines deliver energy for America. The Hill, Congress Blog 11/5/2013. <http://thehill.com/blogs/congress-blog/energy-environment/189187-freight-railand-pipelines-deliver-energy-for-america>.

<sup>8</sup> Source: Association of American Railroads.

**Figure 1: US Oil Transportation by Rail 2005 – 2013<sup>9</sup>**



## Changes in Crude Oil Types Transported by Rail

There are a variety of new types of crude oil being transported by rail in the United States. Bakken crude originating from shale formations in North Dakota and surrounding states, and diluted bitumen from “oil sands oil,” originating from Alberta, Canada, are examples of different oils being transported, summarized in Table 1.

Property	Diluted Bitumen	Bakken Crude
Origin	Alberta, Canada (“oil sands”)	North Dakota, Montana; and Saskatchewan, Manitoba, Canada
Density	Some portions relatively heavy <sup>11</sup>	Relatively lighter or medium <sup>12</sup>
Flammability/Volatility	Higher, though dependent on diluent <sup>13</sup>	Relatively higher than other crudes
Persistence	Relatively higher than other	Relatively lower than other crudes

<sup>9</sup> Based on data from the Association of American Railroads 2013.

<sup>10</sup> Properties relative to other types of crude oil, such as West Texas Intermediate crude which is used as a standard.

<sup>11</sup> Compared with West Texas Intermediate. Diluted bitumen has specific gravity of 0.925 (API° 21.5).

<sup>12</sup> Compared with West Texas Intermediate. Bakken crude has specific gravity of 0.845 – 0.806 (API° 36 – 44).

<sup>13</sup> The commonly used diluent, condensate, has a higher volatility.

	crudes	
Toxicity	Variable depending on diluent	Relatively higher (for crude oils)
Behavior in Water	May break down and submerge or sink, especially in contact with sediment in turbulent waters.	Dissolves, evaporates

Diluted bitumen has been transported into the U.S. including Washington State, mainly via pipeline, for some time. The transportation by rail is relatively new. Diluted bitumen is created from “oil sands oil,” which is similar to asphalt. A “diluent,” most commonly natural gas condensate, is added to reduce the viscosity of bitumen to create a fluid suitable for transportation and pipelines. Different formulations of diluents are used at different times of year, depending on temperature and availability.

The concern about diluted bitumen is that it can become submerged below the water surface or sink to the bottom when spilled into water, especially if there is a great deal of sediment and turbulence in the water, as in a fast-moving stream. This sinking behavior was observed during the response to the July 2010 pipeline spill of over 843,000 gallons of diluted bitumen into the Kalamazoo River in Marshall, Michigan. This creates challenges for spill response and may cause environmental impacts, particularly to fisheries, due to the oil’s persistence in sediments and other parts of the environment. Although much less frequent, heated bitumen<sup>14</sup> without diluent, can be transported by rail tank car.

For Bakken crude, the greatest concern is about the potential volatility or flammability of the oil, as well as the higher potential for groundwater intrusion due to its solubility. These properties create the potential for a greater safety and health risk. While the properties of Bakken crude are contested, a recent report from the Transportation Safety Board of Canada<sup>15</sup> shows that this crude oil produces flammable vapors at temperatures as low as -31°F, which is not much different than gasoline.

## Changes in Oil Transportation in Washington State

Since the capacity of Washington’s refineries has not substantially changed over the last decade, the amount of crude transported into the state has been fairly steady at about 8.5 billion gallons annually. But there has been a shift from import of crude oil by tanker from other locations,

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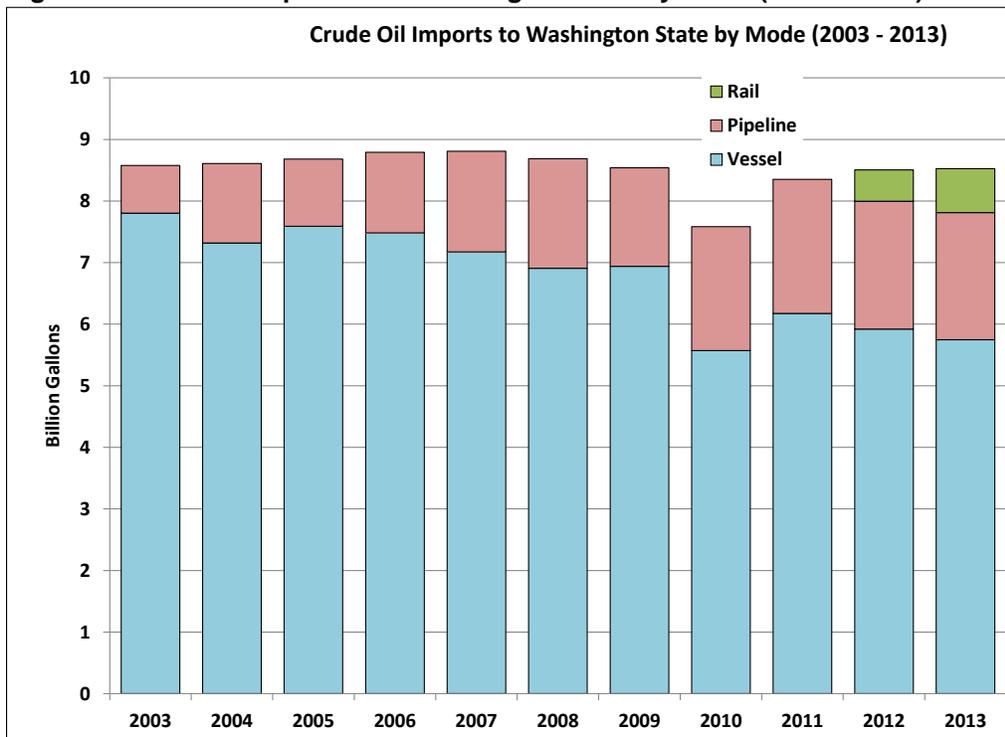
<sup>14</sup> Bitumen needs to be heated so that it can flow during transfers into and out of the rail tank cars and at facilities.

<sup>15</sup> Transportation Safety Board of Canada. 2014. Runaway and Main-Track Derailment: Montreal, Maine & Atlantic Railway Freight Train MMA-002 Mile 0.23, Sherbrooke Subdivision, Lac-Mégantic, Quebec, 6 July 2013. Transportation Safety Board of Canada Railway Investigation Report R13D0054. 191 p.

primarily Alaska,<sup>16</sup> to increased transportation by pipeline, and more recently by rail tank car. Washington State crude oil imports over the last decade by vessel, pipeline, and, more recently, by rail, are shown in Figure 2.

As shown in Figure 3 and Figure 4, there has been a shift in the transportation mode away from vessels to pipelines and rail. While the total volume of imports has not changed significantly during this time period, there may be significant changes in the future. A more detailed breakdown of the types of crude oil being imported into the state for the last three years is shown in Figure 5. There has been a steady decline in Alaska North Slope (ANS) oil production and deliveries to Washington ports. Refinery needs have been fulfilled by imports of foreign oil to make up the ANS crude decline. Availability of crude oil by rail to these refineries is reducing the requirements to supplement ANS oil with foreign oil and perhaps displace ANS crude oil. In 2011, 1.6 billion gallons came into Washington refineries by tanker from overseas sources<sup>17</sup>. In 2013 this was reduced to less than 1.2 billion gallons.

**Figure 2: Crude Oil Imports into Washington State by Mode (2003 – 2013)<sup>18</sup>**

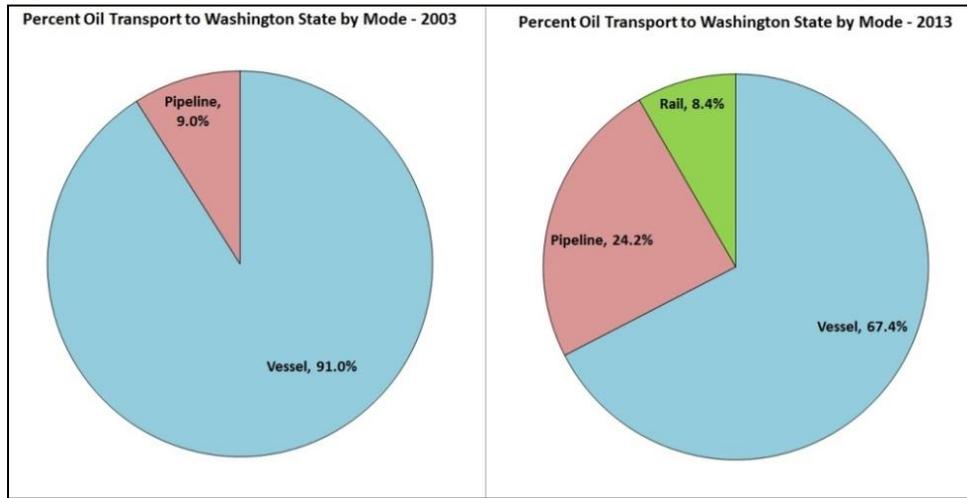


<sup>16</sup> In 2013, 70% of the crude imported into Washington by tank vessel was from Alaska, 20% from foreign sources (not Canada), 3% from Canada, and 6% tank barge and ATB carrying Bakken crude.

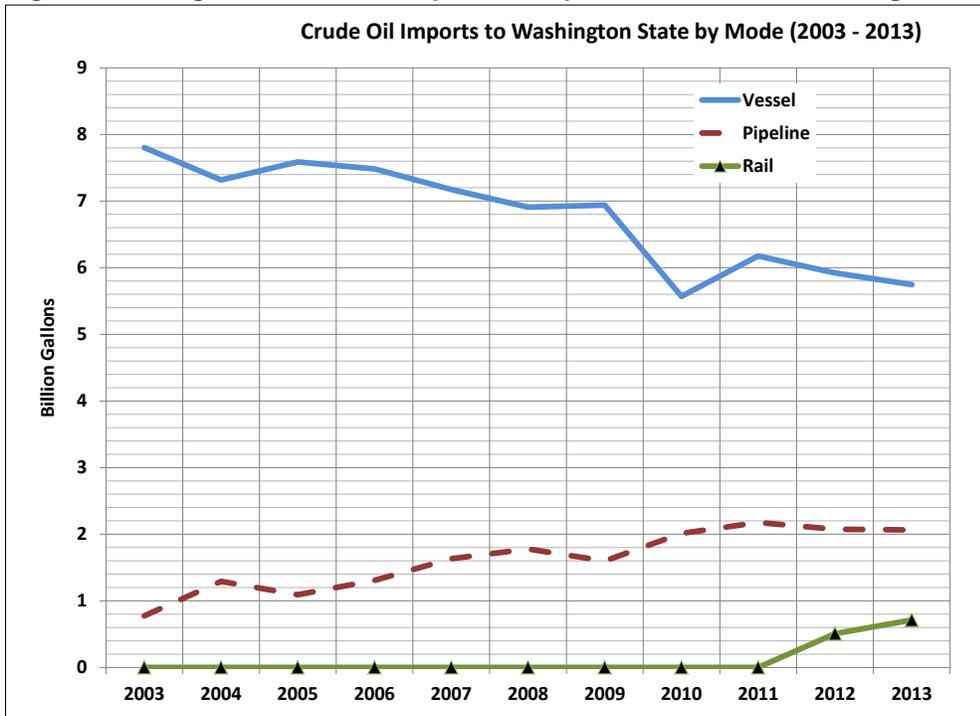
<sup>17</sup> Ecology. 2014. Analysis from Ecology’s Advance Notice of Transfer (ANT) System - 2011 Washington State Petroleum Imports and Exports.

<sup>18</sup> Data from Department of Ecology; based on shipping data from Washington State Petroleum Association for 2003-2007, and Advanced Notice of Transfer (ANT) data for 2008-2013. Pipeline data from Washington State Department of Commerce, as reported by TransMountain Pipeline. Rail data estimated based on refinery throughput data, ANT data, pipeline throughput for refineries, predicted volume transported by rail reported by refineries, and estimated increases in total crude transported through Washington.

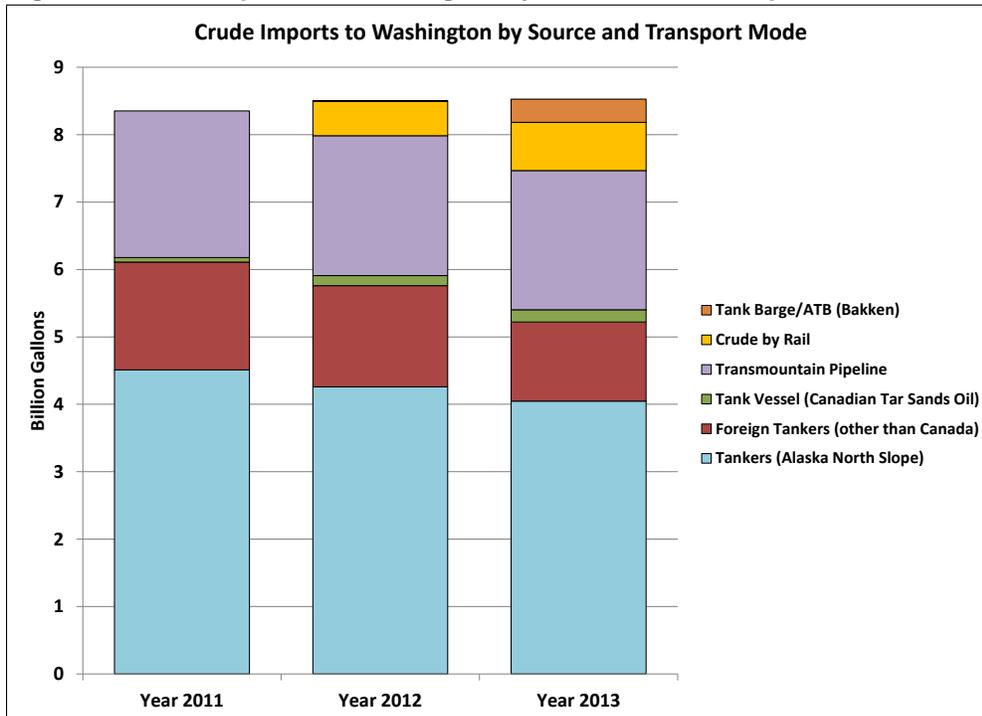
**Figure 3: Comparison between Oil Transportation Modes in Washington 2003 and 2013**



**Figure 4: Changes in Crude Oil Import Transportation Mode in Washington State 2003 – 2013**



**Figure 5: Crude Imports to Washington by Source and Transportation Mode for 2011 – 2013**



## Changing Oil Transportation Model for Washington State

The conceptual model of oil movement into and out of Washington State is shown in Figure 6. This includes current transportation and potential future transportation with the build-out of proposed facilities in Grays Harbor and the Lower Columbia River, as well as changes to Puget Sound facilities and refineries.

In the changing oil transportation model, diluted bitumen from Canada is continuing to be transported by pipeline (to refineries in northern Puget Sound), as in the past. Diluted bitumen and Bakken crude are being transported by rail coming through Spokane to facilities in the Columbia River and Puget Sound. Storage and transportation of diluted bitumen, Bakken crude, and other oils are proposed for facilities in the Columbia River and Grays Harbor. The bulk of crude by rail traffic is currently going through the Columbia River Gorge, but could transit over other rail routes.

Puget Sound refineries are continuing to transfer refined products to the Olympic Pipeline, to tankers, articulated tug-barges (ATBs) and trucks for export. Crude oil received at the proposed facilities in the Lower Columbia River will be exporting oil by tanker and ATB to Puget Sound and California. Currently there are two terminals on the Columbia River using ATBs to move crude to Puget Sound. There is a potential for this export to expand to international markets, if

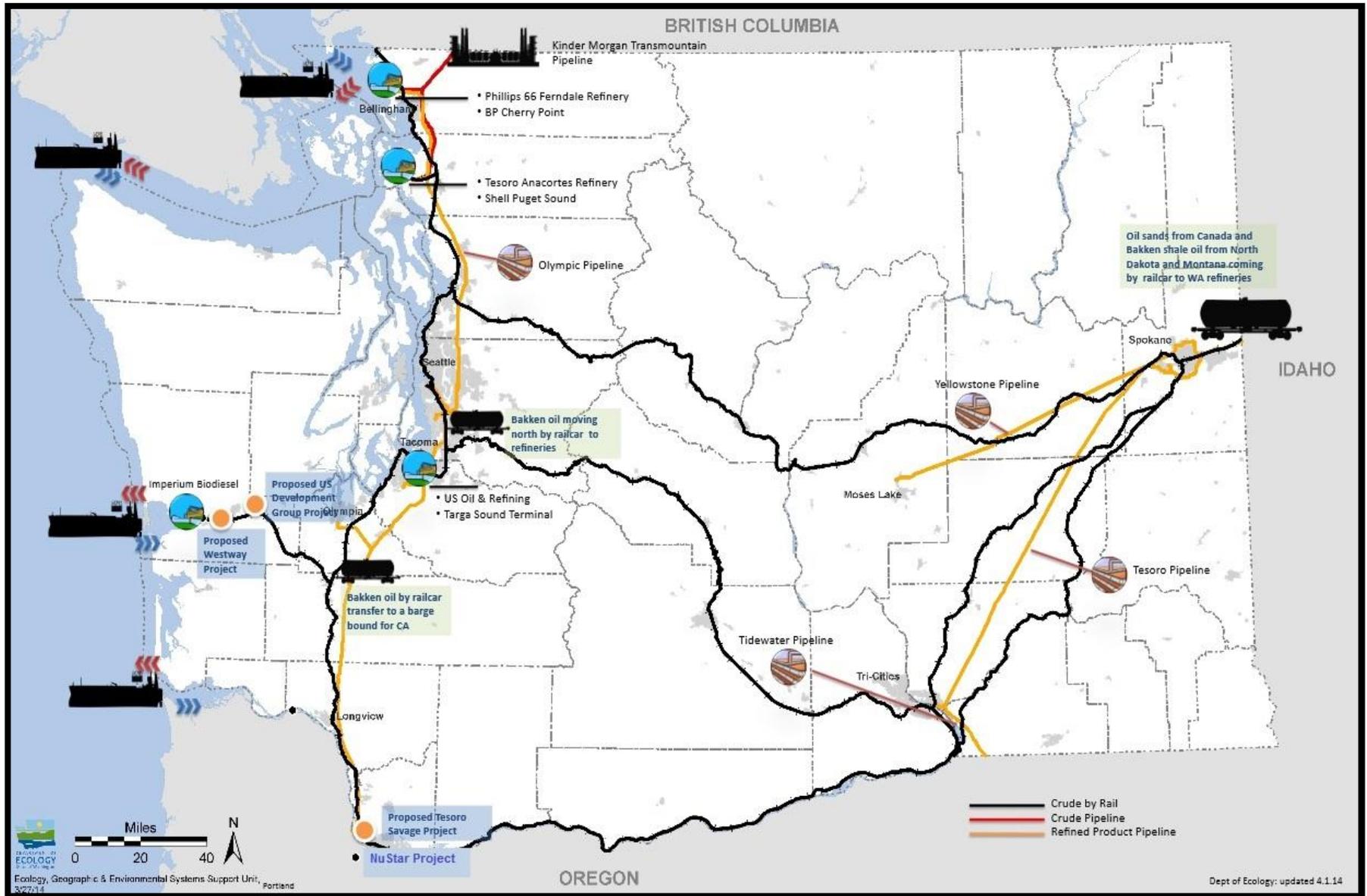
there is a lift on the federal ban of crude exports. The proposed facilities in Grays Harbor would transfer oils received by rail to tankers and ATBs. Bakken crude is expected to be transported to Puget Sound and California for refining. Diluted bitumen, refined oils, and even heated bitumen from Canada may be exported from Columbia River, Grays Harbor, or Puget Sound facilities since it would be non-US crude oil, and thus exempt from the federal ban on crude exports.

Operating Washington refineries and their status are shown in Figure 7. All refineries in Washington are in Puget Sound. They currently have a combined throughput capacity of 26.5 million gallons per day, but process on average about 24.3 million gallons daily. Three currently receive and refine crude by rail. Another will begin to receive crude by rail in late 2014. At present, there are no known plans to build any new refineries in Washington or Oregon. The existing refineries have stated that the crude delivered by rail would replace dwindling Alaska resources (and some foreign oil imports) and that there are no planned increases in throughput.

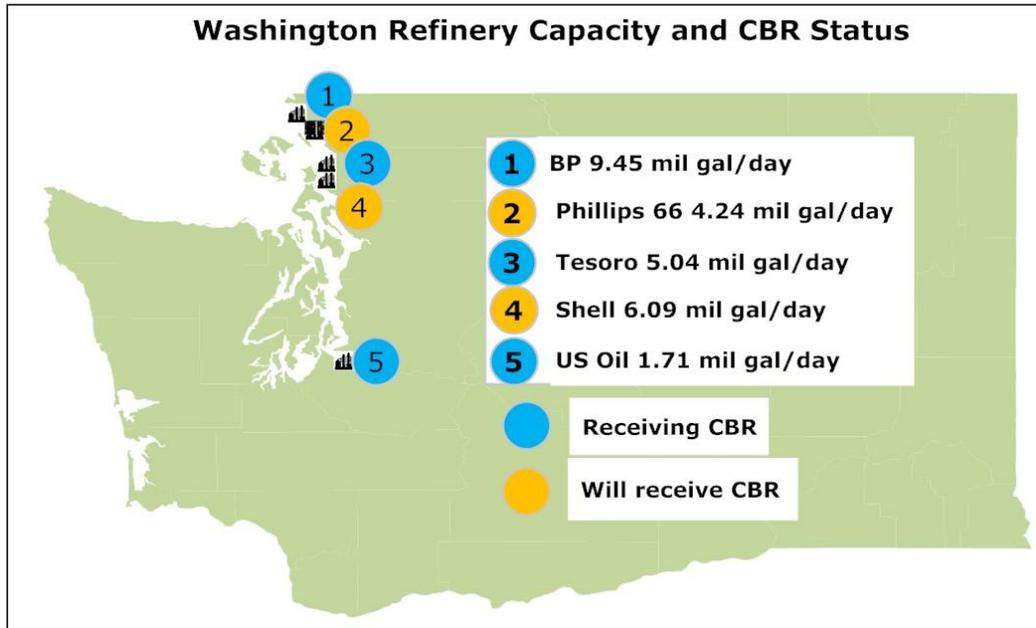
This trend is not necessarily certain to continue. Crude by rail must compete on a price basis with crude from other sources. Because transportation costs of crude by rail are relatively high, demand for crude oil by rail will be affected not just by availability, but also the price, including price of the transportation of the oil. Potential Alaskan oil expansion in the Outer Continental Shelf (OCS) and exploitation of North Slope shale gas fields may reduce the demand for crude by rail in the long term as prices compete. Potential export of crude or lightly refined products could change the model significantly. Export of US crude oil is generally prohibited under current federal restrictions.

The current crude by rail traffic is summarized in Figure 8. A total of 19 loaded unit trains pass through the state weekly. Some trains go south to Oregon and California facilities. Other trains carry smaller numbers of crude tank cars interspersed with other cargo; data on these tank car movements are unknown. This amounts to about 988 loaded trains annually. Each train holds about 2.9 million gallons of crude oil. An estimated 2.87 billion gallons of crude oil is now being transported by rail through Washington annually.

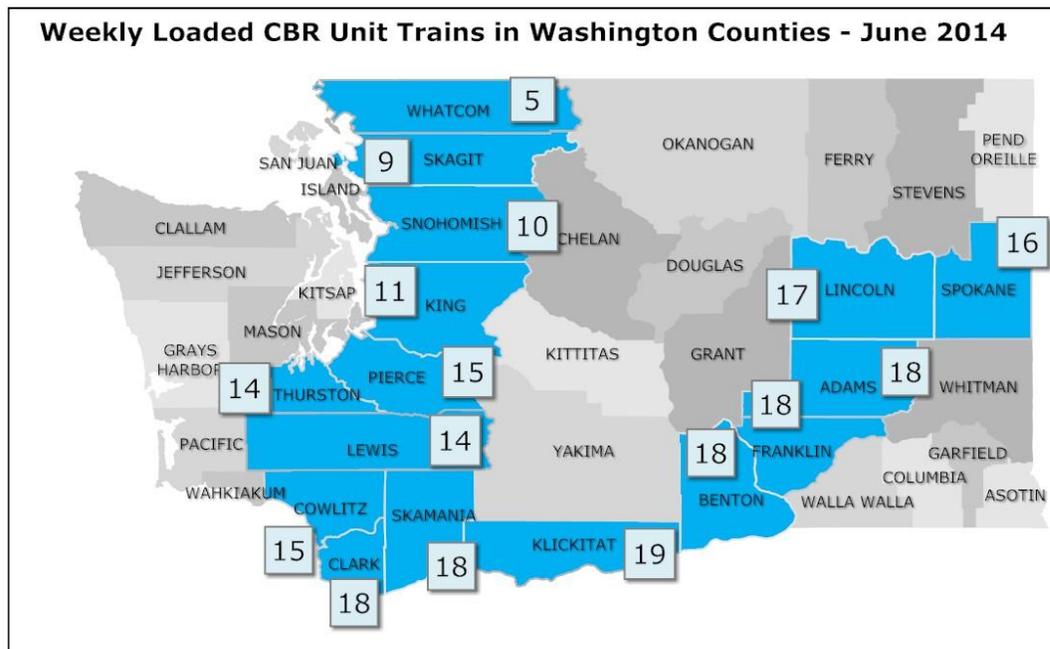
Figure 6: Conceptual Model of Potential Future Oil Movement into and out of Washington



**Figure 7: Oil Refineries in Washington State with Throughput Capacity and Crude by Rail Status**



**Figure 8: Weekly Loaded Crude by Rail Unit Train Traffic in Washington Counties in 2014<sup>19</sup>**



<sup>19</sup> Data for 25 June 2014 from US DOT Emergency Order WA Reports from Portland & Western Railroad, Union Pacific, BNSF, and Tacoma Rail. [www.emd.wa.gov/hazards/serc\\_railroads1.shtml](http://www.emd.wa.gov/hazards/serc_railroads1.shtml); [www.emd.wa.gov/hazards/serc\\_railroads1.shtml](http://www.emd.wa.gov/hazards/serc_railroads1.shtml); [www.emd.wa.gov/hazards/serc\\_railroads1.shtml](http://www.emd.wa.gov/hazards/serc_railroads1.shtml); [www.emd.wa.gov/hazards/serc\\_railroads1.shtml](http://www.emd.wa.gov/hazards/serc_railroads1.shtml). Note that this pattern will change in the future. These data do not include Stevens Pass and Stampede Pass which may be used in the future for loaded rail transportation, and are currently used for transit by unloaded (empty) trains. The maximum number is 19. Some of the trains from Spokane to

The potential future crude by rail traffic may increase to as much as three times this volume by 2020, and six times this volume, or 17 billion gallons, by 2035, depending on the full build-out of proposed facilities in Washington State and export to Oregon and California. This would mean about 113 trains weekly or 16.6 trains daily by 2035. This does not include the potential for export internationally if the federal ban on crude exporting is lifted. The status of operating and proposed facilities in Washington is summarized in

Figure 9: Proposed and Operating Crude by Rail Facilities in Washington

The proposed transportation of crude oil to refineries in Puget Sound would be for purposes of refining into various products that would then be transported via pipeline and/or by tanker and ATB. At their planned full operating capacity, these Puget Sound refineries' rail projects represent the equivalent annual import volume of over 120 fully laden 125,000 dead weight tonnage (DWT) tankers. This would not result in any net changes with regard to existing crude or refined tanker traffic unless:

- The rate of refining in Washington increases substantially.
- The US federal ban on international export of crude oil is lifted.
- The Bakken crude that goes through “stabilizing micro-refineries” and the micro-refined product is transported through the state for export.

There are no projected plans for expansion of refinery capacity at this time.

Currently, there are ATBs carrying crude by rail cargo from a terminal near Clatskanie, Oregon, out of the Columbia River north to Puget Sound via the outer coast, or south to California.<sup>20</sup> There is also some crude by rail being carried by barge traffic within Puget Sound. Diluted bitumen is currently moved by barge and tanker in Northern Puget Sound. The proposed crude by rail terminals will change the current traffic patterns by increasing movement of crude by rail from Lower Columbia River ports and creating crude by rail movement in Grays Harbor. The crude by rail loaded in the Columbia River and Grays Harbor is expected to be exported to California, and potentially, internationally should the federal crude export ban be lifted. Refined products may also be exported from Grays Harbor facilities. This shift in traffic patterns would result in new and additional tanker and ATB traffic in the Columbia River and Grays Harbor, the Salish Sea, as well as along the outer coast.

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Clark County were missed as they passed through each individual county. Some of the trains turn south to Oregon and California at this point.

<sup>20</sup> Kirby and Harley (OTB) traditional tow-wire barges are currently moving oil out of Clatskanie (Port Westward), bound for BP Cherry Point and Phillips 66.

With each crude oil unit train holding as much as 2.9 million gallons,<sup>21</sup> this translates to two to three trainloads per ATB or about 12 to 13 trainloads per Aframax tanker.<sup>22</sup> If the volume transported increases to 59 trains weekly, as estimated for 2020, there may be 28 ATBs or five tankers per week. With 113 trains weekly, as estimated for 2035, this would double again. These numbers could increase significantly with the lifting of the federal crude export ban.

There may be more train transportation than predicted if there are significant expansions of facilities in Oregon and/or California. Oil may then be transported through the state for export to these facilities in other states.

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<sup>21</sup> Each of the 100 tank cars in a crude by rail unit train holds about 30,000 gallons, regardless of the tank type.

<sup>22</sup> A tanker smaller than 120,000 deadweight tonnage.

Figure 9: Proposed and Operating Crude by Rail Facilities in Washington<sup>23</sup>



<sup>23</sup> BP Cherry Point has been in operation as a crude by rail facility since December 2013 with capacity of 3 million gal/day; Phillips 66 has a crude by rail facility (3.15 million gal/day) in construction; Tesoro Anacortes has been operating as a crude by rail facility since September 2012 with capacity of 3.15 million gal/day; Shell Anacortes has proposed expansion with 3.15 million gal/day capacity; US Oil has been operating as a crude by rail facility since April 2013 with construction for expansion (2.02 million gal/day); Targa Sound is in permitting phase for expansion to more offload stations (3.15 million gal/day); Imperium proposes to change existing facility with Environmental Impact Statement (EIS) due in early 2015 (3.15 million gal/day); Westway is proposed change to existing facility with EIS due in early 2015 (3.15 million gal/day); US Development is proposed new facility in discussion phase; NuStar is proposed change to existing facility, in permitting phase (1.72 million gal/day); Vancouver Energy (formerly called Tesoro Savage) is proposed new facility in EIS process (12.3 million gal/day).

## Summary of Major Changes for Washington in Crude by Rail Transportation

In the last decade, and particularly in the last three years, there have been significant changes in crude oil transportation in Washington State, which mirror changes occurring across the nation:

- There is an entirely new type of crude oil being transported by rail – Bakken crude. This oil may present significant risks with respect to public safety due to its higher volatility and flammability.
- There has been an unprecedented increase in the transportation of crude oil by rail from virtually none in 2011 to 714 million gallons in 2013. The amount may reach 2.87 billion gallons by the end 2014 or during 2015. This amount may increase beyond this with the full build-out of proposed crude by rail facilities and the potential lifting of the federal crude oil export ban.
- At the same time, there has also been an increase in pipeline transportation of crude oil – an increase of 2.7 times since 2003, with a leveling-off in the last three years.<sup>24</sup>
- There are proposed crude by rail transfer and storage facilities in the Lower Columbia River and Grays Harbor. Since the crude oil stored at the facility would be transferred to tank vessels, there would be tank vessel traffic in locations that have not previously had such large amounts of traffic. Oil tankers and ATBs have operated in the Lower Columbia River transporting refined products and in Grays Harbor transporting biodiesel, but not at these levels or with these types of oil.
- There is an increase in the amount of diluted and other forms of bitumen being transported, and potentially new ways of transporting this type of crude oil by rail and by tank vessel. The properties of these oils vary, but can become submerged or sink in water under certain conditions. This creates challenges for spill response and may cause environmental impacts particularly to fisheries due to the oil's persistence in the environment.

## Role of Environmental Impact Statement Process

Under the State Environmental Policy Act, the proposed crude by rail facilities in Grays Harbor and along the Columbia River are undergoing environmental reviews. Ecology and City of Hoquiam are co-leads for the environmental reviews of the Westway, Imperium, and Grays Harbor Rail Terminal LLC terminal proposals in Grays Harbor. The Energy Facility Siting Council is the lead environmental reviewer of the Vancouver Energy proposal in Vancouver.

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<sup>24</sup> Pipeline transportation is not addressed at this time in this study, but potentially impacts the larger picture of oil movement and risk in Washington.

For all of these proposals, environmental impact statements (EISs) are being conducted. The EISs will include analysis of impacts, reasonable alternatives, and mitigation measures to offset potential environmental impacts. Significant environmental impacts will be evaluated as part of this process, including those discussed in the following sections. This EIS process is a separate and distinct process from this Study.

## **Concerns about Crude by Rail Transportation Risk**

There are a large number of sensitive environmental, tribal, and economic resources potentially at risk from spills and accidents involving crude by rail transportation, as well as associated marine handling and transportation. The greatest concern, however, is for public safety as stressed in the Governor's Directive. The following sections describe the potential risks that have been identified by stakeholders as concerns during the outreach for this report as well as the scoping meetings held for proposed facilities currently in an environmental impact statement process.

### **Potential Public Safety Risks**

There is particular public concern with regard to potential public safety risks from fires and explosions with the rail transportation of Bakken crude oil due to its potentially higher volatility. The issue of the safety of Bakken crude oil transportation came to light with the July 6, 2013 accident in Lac-Mégantic, Quebec, Canada, in which a crude by rail train derailed near a town center causing an explosion that resulted in 47 fatalities (Figure 10). In this incident, 63 tank cars from an unattended train rolled down a descending grade into town center and derailed, after which the spilled oil ignited.

**Figure 10: Rail Cars Burning in Lac-Mégantic, Quebec<sup>25</sup>**



In addition to this tragic incident, there were eight other notable crude oil train derailments in North America in 2013 and 2014. Four involved fires and/or explosions, which are a major public safety concern. Only the Lac-Mégantic incident involved casualties – fatalities or injuries (Figure 11).

The potential risk to public safety and health is greatest in locations where rail lines run through heavily populated areas, such as Seattle, which has a density of over 7,000 people per square mile in the vicinity of rail lines used for crude transportation. The 38 heavily populated cities and towns (over 3,000 persons per square mile) that are adjacent to crude by rail lines are shown in Figure 12. There are also at least a dozen other cities and towns with population densities of 2,500 to 3,000 per square mile at potential risk. Cities and towns were historically settled and grew along railroad lines and rivers – for economic and practical purposes, it is not surprising that railroad tracks currently run through some heavily populated areas. Nearly 3 million Washington State residents live in 93 cities and towns on or near crude by rail train routes.

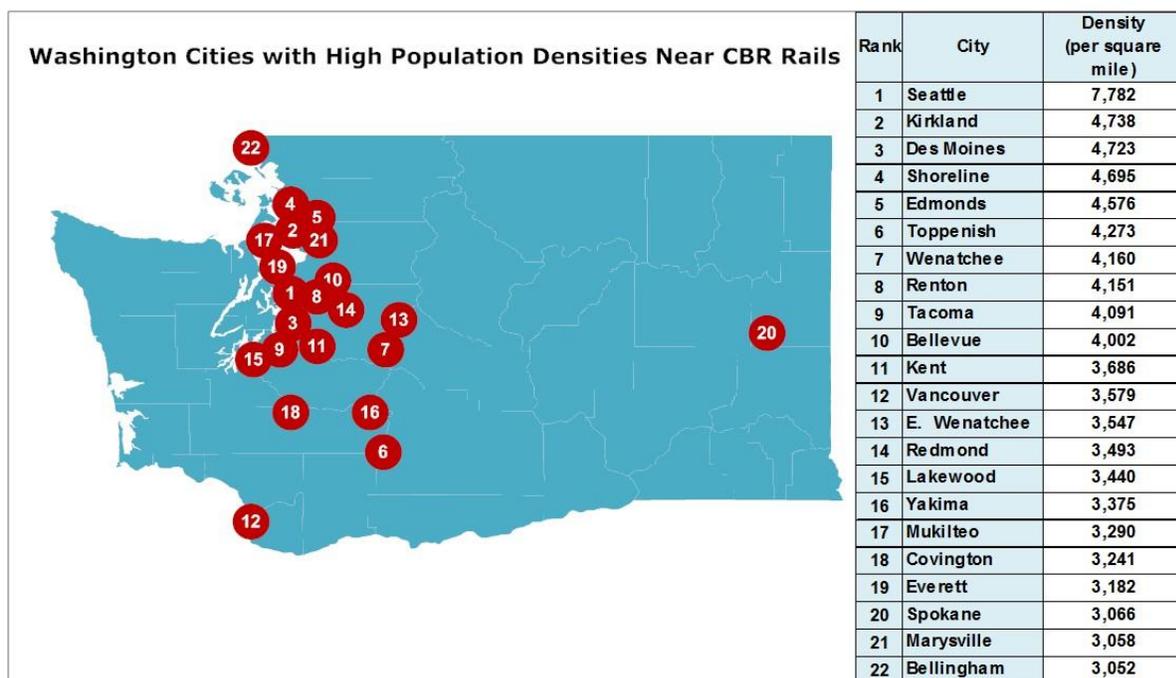
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<sup>25</sup> Source: AP Photo/The Canadian Press, Paul Chiasson.

Figure 11: Recent crude by rail Train Accidents Involving Fires in the US and Canada



Figure 12: Densely-Populated Washington Cities Near Crude by Rail Routes



For Washington State, fire risk extends not only to populated areas where casualties and property destruction may occur, but also to rural areas where wildfire risks exist during certain times of year. Even a relatively small fire associated with a rail incident could potentially spark a much larger wildfire, which again would pose safety risks to residents and first responders.

There are also potential crossing accident risks. The passage of freight and passenger trains through populated areas and road crossings has always created a risk of accidents. With an increase in the number of trains passing through these areas due to the crude by rail trains, the likelihood of fatalities and serious injuries increases. Currently, each week as many as 19 loaded unit trains pass through different parts of the state. Each of these crude by rail trains returns unloaded, which means there are as many as 38 new trains weekly, or five additional trains passing through daily.

There are many locations in which there are no overpasses or underpasses and trains intersect roads at grade or level crossings. This is particularly true in lesser-populated areas. These types of accidents may also occur when tribal members access Tribal Usual and Accustomed (U&A) Fishing Areas.

According to an analysis conducted by UTC, there are 347 public-grade crossings<sup>26</sup> along the routes used by BNSF and Union Pacific (UP) to transport crude by rail unit trains through Washington. A majority of these crossings are appropriately protected, however there are a number in the state that present a heightened risk of incident. The potential for human fatalities and injuries are evident at some of these crossings. Collisions with vehicles, especially large trucks, increase the possibility of train derailment. There is also a risk for human casualties at crossings that lack appropriate safety measures or areas of increased train traffic. Private crossings, due to lack of safety standards, also present a significant risk for pedestrians and vehicles.

Many citizens have expressed concern about people being tempted to make dangerous crossings at unprotected crossings to avoid the inconvenience of long waits long waits for 100-car, 1.5 mile long crude by rail trains to pass. This would also be true of any longer freight train. At 30 mph, a crude by rail train would take three minutes to pass; at a higher rate of speed – 50 mph, the train would pass in less than two minutes.

The issue of blocked access from transiting trains or after a serious accident is a major concern for emergency services. Many communities have emergency service resources (firefighters and

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<sup>26</sup> Public grade crossings are roadways that are under the jurisdiction of, and maintained by, a public authority. A private-grade crossings is on a privately-owned roadway, such as on a farm or industrial area, and is intended for use by the owner or by the owner's licensees and invitees. A private crossing is not intended for public use and is not maintained by a public highway authority (Federal Railroad Administration, US Department of Transportation).

equipment, hospitals and other medical services, police) on either or both sides of railroad tracks that run through cities and towns.

Recognizing the significant changes affecting the nation with the introduction of crude by rail, the US federal government took new steps on safety and environmental protection beginning in September 2012. The timetable of federal actions through the present is summarized in Table 2.

<b>Table 2: Summary of Federal Actions on Crude by Rail Incident Prevention Measures</b>	
Date	Action
September 2012	PHMSA Administrator Quarterman visits North Dakota Bakken Region to observe operations at rail loading facilities and the application of US DOT regulations.
October 2012	PHMSA Bakken Field Working Group established to increase inspection focus on hazmat shipments by truck and rail from the Bakken region and increase awareness within the emergency response community.
December 2012	FRA begins Bakken Rail Accident Mitigation Project (RAMP).
July 29, 2013	In a letter to the American Petroleum Institute, FRA informed industry that it will use PHMSA’s test sampling program to ensure that crude oil is being properly tested and classified.
August 2, 2013	FRA Safety Advisory 2013-06 “Preventing Unintended Movement of Freight Trains and Vehicles on Mainline Track or Mainline Siding Outside of a Yard or Terminal”
August 7, 2013	FRA Emergency Order 28, “Establishing Additional Requirements for Attendance and Securement of Certain Freight Trains and Vehicles on Mainline Track or Mainline Siding Outside of a Yard or Terminal”
August 27, 2013	FRA and PHMSA public meeting with industry stakeholders
August 29, 2013	FRA convenes emergency session of Railroad Safety Advisory Committee (RSAC). RSAC established three working groups on new rulemaking: 1) hazardous materials by rail, 2) train crew size and 3) train securement procedures. Launch of Bakken Blitz.
September 6, 2013	PHMSA issues 78 FR 54849 – ANPRM (2012-0082 HM-251), in response to railroad industry petitions and recommendations to improve the safety of railroad tank car transportation.
October 1, 2013	FRA Administrator Szabo sends a letter to railroad industry organization asking they detail actions they have taken in response to the Safety Advisory issued on August 2, 2013.
November 5, 2013	PHMSA extension of comment period of HM-251.
November 20, 2013	PHMSA and FRA issue Safety Advisory 2013-07 “Safety and Security Plans for Class 3 Hazardous Materials Transported by Rail”

**Table 2: Summary of Federal Actions on Crude by Rail Incident Prevention Measures**

Date	Action
December 11, 2013	FRA Safety Advisory, “Notice of safety advisory; Operational tests and inspections for compliance with maximum authorized train speeds and other speed restrictions”
January 2, 2014	PHMSA safety advisory issued stating that crude oil from the Bakken region may be more flammable than traditional crude.
January 16, 2014	Secretary Foxx meets with rail company CEOs and rail and energy association leadership as part of the USDOT's Call to Action to discuss how to maintain a safety record even as domestic crude oil production and movement has increased.
January 21, 2014	Secretary Foxx issues follow-up letter to Call to Action participants summarizing industry commitments.
February 4, 2014	PHMSA issues \$93,000 in proposed civil penalties after investigation into the transportation of Bakken crude oil finds companies improperly classified shipments.
February 10, 2014	PHMSA meets with emergency response stakeholders and industry groups to discuss training and awareness related to the transportation of Bakken crude. Follow-up meeting to be scheduled in late February 2014.
February 21, 2014	Secretary of Transportation sends letter to President/CEO of AAR to request members voluntarily: impose speed restrictions, braking signal propagation system, routing analysis, additional track and rail inspections, more frequent mechanical inspections, emergency response inventory, funding for emergency responder training, and more communication with communities.
February 25, 2014	USDOT Emergency Order requiring the testing and proper classification of oil being transported and does not allow crude oil to be transported at the lowest packing group.
March 6, 2014	To provide further clarity for shippers and to prevent attempts to circumvent the requirements in its recent Emergency Order concerning the safe transportation of crude oil by rail, the US Department of Transportation (USDOT) issued an amended version that specifies which tests are required, while also prohibiting shippers from switching to an alternate classification that involves less stringent packaging.
April 9, 2014	FRA announced intention to issue a proposed rule requiring two-person train crews on crude oil trains.
May 7, 2014	Joint safety advisory issued by FRA and PHMSA strongly urging those shipping Bakken crude oil to use tank car designs with the highest level of integrity. Also recommended avoiding use of older legacy DOT 111 or CTC 111 tank cars for the shipment of Bakken crude oil.

<b>Table 2: Summary of Federal Actions on Crude by Rail Incident Prevention Measures</b>	
<b>Date</b>	<b>Action</b>
May 7, 2014	DOT Emergency Order requiring reporting to State Emergency Response Committees (SERCs) of information on trains with more than 1 million gallons within 30 days of order.
July 23, 2014	US DOT releases regulations pertaining to the transportation of oil by rail and tank car standards.
September 10, 2014	FRA proposes amendments to the brake system safety standards for freight and other non-passenger trains and equipment to strengthen the requirements relating to the securement of unattended equipment. Specifically, FRA would codify many of the requirements already included in its Emergency Order 28, Establishing Additional Requirements for Attendance and Securement of Certain Freight Trains and Vehicles on Mainline Track or Mainline Siding Outside of a Yard or Terminal.

## Potential Health Risks

In addition to the potentially serious safety risks from fires and explosions, there are numerous other risks to people and the environment. Bakken crude and diluted bitumen may have varying effects due to their toxicity, persistence, and adherence properties. Potential health risks are associated with spills that may result from the rail and marine transportation, storage, and handling of Bakken crude and/or diluted bitumen as described below. It is important to note that these risks exist for any type of oil spill. Health risks from spills have already existed in all areas of the state for decades, but there are significant changes associated with crude marine and rail transportation and associated facilities that add to this background that may increase or change the types of health risks.

### Drinking Water Contamination

Drinking water intakes exist along the Columbia River for Kennewick, Longview, Pasco, and Richland, as well as innumerable wells and intakes at aquifers in inland areas that are at risk from spills. A sole-source aquifer is in the Spokane region.<sup>27</sup>

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<sup>27</sup> EPA defines a sole or principal source aquifer as an aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas may have no alternative drinking water source(s) that could physically, legally and economically supply all those who depend on the aquifer for drinking water.

### **Pollution of Subsistence and Tribal Fishing Resources**

Communities that rely on subsistence fishing and/or for whom locally caught fish are an important part of traditional practices could potentially be significantly affected. Many communities rely on fish and shellfish from inland rivers, streams, the Columbia River, and the marine waters of Washington and could be severely affected if temporary or long-term impacts affected fisheries. The impacts could include toxicity-related mortality to existing fish and shellfish stocks (adults, juveniles, and eggs), as well as decreases in fish and shellfish reproduction in future years, reducing important food sources. There is also a potential for tainting of fish, which may have health consequences for vulnerable populations, including children.

### **Air Quality Issues with Emissions from Locomotives and Vapor Release**

Citizen groups have expressed concern over air pollution associated with increased rail traffic and associated locomotive diesel exhaust. In addition, people have expressed concerns about potential vapor release from tank cars containing the more volatile Bakken crude.

### **Psychological Impacts of Concern over Safety**

Public anxiety about safety is high as evidenced in the news media and as we've observed at public meetings.<sup>28</sup> Much of the public anxiety appears to be related to uncertainties and issues related to lack of information to the potentially affected public, as well as concerns about the lack of control over crude by rail transportation through populated areas and other sensitive locations.<sup>29</sup>

## **Potential Tribal Treaty Risks**

There are potential risks to tribal culture, tribal community subsistence harvest, and tribal treaty rights. With spills and potential fires associated with crude by rail transportation, there is a potential for significant impacts to tribes on lands used for cultural and traditional practices, and lands associated with treaty resources, including Usual and Accustomed Areas (U&A)<sup>30</sup> and tribal fisheries habitat areas. Tribal risks from spills currently exist in all areas of the state and have for decades, but the significant changes associated with crude marine and rail transportation and associated facilities add to this and increase or change the types of risks. Risks include:

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<sup>28</sup> For example, the environmental group ForestEthics has developed a website that allows citizens to enter their addresses to determine whether they are in the “blast zone” of crude by rail trains. (<http://explosive-crude-by-rail.org/>).

<sup>29</sup> Research studies indicate that public perception of risk increases dramatically when there is a lack of control and involuntary nature associated with the source of risk (Slovic and Weber 2002).

<sup>30</sup> U&A is a treaty term from the 1854–1855 Stevens’ Treaties used extensively in *US v. Washington*, referring to an area where a particular tribe traditionally fished and over which the tribe has a territorial use claim under the provisions of the treaty. Treaty tribes retained their right to take fish in their “usual and accustomed” areas. These treaties are legally-binding contracts and are the supreme law of the land under the US Constitution.

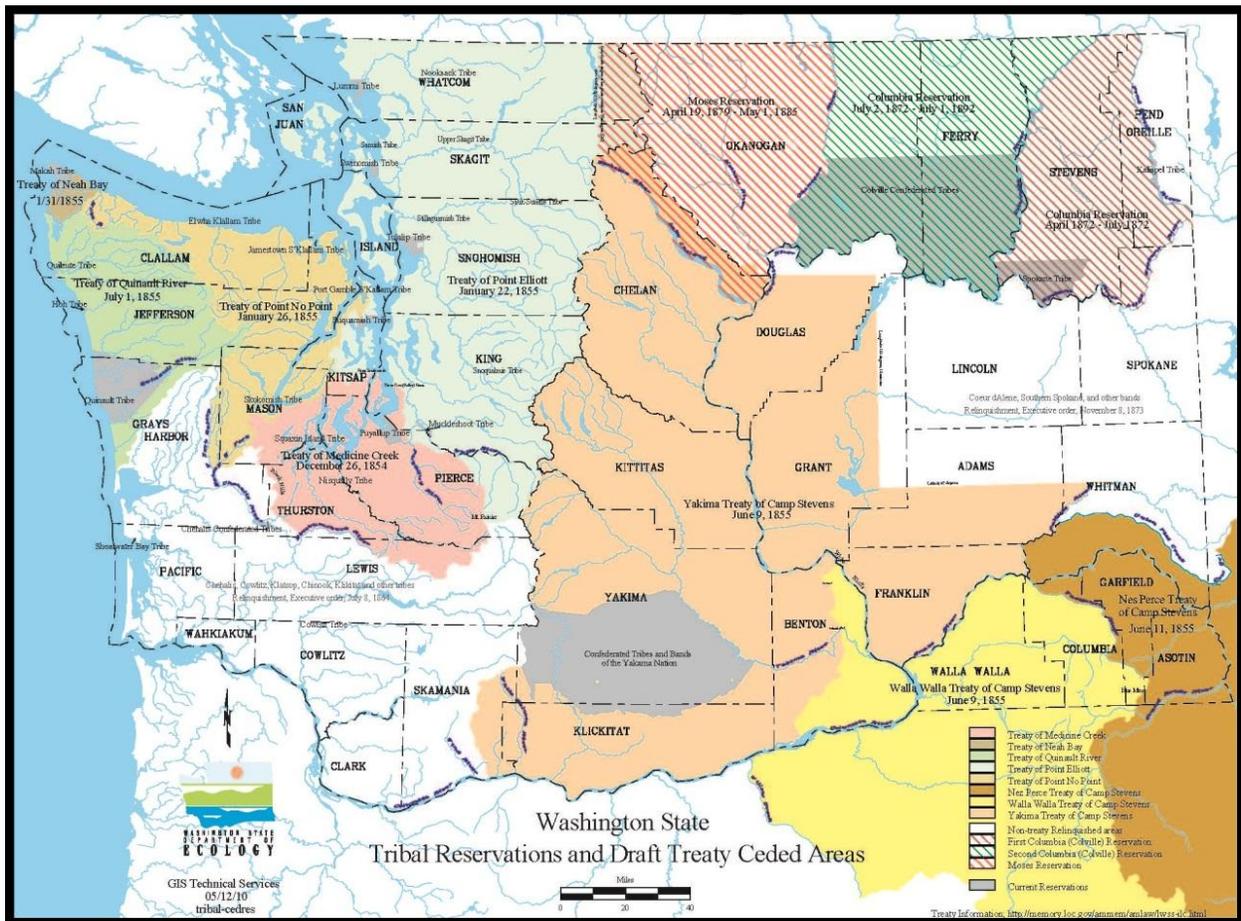
## Pollution of U&A Fishing Rights Areas

In addition, to the potential health impacts of oil contamination of fish and shellfish, damages to fisheries have a significant impact on cultural, traditional, and economic uses of fish for many tribes. Nearly all of the 29 tribes of Washington State and several bordering tribes have the potential for impacts related to either rail and/or marine incidents associated with the crude marine and rail transportation and associated facilities in their traditional use areas, ceded lands, or treaty U&As (Figure 13).

## Destruction of U&A Areas, Tribal Ceded Lands, and Traditional Use Areas

Fires associated with rail accidents in inland areas could potentially have significant short- and possibly long-term impacts on U&A fishing, hunting, and culturally important tribal lands. Oil spill damages to these lands could also have significant short-term, or potentially long-term impacts for tribes.

Figure 13: Washington State Tribal Reservations and Draft Treaty Ceded Areas



### **Reduction of Access to U&A Areas, Tribal Ceded Lands, and Traditional Use Areas**

During prolonged spill responses, safety evacuations, and fires, and in the aftermath of a significant event there may be reduced access to U&A fishing, hunting, and culturally important tribal lands.

## **Potential Environmental Risks**

The sensitive natural resources of Washington's inland, coastal, marine, and estuarine areas are at added risk from potential spills associated with the transportation of crude by rail in inland areas, the handling and transfer of crude at marine facilities, and the transportation of crude by tank vessels. The environmental risks from spills already existed in all areas of the state for decades, but there are significant changes associated with the transportation of crude by rail that add to this background that may increase or change the types of environmental risks for Washington's unique, sensitive, and highly-treasured natural resources.

In addition to impacts of the oil, the potential effects of spill and emergency response operations to spill and fire incidents may also add to the environmental impacts. The types of oils being transported by rail may have varying effects due to their toxicity, persistence, and adherence properties. The most important changes that may affect the nature and degree of environmental risk are:

### **Increased Potential for Spills of New Types of Crude Oil**

The potential for spillage of Bakken crude into waterways and inland areas, which could also impact aquifers, is introduced with transportation of this type of crude oil by rail and handling and transportation of the crude in marine areas. The toxicity and other properties of this oil may cause different types of environmental impacts than other oils that have spilled.

### **Increased Potential for Spillage of Diluted Bitumen into Water**

While diluted bitumen has been transported into Washington for decades (mainly via pipeline), a greater potential for spillage of the crude oil into water exists with its transportation by tankers and ATBs as well as by rail at locations where rail lines run along waterways, as in the Columbia River Gorge. The properties of this oil include the greater possibility of sinking or submerging in water, particularly if there is a great deal of sediment and turbulence. This is likely to be more of a concern in rivers rather than in marine waters because of the increased volume of sediment, shallower depths, and higher currents. Any hydrocarbons that become submerged in rivers and streams could impact fish spawning areas.

### **Potentially More and Larger Inland Spills Than Previously Experienced**

There may be spills in inland areas transited by crude by rail lines that are significantly larger than those previously experienced in these areas. The largest spills in most inland areas were from overturned tanker trucks or pipelines. The occasional rail spillage came mainly from leaks

from locomotives on freight or passenger trains, which carry fuel, but not the nearly three million gallons of crude oil being transported today in unit trains.<sup>31</sup> Inland resources, including streams and rivers, as well as farmland, forests, wetlands, and other uniquely sensitive areas will be at increased risk from spills of Bakken crude and/or diluted bitumen.

### **Increased Spill Potential from Crude by Rail Facilities and Tank Vessels in Grays Harbor**

If the proposed crude by rail facilities in Grays Harbor are built, there is a potential for oil spills from facility storage tanks and operations, as well as from tankers and ATBs that receive the crude oil for transportation. The potential volume of spillage and potential frequency of spill incidents in Grays Harbor may be different from what this area has experienced in the past. The potential spillage of Bakken crude and/or diluted bitumen and other forms of bitumen presents a risk of environmental impacts to the sensitive marine and coastal environment of Grays Harbor, as does any oil spill. Wetlands are particularly vulnerable. There may be associated increases in bunkering activities.

### **Changing Spill Potential in Lower Columbia River from Crude by Rail Facilities and Tank Vessels**

If the proposed crude by rail facilities in the Lower Columbia River are built, there is a potential for spills from both the facility storage tanks and operations, as well as from tankers and ATBs that receive the crude oil for transportation. The potential volume of spillage and potential frequency of spill incidents in the Lower Columbia will be somewhat different than what this area has experienced in the past. The potential spillage of Bakken crude and/or diluted bitumen presents a risk of environmental impacts to the sensitive estuarine and coastal environment of the Lower Columbia River. Wetlands are particularly vulnerable.

### **Changing Spill Potential along the Outer Coast**

If the proposed crude by rail facilities are built there is expected to be an increase in ATB and tanker traffic along Washington's outer coast. The frequency of tanker and ATB traffic may also change, increasing the likelihood of spills. The type of oil spilled (Bakken crude and/or diluted bitumen) causes the potential for new types of impacts.

### **Changing Spill Potential in Puget Sound**

The potential for oil spills in Puget Sound may change with shifts in the patterns of vessel traffic related to the proposed Gateway Pacific Terminal, Roberts Bank Terminal Deltaport (in Vancouver, BC), Kinder Morgan Terminal (also in Vancouver, BC), and other changes. At the same time, there are already documented decreases in tanker traffic bringing oil into the refineries from Alaska and foreign sources, and this pattern of reduced crude imports is likely to continue with crude by rail as a source of crude for refining. The vessel traffic associated with

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<sup>31</sup> Note that there have been freight trains containing hazardous cargo (e.g., chlorine gas) in tank cars passing through Washington State for decades, but the quantities have been much lower.

crude by rail (refined product carriers, ATBs, and oil barges) will be superimposed on this uncertain future background and may add a further strain to the waterway system as bunkering/fueling operations increase and anchorages get more congested. With respect to spills, however, there will be important changes associated with the type of oils spilled, Bakken crude and diluted bitumen. The sensitive marine and coastal resources of Puget Sound are at risk from impacts from these types of spills due to the oil properties and the unproven technology to respond to these properties. Wetlands are particularly vulnerable. As has always been the case, a large spill of crude oil could have devastating far-reaching impacts.

### **Changing Spill Potential in All Waters if Export of Crude Oil is permitted**

If federal restrictions are not applied to the export of crude oil, or processes that modify crude oil, significant additional vessel traffic may occur. Foreign-flag tankers have international marine standards and applicable federal and state domestic standards to meet. Though these standards have proven to serve the safety and spill prevention regime well internationally, they are lower than the voluntarily adopted levels of design redundancy in powering and steering on the current Jones Act fleet of tankers transporting ANS crude oil into Washington. Exports of Canadian sourced, diluted bitumen may happen through crude by rail as well as via potential pipeline expansions.

In addition to these concerns, environmental groups have expressed concern about climate impacts associated with the burning of crude by rail as a fossil fuel. This is a larger issue related to regional, national, and global energy policies and practices.

## **Potential Socio-Economic Risks**

Crude by rail and marine transportation causes concerns about social and economic impacts as well. The socio-economic risks from oil spills has already existed in all areas of the state for decades, but there are significant changes associated with crude by rail transportation that add to this background that may increase or change the types of environmental risks for Washington's unique, sensitive, and highly-treasured natural resources. Any damages to economic resources because of spillage and/or fires associated with crude by rail incidents could have direct effects on local and regional economies. The addition of 19 loaded trains, with the potential of as many as 59 to 113 loaded crude by rail trains weekly, combined<sup>32</sup> with the full build-out of Washington facilities and export to Oregon and California could have far-reaching rippling effects on the region's economic infrastructure. Additional facilities and changes in vessel traffic associated with crude by rail could potentially have complex effects on other port activities and

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<sup>32</sup> Estimates of 59 trains weekly are based estimates for 2020 with expected build-out of proposed facilities; 113 trains weekly are based on estimates for 2035 full build-out of proposed facilities with export of oil to California and Oregon.

economic resources.<sup>33</sup> Some of the potential economic impacts of crude by rail that have been identified by various stakeholders include:

### **Crude by Rail Train Traffic Blocking or Slowing Other Freight Train Traffic**

The addition of crude by rail trains is causing concerns about slowdowns or temporary blockages of other freight trains carrying grains and other perishable food commodities. This is mainly due to a lack of locomotives, freight cars, and other factors, in addition to congestion on the rails. BNSF and UP have stated that the increase in crude by rail trains will not impact other freight train traffic, however, some stakeholders are concerned. Decisions on the use of locomotives and railroad lines are based on commercial market factors. The issue of train capacity affecting transportation of various commodities is not a new one. At some times of year, anhydrous ammonia shipments (for fertilizer used in spring planting) are given priority, for example.

### **Increased Vessel Traffic in Grays Harbor and Columbia River**

The increased vessel traffic that would result if the full build-out of proposed crude by rail facilities occurs could add to port congestion, especially in Grays Harbor and the Lower Columbia River.<sup>34</sup> This could potentially have economic impacts on existing industries in the area.

### **Social and Economic Disruptions due to Evacuations**

People, businesses and entire communities could be socially and economically impacted in the event of a rail accident that threatens public safety and results in evacuations.

### **Property Damage from Fires or Spills**

The potential for significant damage to private and public property as a result of spillage and/or fires directly or indirectly associated with crude by rail transportation is of concern to many citizens. There is fear that adequate compensation for damages will not exist.

### **Effects on Property Values with Proximity to Tracks**

The potential for property damage from fires and spills along inland railroad lines may have an effect on property values due to perceptions of added risk.

### **Vehicular Traffic Interruptions at Rail Crossings**

Many citizens have expressed frustration and concern about vehicular traffic disruptions by the several-minute waits experienced as trains pass in locations with no vehicular overpasses. Some groups have mentioned concerns regarding people choosing to drive rather than take commuter trains due to fears about potential service disruptions due to crude by rail trains.

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<sup>33</sup> There are potential economic benefits from crude by rail that are not addressed in this preliminary study.

<sup>34</sup> There will be some changes in vessel traffic in Puget Sound with crude by rail, but not necessarily a dramatic increase. More changes would be associated with other proposed projects, including Gateway Pacific Terminal.

### **Vehicular Access Interruptions Due to Accidents and Fires**

Some citizens have expressed concern about traffic disruptions in the aftermath of accidents due to fires and/or cleanup operations. This may block access to different parts of communities, which may have economic and social implications.

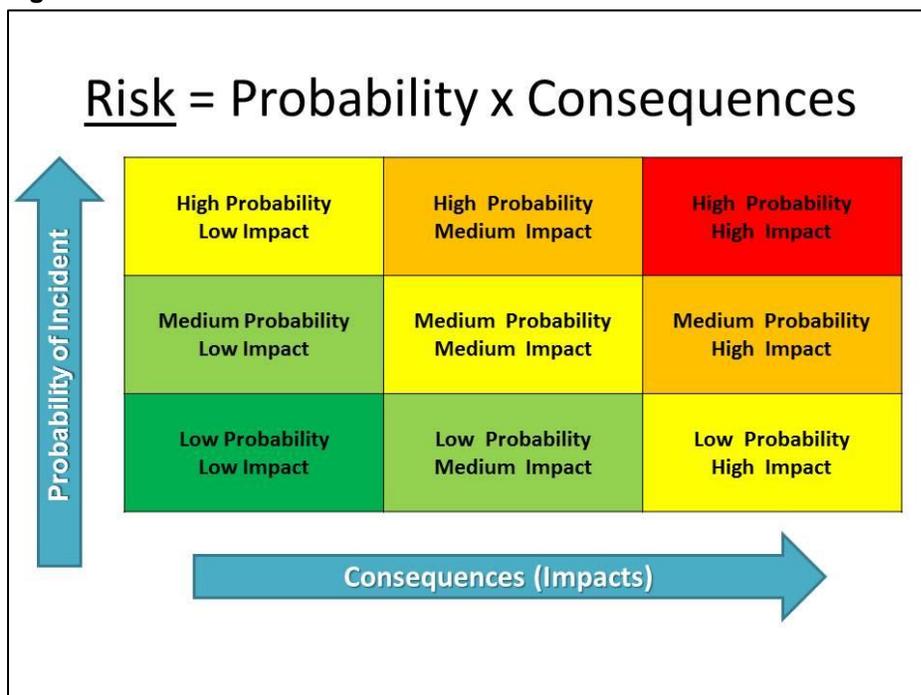
### **Compensation for Damages from Fires and Spills along Rail Lines**

Various community groups have expressed concern about who would pay for cleanup response and compensate affected third parties in the event of a major spill and fire accident. The liability and financial responsibility of vessel and facility owners is well understood by most groups, but there is a concern that railroads would not pay for response and damages.

## **Mitigating Risk**

Risk encompasses either the likelihood, or probability, of an event occurring *and* the consequences or impacts of that event. The “event” in the case of rail and marine crude oil transportation is an incident or accident that causes the release or spillage of oil. Spilled oil may cause significant impacts to valued environmental, cultural, and economic resources – and the oil may ignite causing significant human safety and health impacts, including fatalities. The consequences of the incident depend on the type and amount of oil released, whether it ignites, and the timing and location of the incident relative to humans and sensitive resources. The incidents with the highest risk are those with the highest probability and the highest consequences (Figure 14).

**Figure 14: Basic Risk Matrix**



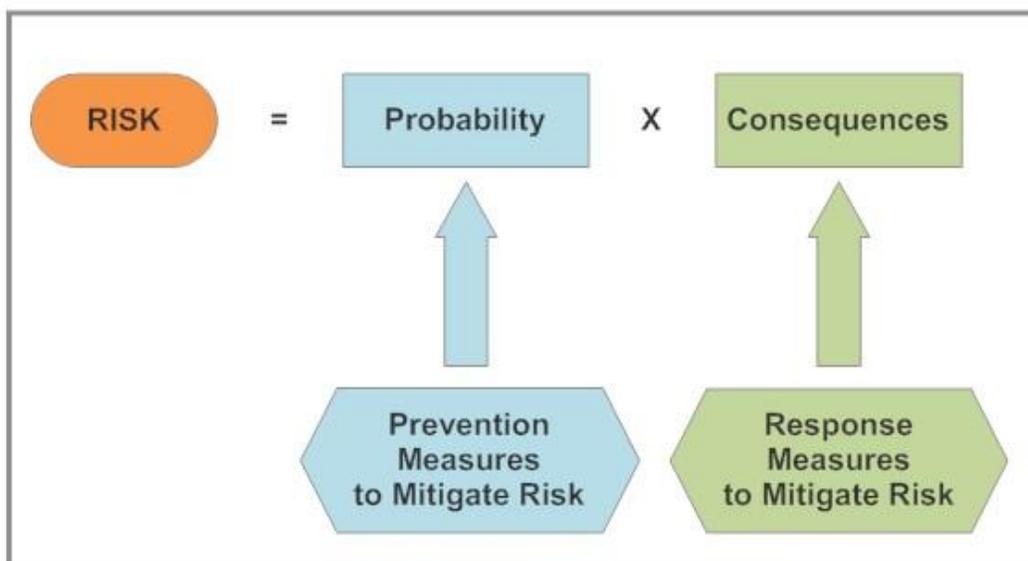
Often, however, the incidents with the highest probability have the lowest impacts (e.g., small operational spills in industrial areas), and the incidents with the highest impact (e.g., a major spill or catastrophic incident involving a fire) are more rare events. In the risk matrix, the situation types shown in yellow and orange present the greatest challenge.

## General Approaches to Mitigating Risk

Risk can be mitigated or reduced in two principle ways – by reducing the probability of incidents, and by reducing the consequences of incidents (Figure 15). In general, incident probability is reduced through prevention measures, i.e., stopping the incidents from happening in the first place, or at least reducing their frequency. Prevention is the most effective means to reduce risk.

The second way to mitigate risk is to address the consequence side. For oil spills, this means being prepared to respond to an emergency that occurs and reducing the degree to which humans and sensitive resources are impacted. This includes, first and foremost, preventing fatalities and injuries from fires and/or explosions that might occur, and reducing the exposure of humans to the spilled substances either through direct contact or through contact with contaminated groundwater. An effective spill response reduces the spread of the oil, protects sensitive resources, and removes the oil to the extent possible from the environment. In later phases of response operations, rehabilitation of the impacted environmental, cultural, and economic resources occurs.

**Figure 15: Risk Mitigation Approaches Addressing Probability and Consequences**



# Mitigating Risks from Crude by Rail Transportation through Prevention

With the potentially significant impacts of major crude by rail incidents to public health and safety, as well as to tribal lands, sensitive environmental resources, and the state's economy, prevention of accidents is most important. Washington State's ability to directly address rail incident prevention is dictated largely by current federal regulations, but there are a number of actions that the state can take to protect the safety of its citizens in this regard.

## Regulatory & Statutory Framework Governing the Rail Industry

Regulation of railroads is largely under exclusive federal jurisdiction. This limits the state's authority even with regard to safety measures under the Federal Railroad Safety Act (FRSA), and controlling, restricting, or banning outright the transportation of goods, including hazardous materials, through the state based upon common carrier obligations, which are included in federal statute. Common carrier obligations only apply to operations and economic regulation, not safety regulation.

Railroads have a common carrier obligation to transport all goods offered, including hazardous materials. This obligation is a common law doctrine, codified in the Interstate Commerce Act and recognized by the United States Supreme Court in the early 1900s.<sup>35</sup> The Interstate Commerce Commission Termination Act of 1995 (ICCTA) maintains the common carrier obligations of railroads and requires railroads to "provide the transportation or service on reasonable request."<sup>36</sup> This obligation ensures that railroads do not unreasonably discriminate between shippers. Thus, railroads may not refuse shipment on the basis of inconvenience or lack of profitability.<sup>37</sup> The Surface Transportation Board (STB), which succeeded the Interstate Commerce Commission, has exclusive jurisdiction over the transportation of goods by rail within the United States, as well as intrastate operations along an interstate rail network, preempting state and local authority.<sup>38</sup>

Washington State's first railroad regulatory laws were enacted in the early 1900's. For decades after the creation of the Washington Railroad Commission in 1905, Washington was involved in regulating railroad companies in four critical areas: economics (rates, routes and services), public safety, railroad employee health and safety, and consumer protection.

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<sup>35</sup> Pa. R.R. Co v. Puritan Coal Mining Co., 237 US 121, 133 (1914).

<sup>36</sup> Pub. L. No. 104-88, 109 Stat. 803 (Dec. 29, 1994); 49 USC. § 11101(a).

<sup>37</sup> G.S. Roofing Prods. Co. v. Surface Transp. Bd., 143 F.3d 387, 391 (8<sup>th</sup> Cir. 1998).

<sup>38</sup> See 49 USC. § 10501.

Since 1970, there have been a number of changes in federal law that significantly limits the ability of states to regulate railroad companies. For example, states no longer have a role in determining the rates and routes of railroad companies or in protecting consumers. These responsibilities rest with the STB.

Regulation of railroad employee health and safety is shared by both federal and state agencies. states have limited authority for health and safety matters. In Washington, this authority is shared by the UTC and the Department of Labor and Industries. Federal responsibilities for employee health and safety are shared by the FRA and the Occupational Safety and Health Administration.

The federal laws that limit the states' ability to regulate railroads for public safety issues are the 1970 FRSA and the ICCTA. In particular, the FRSA preempts states from passing laws or adopting rules in safety areas where the federal government has adopted its own laws or rules. The FRA is the federal agency with jurisdiction to administer FRSA and adopt railroad safety regulations. The FRSA provides that:

- Laws, regulations, and orders related to railroad safety must be nationally uniform to the extent practicable.
- A state may adopt regulations related to railroad safety only if the federal government does not already have a law or rule on the same topic. It is this provision that allows Washington State to adopt laws and rules for changing the configuration of public railroad crossings.<sup>39</sup>
- A state may adopt additional or more stringent regulations than those at the federal level if the regulations are necessary to “eliminate or reduce an essentially local safety hazard”. Note that case law since 1970 defines an “essentially local safety hazard” as one that is unique on a nationwide basis. In other words, the same or similar safety hazard cannot exist anywhere else in the country.<sup>40</sup> While the statutory language appears to provide states the flexibility to deal with local safety issues, the courts have interpreted the statute to permit state action only when the federal government has not addressed the safety issue – essentially preempting the field of railroad safety.
- Finally, a state may adopt additional or more stringent regulations than those at the federal level if the regulations are not incompatible with a law, regulation, or order of the United States Government and if the regulations do not unreasonably burden interstate commerce.

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<sup>39</sup> While the UTC has jurisdiction and authority under Chapter 81.53 RCW to determine whether a public crossing should be opened, closed or modified, the Legislature provided that the UTC does not have authority over the configuration of crossings in first class cities in the state. See RCW 81.53.240.

<sup>40</sup> The courts have set a very high bar for states attempting to impose more stringent railroad safety regulations. Essentially, the courts have interpreted the statute to allow additional state regulation only where it can be demonstrated that the safety issue is unique to the area and does not exist anywhere else in the country.

Under the ICCTA, the courts have held that most state and local regulation of railroads is preempted. However, state and local regulation is not preempted in two distinct circumstances: (1) when the state or local government is implementing a federal law through a federally approved state plan, such as under the Clean Water Act, the Clean Air Act, or the Coastal Zone Management Act; and (2) when the state or local regulation is intended to protect the health, safety and welfare of the community, it is non-discriminatory, and it does not unduly restrict railroad operations. Thus, for example, the Ninth Circuit has stated:

[T]his system preserves a role for state and local agencies in the environmental regulation of railroads in at least two ways. First, to the extent that state and local agencies promulgate EPA-approved statewide plans under federal environmental laws (such as “statewide implementation plans” under the Clean Air Act), ICCTA generally does not preempt those regulations because it is possible to harmonize ICCTA with those federally recognized regulations. . . . Second, to the extent that state and local agencies enforce their generally applicable regulations in a way that does not unreasonably burden railroad activity, ICCTA does not preempt such regulation, despite the fact that the regulation does not have the force and effect of federal law,

Association of American Railroads v. South Coast Air Quality Management Dist., 622 F. 3d 1094, 1097 – 1098 (9<sup>th</sup> Cir. 2010) (citation omitted); see also Florida East Coast Ry. Co. v. City of West Palm Beach, 266 F. 3d 1324, 1330 – 1332 (11<sup>th</sup> Cir. 2001); Southern Pacific Transportation Co. v. California Coastal Commission, 520 F. Supp. 800, 804 – 805 (D.C.N.D. Cal. 1981).

The STB has given some examples of the types of state and local regulations that are not preempted under the second exception:

[W]e agree . . . that there are areas with respect to railroad activity that are reasonably within the local authorities’ jurisdiction under the Constitution. For example, even in cases where we approve a construction or abandonment project, a local law prohibiting the railroad from dumping excavated earth into local waterways would appear to be a reasonable exercise of local police power. Similarly, . . . a state or local government could issue citations or seek damages if harmful substances were discharged during a railroad construction or upgrading project. A railroad that violated a local ordinance involving the dumping of waste could be fined or penalized for dumping by the state or local entity. The railroad also could be required to bear the cost of disposing of the waste from the construction in a way that did not harm the health or well being of the community. We know of no court or agency ruling that such a requirement would constitute an unreasonable burden on, or interfere with, interstate commerce. Therefore, such requirements are not preempted.

*Cities of Auburn & Kent*, STB No. 33200, 1997 WL 362017 at \*6 (July 1, 1997)

The following is a summary of state and local permitting requirements preempted by the ICCTA, or case law under the ICCTA:

- State statutes regulating railroad operations,<sup>41</sup> including state and local regulations on blocked crossings.<sup>42</sup>
- Environmental and land use permitting, subject to the exceptions outlined above.<sup>43</sup>
- State negligence and nuisance claims.<sup>44</sup>
- The demolition permitting process.<sup>45</sup>
- The requirement that a railroad obtain state approval before discontinuing station agents, abandoning rail lines or removing side tracks or spurs.<sup>46</sup>
- Preconstruction permitting of a transload facility.<sup>47</sup>
- State statutes regulating contracts between rail carriers.<sup>48</sup>
- Attempts to condemn railroad tracks.<sup>49</sup>

The FRA's stated purpose, as it pertains to the implementation of the FRSA, is to develop and implement a national railroad safety program to reduce deaths, injuries and damage to property resulting from railroad accidents. The program consists of mandatory safety requirements and inspections to ensure compliance with these requirements. The FRA has adopted rules covering five safety disciplines: track, signal and train control, motive power and equipment (locomotives, freight cars, and other equipment), operating practices, and hazardous materials transportation. These five areas of railroad safety represent the majority of subject matter over which the FRA has exclusive jurisdiction.

Even though the FRA has exclusive authority over railroad safety for these five areas, the states have a role in inspections and enforcement if they so choose. FRSA provides for establishment of a state rail safety participation program whereby states may conduct inspections related to federal railroad safety laws and regulations. The intent of the program is to provide enhanced inspection, investigative and surveillance capability.

The program was initiated by the Railroad Safety Act of 1970, and by 1975, regulations were adopted to enable states to enforce track and freight car safety standards. In 1980, Congress broadened state involvement to include the Safety Appliance, Locomotive Inspection, Signal Inspection, and Hours of Service Acts. The State Safety Participation regulations (49 CFR, Part

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<sup>41</sup> *Friberg v. Kansas City S. Ry Co.*, 267 F.3d 439 (5<sup>th</sup> Cir. 2001).

<sup>42</sup> *RR Ventures, Inc. v. Surface Transportation Board*, 299 F.3d 523 (6<sup>th</sup> Cir. 2002).

<sup>43</sup> *Auburn v. United States*, 154 F.3d 1025 (9<sup>th</sup> Cir. 1998).

<sup>44</sup> *Friberg*, 267 F.3d 439 (5<sup>th</sup> Cir. 2001).

<sup>45</sup> *Soo Line RR Co v. City of Minneapolis*, 38 F. Supp. 2d 1096 (D. Minn. 1998).

<sup>46</sup> *Burlington Northern Santa Fe Corp v. Anderson*, 959 F. Supp. 1288 (D. Mont. 1997).

<sup>47</sup> *Green Mountain RR Corp v. Vermont*, 404 F.3d 638 (2<sup>nd</sup> Cir. 2005).

<sup>48</sup> *San Luis Cent RR Co. v. Springfield Terminal Ry Co.*, 369 F. Supp. 2d 172 (D. Mass. 2005).

<sup>49</sup> *Lincoln v. Surface Transportation Board*, 414 F.3d 858 (8<sup>th</sup> Cir. 2005).

212) were revised in 1992 to permit states to perform rail hazardous materials inspections, allowing them to participate in all five safety disciplines. In 1995, the Grade Crossing Signal System Safety regulations (49 CFR, Part 234) were revised to authorize both federal and state signal inspectors to assure that railroads were properly testing, inspecting and maintaining automated warning devices at grade crossings.<sup>50</sup> When FRA began the program, the federal government provided partial federal funding (60 percent) as an incentive for states to participate. That funding ended in the 1980's and states must now participate at their own expense. The FRA provides extensive training to state employed inspectors, and pays for associated travel for maintaining certification. The FRA will train and then certify state inspectors to conduct federal inspections and investigations in the five safety disciplines over which the FRA has adopted rules.

## Crude by Rail Prevention-Based Risk Mitigation Recommendations

The following are findings, gaps and recommendations related to rail operations, rail equipment and rules and regulations.

### 1. Support of Multi-Agency Comments on Federal Rulemaking on Rail Safety

**Finding:** There is currently a Notice of Proposed Rulemaking (NPRM) at the federal level by FRA, the PHMSA, and the US Department of Transportation (USDOT) that address a number of the safety concerns regarding rail transportation.

September 30, 2014, Washington State provided multi-agency comments to the FRA, PHMSA, and USDOT in response to its NPRM on enhanced tank car standards, operational controls and other matters involving the transportation of Bakken oil and other highly flammable liquids by rail. A copy is provided in Appendix B.

**Recommendations:** The joint state agency comments included the following recommendations:

- FRA and PHMSA should ensure the standards, operational controls, routing and speed restrictions for rail cars transporting crude oil to provide the highest level of protection for the state's citizens and environment.
- FRA and PHMSA should define a high-hazard flammable train to include a single train carrying 20 or more carloads of a Class 3 flammable liquid or a single train carrying one carload of a Packing Group I, Class 3 flammable liquid.

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<sup>50</sup> The Rail Safety State Participation Program, Association of State Rail Managers.

- FRA and PHMSA should establish tank car standards with the most stringent requirements and older model tank cars should be phased out for use in transporting Class 3 flammable liquids within two years.

## 2. Derailment Prevention is Key to Public Safety, Health, and Environmental Protection

**Finding:** The key to protecting the public and the environment in regards to rail operations is the prevention of derailments and rail accidents in the first place. The activities the state rail safety program can engage in may be limited by federal pre-emption.

Washington State should explore actions it can take beyond the pre-emption aspects of rail safety to further focus on preventing derailments and accidents. This can be achieved through improved rail infrastructure oversight through state and federal resources, reviewing the impacts on rail safety regarding speed and working with the railroads and the federal government to make appropriate changes, and monitoring through the state's inspection programs human factors as it relates to railroad track operational management.

**Recommendations:** Modify the railroad regulatory fee structure. It should allow the UTC to fund additional inspector positions, including FRA-certified inspectors and increase state inspections in the areas of track, hazardous materials, operating practices, motive power and equipment, and crossing signals.

## 3. Derailment Prevention and Federal Operating and Speed Restrictions

**Finding:** There is an identified gap with respect to the pending federal decision on the operating requirements and restrictions of HHFT/Key Trains, along with BNSF's willingness to accept a 45 mph maximum speed for such trains.

BNSF restricts the maximum speed of loaded unit bulk trains (i.e., grain and coal) to 45 mph for safe operating purposes. Empty unit bulk trains are allowed to operate at maximum track speed. Operating HHFT/Key Trains at the same maximum speed as other loaded unit bulk trains would likely have a minimal impact on unit train cycle times and not negatively impact overall route capacity as most loaded bulk trains move east to west within the state.

**Recommendation:** Washington State should work with BNSF, UP and other railroads operating in Washington State to establish voluntary agreement(s), to operate loaded HHFT/Key Trains at a maximum speed of no more than 45 mph.

## 4. Regulation and Oversight Issue: Insufficiency of Trained Personnel

**Finding:** Funding mechanisms levels are insufficient to support an adequate number of state rail inspectors.

The UTC receives revenue to fund its rail safety program from fees the railroads operating in Washington pay to the UTC. Currently, these fees are set in statute based on a percentage of railroad revenue from intrastate rail traffic only. The fee structure limits the number of railroad inspectors the UTC can hire. Other states use other funding sources that provide a broader base of revenue. Oregon, for example, utilizes a methodology that generates revenue from the railroads based on intrastate, interstate and mileage. Given that railroads operate in interstate commerce, the state should develop a funding structure that would not be overly burdensome to the railroads and their interstate operations. California is reportedly also investigating the creation of a railroad-generated funding source to meet similar needs.

In addition to the current budget limitations, the UTC railroad safety program also faces the issue that UTC FRA-certified inspectors are classified in such a way that the salary levels are lower than FRA, other states, and railroads currently offer. As a result, the UTC has had difficulty attracting and retaining qualified FRA-certified inspectors.

**Recommendation:** Modify the railroad regulatory fee structure. It should allow the UTC to fund additional inspector positions, including FRA-certified inspectors with increased pay that is competitive with comparable private-sector and federal inspectors.

## 5. Regulation and Oversight Issue: Authority for UTC Rails Inspections on Private Property

**Finding:** UTC regulatory authority to conduct hazardous material inspections on private shipper's property is limited, complicating the ability of UTC inspectors to perform vital safety inspections.

The UTC FRA-certified inspectors currently must be accompanied by an FRA representative to enter private shipper's property for the purpose of conducting hazardous material inspections relating to railroad operations. These inspections are already occurring but the need for FRA to attend complicates the ability of inspectors to perform their work.

**Recommendation:** Amend statutory authority to allow UTC inspectors to enter a private shipper's property to conduct hazardous material inspections related to rail operations.

## 6. Regulation and Oversight Issue: At-Risk Crossings

**Finding:** The UTC has identified a number of at-grade crossings which crude by rail trains operate over that represent a higher risk of possible train accidents/incidents due to the characteristics present at the crossing.

**Recommendation:** Provide authority and funding for UTC to conduct Railroad and Road Authority Diagnostic reviews of the road crossings most at risk to determine whether each crossing has sufficient protective devices.

## 7. Regulation and Oversight Issue: Oversight of At-Grade Crossings

**Finding:** There is a gap in Washington State law concerning oversight of at-grade crossings between those in first-class cities and other crossings within the state.

The UTC does not currently have jurisdiction for at-grade crossings in first-class cities. Each city so designated is free to open, close or modify at-grade crossings without UTC involvement.

**Recommendation:** Amend RCW 81.53 to allow designated ‘first-class cities’ to opt-in to the UTC’s railroad crossing inspection and enforcement program. Give the UTC jurisdiction to require first class cities inform the UTC when crossings are opened or closed.

## 8. Regulation and Oversight Issue: Private Crossings

**Finding:** Insufficient regulatory authority to monitor safety at private crossings in the state.

Federal and state regulations do not apply to private crossings for safety standards and inspection authority.

**Recommendation:** Amend Chapter 81.53 RCW to give UTC jurisdiction over private road crossings on the primary routes for the transportation of crude oil, and to establish and enforce minimum safety standards, including appropriate safety signage.

## 9. Regulation and Oversight Issue: Placarding Standards for Rail Cars

**Finding:** Current tank car placarding standards for the transportation of hazardous materials are insufficient in providing First Responders timely and important information in the case of a derailment, spill or undesired release.

The current placarding standard for rail cars transporting hazardous flammable materials is insufficient for non-railroad personnel. While railroad personnel often have specific information regarding the specific commodity(s) involved in an incident/derailment, that information is often not available to First Responders in a timely manner, and the current placarding criteria does not provide meaningful assistance.

**Recommendation:** US Department of Transportation should change the hazardous material identification on trains to be more user friendly to First Responders. The United Nations is responsible for assigning unique and internationally consistent hazardous materials identifiers.

The current identification system is not responsive to the needs of first responders and community leader in case of a train derailment or release of hazardous flammable liquids.

#### **10. Regulation and Oversight Issue: Enhancement of FRA/UTC Rail Incident Databases**

**Finding:** Existing FRA and state rail incident databases are difficult to use and in some cases, not up to date. Additionally, rail accidents investigated by the FRA and/or state have preliminary short form (FRA 6180) information filled out and placed on-line within one month of the accident to aid in data collection and dissemination.

The FRA and UTC rail incident databases are inadequate for use in a timely and effective manner to research and investigate various rail incidents within a state or in a localized area. The FRA database of rail incidents is massive and difficult to navigate to find specific and meaningful data in a timely manner. The UTC information files may not correspond with FRA data files for a specific incident or type of incident.

**Recommendation:** FRA, in conjunction with state and local governments, should review and enhance usability of existing databases to include sort-ability by state and incident type, so that they are immediately accessible, providing the ability to search and retrieve accident and incident information.

#### **11. Cooperation and Communication: Establish Railroad Safety Committee Based on Harbor Safety Committee Model**

**Finding:** There is not existing infrastructure for cooperative communications between the railroad industry, regulatory agencies, and other interested stakeholders to foster safety on the rail systems.

There has been great success in the harbor safety committee process in Puget Sound, Grays Harbor, and the Columbia River with respect to fostering communication and cooperative approaches to reducing accidents and promoting safe practices in the state's waterways. Similar committee may help to promote safety on the railroads running through the state. Since the harbor safety committees are generally overseen by the US Coast Guard (USCG), the railroad committee may best be administered by the FRA.

**Recommendation:** PHMSA, FRA and UTC should form and co-lead Railroad Safety Committees similar to maritime-oriented harbor safety committee(s) for Class 1 railroads and for short-line railroads to foster communication and cooperative approaches to promote safe practices on Washington railroads. These committees may be expansions of the already existing monthly safety programs operating at the railroad and union levels.

# Mitigating Potential Risks from Crude by Rail Marine Transportation through Prevention

Potential crude by rail impacts on marine vessel traffic cover all regions of Washington's waterways and all segments of the marine transportation industry.

## Current Marine Traffic Carrying Crude by Rail Cargoes<sup>51</sup>

- **Columbia River:** BP Cherry Point Refinery in Puget Sound is currently receiving Bakken crude oil deliveries via Crowley Maritime ATBs from the Columbia River. Harley and Kirby are also moving crude oil from Clatskanie by tank barge (without inert gas systems) for delivery to BP Cherry Point, Phillips 66 Ferndale, and California. These transshipments originate from unit train deliveries (in 2013, 110 oil trains<sup>52</sup>) to the Columbia Pacific Bio-Refinery storage facility/marine terminal in Clatskanie, Oregon. BP has indicated these transshipments may cease upon completion of crude oil rail facility on-site at the Cherry Point refinery complex.
- **Columbia River and Puget Sound:** Portland oil terminals, McCall Oil, Willbridge, Famm Oil, Tesoro, and NuStar load tankers with Utah *crude by rail* for shipment to California refineries.<sup>53</sup>
- **Puget Sound:** The Targa Sound oil terminal (ex-Sound Refining) in Tacoma was receiving unit trainloads of Bakken crude oil for transshipment by barge to Washington's northern refineries.

## Potential Future Marine Traffic Carrying Crude by Rail Cargoes

- **Grays Harbor:** Three planned projects (Westway, Imperium, and Grays Harbor Rail Terminal LLC) to receive *crude by rail* in the Port of Grays Harbor could add an estimated 763 laden tanker and tank barge transits.<sup>53</sup> Three facilities to receive crude by rail are in the environmental review phase with a potential of 2.52 to 3.99 billion gallons of oil per year.
- **Columbia River:** Arc Terminals in Portland (the old Paramount Facility) takes Utah crude by rail to load onto Chevron tankers at the Portland Chevron oil dock to go to

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<sup>51</sup> ECOLOGY. 2013. Changing Oil Movement in the Northwest, July 2013.

<sup>52</sup> ECOLOGY. 2014. Marine Transportation Lower Columbia River Waterway Use.

<sup>53</sup> ECOLOGY. 2014. Changes to the Marine Transportation Lower Columbia River Waterway Use.

California. This operation began in May 2014 and current or future capacities have not yet been determined. In Vancouver, NuStar Energy LP (2.1 million gallons a day) is in construction to handle crude by rail. One facility is in the environmental review process: Vancouver Energy (7.56 million gallons a day).

- **Puget Sound:** As noted above, Bakken crude was brought in by rail to Targa Sound (ex-Sound Refining) to supply Phillips 66 Ferndale by barge, and now these operations are occurring from Clatskanie. Plans are to start the rail back up and eventually take one unit train per day.

## Impact of Crude by Rail on Future Vessel Traffic

Incorporating crude by rail related tankers and ATBs into the ever-changing vessel traffic in Washington State waters could potentially increase risks of spills from all vessels. Although difficult to quantify, the most likely source of a major oil spill from a marine vessel in Washington State is the rupture of a non-tank vessel's fuel oil tanks from a collision or grounding event. The non-tank vessel scenario is more likely due to the relative number of non-tank ships to tank ships. Credible spill sizes reach to several hundred thousand gallons. Increased traffic from all sources increases these risks. Crude by rail leading to increased exports of petroleum products contributes to this increased risk. The effects of this change have not been included in existing publicly released vessel traffic studies. The impacts to Grays Harbor vessel traffic from crude by rail proposals are expected to be included in the environmental impact statements.<sup>54</sup>

The addition of crude by rail-related tank vessels to the existing and future traffic will also change the patterns of bunkering activities. Many of the tank vessels that transit north from Grays Harbor, for example, are expected to transit to Puget Sound for bunkering, adding to the existing bunkering activities in those waters. Increases in bunkering in the Lower Columbia River with the increases of tank vessel traffic in those ports are expected. A decrease in tank vessel traffic from Alaska to Puget Sound and California is expected.

A number of factors will determine future vessel traffic patterns into which the crude by rail traffic would be incorporated:

- If crude prices continue as projected, incoming crude tanker traffic from Alaska will continue to decrease in Puget Sound; however, crude by rail-related ATB and tanker traffic from Lower Columbia River and Grays Harbor ports may supplant this to some degree. Tankers will continue to export refined products, and the amount of refined product exported is predicted to stay the same or slightly increase.

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<sup>54</sup> This may also be done for Columbia River under the EFSEC EIS.

- Due to economy of scale, cargo ship sizes (container ships, bulk carriers) are increasing, which may lead to fewer ship transits, but the larger ships have more mass and windage and might experience more difficulty in maneuvering in congested areas. Tanker sizes are currently limited to 125,000 DWT by regulation (in Washington). Ship size is also limited by navigational restrictions in BC, Grays Harbor, and Columbia River.<sup>55</sup> This risk is partially offset by improved navigational equipment onboard these new vessels, as well as fuel tanks independent from the hull.
- During peak traffic times, anchorages in Washington in Puget Sound and the Columbia River are near capacity. Any increase in the number of vessels requiring anchorage increases the likelihood of vessel “bunching” and exceeding the designated anchorage capacity. In addition, crude oil tankers servicing refineries often make multiple trips to/from anchorages.
- The proposed Canadian TransMountain Pipeline Expansion Project in Canada represents the largest potential, single introduction of new oil (diluted bitumen and other forms of bitumen) transported in Washington waters.
- Additional exports of petroleum products could potentially lead to more spills of hazardous cargoes (refined products and chemicals) other than crude oil. In 2011, for example, 83 million barrels of refined products were exported from the state.
- The risk of crude spills will increase as more crude will be moved across Washington waters, if the federal ban is lifted.

## Safety Concerns with Crude by Rail Vessel Traffic

The current and potentially expanding crude by rail vessel traffic in Puget Sound, Grays Harbor, and the Lower Columbia River present a number of specific vessel safety concerns, including:

- ATBs, which currently hold up to 7.5 million gallons of oil,<sup>56</sup> are not required to meet Rosario Strait traffic rules;<sup>57</sup>
- Inerting of tanks is not required on tank vessels under 20,000 deadweight tons. This includes most *towed oil barges transiting Washington waters*. Although not required, ATBs do have Inert Gas Systems onboard. The inability to inert tanks greatly increases the likelihood of a fire or explosion when transporting more flammable/volatile cargoes of Bakken crude, though ATBs are most likely to be used for crude oil.
- “Pre-booming” tank vessels during transfer operations at refineries and terminals may not be possible with cargoes of highly volatile Bakken crude for safety reasons; this may increase the spread of oil in the event of a spill.

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<sup>55</sup> Lower Columbia River Harbor Safety Plan, Navigation Practices Section, and GH Harbor Safety Plan.

<sup>56</sup> Some ATBs hold up to 13 million gallons, but these are not currently transiting Washington waters.

<sup>57</sup> 33 CFR 161.55 Vessel Traffic Service Puget Sound and the Cooperative Vessel Traffic Service for the Juan de Fuca Region.

# Crude by Rail Marine Prevention-Based Risk Mitigation Recommendations

To be most effective, risk mitigation measures to reduce the incidence of vessel and marine facility spills and accidents that lead to spills should be developed taking a sound waterways management systems approach. In large part, due to the federal government's pre-emption of a state's ability to regulate in this area, states rely on the USCG to set strong standards for prevention and waterways management.

## 12. Build on Previous Spill Prevention Successes

**Finding:** There has been a great degree of success with vessel spill and accident prevention measures in Washington waters.

Existing training and management practices in Washington State represent high standards of care, including:

- Sixty years of experience with marine transportation of oil.
- Active harbor safety committees in Puget Sound, the Lower Columbia River, and Grays Harbor.
- Vessel inspections at federal and state levels, as well as classification societies and industry audits.
- Managed vessel traffic in Columbia River, Puget Sound and Southern Salish Sea including Puget Sound vessel traffic services (VTS), including the Cooperative VTS (CTVS) between the US and Canada, and the Canadian Marine Communications and Traffic Services (MCTS).
- Tanker escort practices.
- Pilotage of large vessels in most areas, with:
  - Extensive training procedures (with federal and state issued licenses).
  - Use of more than one pilot for long voyages reduces fatigue.
  - Requirements for two pilots onboard in some areas (e.g. BC requirements in Boundary Pass) to reduce the risk of pilot distraction.
  - Current US-flagged crude oil tankers and ATBs have high levels of redundancy in powering and steering systems.<sup>58</sup>

Current regulatory, inspection and operational procedures have been relatively effective at prevention. The 2014 VTRA 2010 report<sup>59</sup> found that there have been no spills from deep draft

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<sup>58</sup> Both the ATC and Polar tankers are twin-screw, twin-rudder designs. This is not typical of foreign flag tankers. The Crowley ATBs have redundant steering systems.

vessels in transit and none greater than 10,000 gallons from oil barges in transit in the past 20 years.

**Recommendation:** Ecology and the Pilotage Commission should continue to support the extensive maritime safety programs in place at the international, federal, state, and industry levels, and be a catalyst for continued training, drills, and vigilance at all levels of the spill prevention and preparedness “system,”

### 13. Reduce Human Error and Increase Situational Awareness

**Finding:** Risk mitigation options that address human error and improve situational awareness are the most effective. A number of these measures would increase safety of crude by rail and other transportation in Washington waters.

As much as 80% of maritime accidents are attributed to human error,<sup>60</sup> many with fatigue as a root cause. An example of this can be found in a recent National Transportation Safety Board (NTSB) action and subsequent Safety Recommendation implanted by the Columbia River Bar Pilots (CRBP) and Columbia River Pilots (COLRIP)<sup>61</sup>. Risk control options that improve situational awareness (e.g. navigational tools, traffic management systems, management practices) and reduce mariner fatigue (e.g. manning/work hour requirements) have been evaluated to be most effective.<sup>62</sup> A systems approach looking at this issue from a situational awareness perspective, which encompasses manning levels on all classes of vessels including commercial fishing and towing vessels, is appropriate for follow-on work related to this study.

Long voyages lead to mariner (pilot and crew) fatigue and to more accidents. This has been verified by a Pacific Pilotage Authority study<sup>63</sup>. Increased number of ships, driven in part by increased exports of petroleum products using crude by rail as a source, will lead to more vessel encounters requiring heightened situational awareness.

The approaches to reducing human error and increasing situational awareness that have proven successful in other locations include:

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<sup>59</sup> vanDorp, J.R., and J. Merrick. 2014. 2014 VTRA 2010 Final Report: Preventing Oil Spills from Large Ships and Barges in Northern Puget Sound & Strait of Juan de Fuca. Prepared for Washington State Puget Sound Partnership. 163 p.

<sup>60</sup> Approximately 50% of maritime accidents are initiated by human error, while another 30% occur due to failures of humans to avoid an accident (Baker and Seah 2004).

<sup>61</sup> NTSB, 2014. Safety Recommendation M-11-20

<sup>62</sup> Based on various IMO Formal Safety Assessments.

<sup>63</sup> Pacific Pilotage Authority, Canada, personal communication.

- Restriction of working hours in command positions on small passenger vessels, tug boats, and fishing boats.
- Increased manning on covered fishing vessels and tugs towing oil barges.
- Automated track control system for pilots.
- Requirement for pilots in high-risk areas.

A systems approach looking at the situational awareness issue that encompasses manning levels on all classes of vessels, including commercial fishing and towing vessels, may be also appropriate for follow-on work related to this study.

**Recommendation:** Ecology should continue to develop marine safety, industry oversight, and inspection criteria to reduce human error and increase situational awareness:

- Advocate for the implementation and monitoring of the proposed USCG rulemaking on barge inspections and crew working hours.
- Direct the implementation of an automated track control system into mobile navigational systems used by state pilots.
- Advocate for the conducting of a situational awareness analysis to include manning levels on all classes of vessels including commercial fishing and towing vessels.

#### 14. Reduce Spill Probability with Protected Fuel Tanks on Ships

**Finding:** The implementation of International Maritime Organization (IMO) requirements for protective location of fuel oil tanks<sup>64</sup> for ships constructed in 2010 and later reduces the risk of a fuel oil spill in collisions, allisions and groundings. The implementation of these regulations has been occurring at a voluntarily enhanced pace by the shipping industry.

This regulation eliminates the placement of fuel oil tanks adjacent to the hull skin for all vessels subject to the regulation. This requirement reduces the probability of oil spills in accidents similar to the Cosco Busan spill (in San Francisco) and those due to tug and bunker barge impacts. This requirement applies to all vessel types, including tankers for which the double hull requirements of OPA 90 only applies to cargo tanks. Research<sup>65</sup> in support of the IMO regulation indicated reductions in fuel tank spill probabilities of the order of 80% in the examined bulk carriers and 50% in the examined container ships.

Requiring, or encouraging through a voluntary “best practices”-type program, newly-permitted facilities to accept only vessels with the new fuel tank construction would effectively put an age

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<sup>64</sup> International Maritime Organization (IMO). 2010. Regulation 12A to MARPOL Annex I. 2010.

<sup>65</sup> Michel, K., and T.S. Winslow. 2000. Cargo ship bunker tanks: Designing to mitigate oil spillage, *Marine Technology* Vol. 37 (4): 191 – 199.

restriction on vessels but might be implemented as a performance standard. It would be difficult to require this of vessels visiting existing facilities but a maximum age requirement has been implemented for tankers in other countries (Japan). Commitments to utilize best practices would encourage adoption of this approach for all facilities. Costs to implement these procedures are indirect in that they reduce the available pool of vessels that can call. However, as new ships are generally safer than old ships, costs associated with non-environmental risks should lower. Costs will reduce with time as fewer ships built before 2010 transit the region.

**Recommendation:** Require, through the project permitting process or similar, newly constructed and significantly expanded facilities implement ship vetting procedures or contractual agreements with shippers calling at their docks to meet the IMO Convention for Prevention of Marine Pollution (MARPOL) Annex 1, Regulation 12A, Oil Fuel Tank Protection requirements for independent from the hull fuel tank construction standards required for new vessel builds after 2010. An additional possible strategy for implementation is through the Army Corps of Engineers facility permitting process.

### **15. Railroads Join Harbor Safety, Area Maritime Security, and NW Area Planning, and Local Area Planning Committees (LEPCs)**

**Finding:** Railroad representation has been absent in Harbor Safety and Area Maritime Security Committees, the Northwest Area Committee, and LEPCs at a time when there are significant changes to the crude by rail facility and maritime interface.

Harbor Safety and Area Maritime Security committees, the Northwest Area Committee and LEPCs are important entities that effectively foster spill and accident prevention and improve maritime safety and security through cooperation and communication between regulatory agencies, industry, and other stakeholder groups.

**Recommendation:** Engage the applicable railroads to actively participate in the three harbor safety committees, two Area Maritime Security Committees, the Northwest Area Committee, and LEPCs. The USCG and Ecology should support the harbor safety committees through increased funding.

### **16. Expand Tug Escort Requirement for Oil Tankers to Grays Harbor and Columbia River**

**Finding:** Tug escorts are required for tank vessels in Puget Sound but not in Grays Harbor or the Columbia River. Tug escorts provide one of the strongest prevention measures for vessel incidents.

The regulation for tanker tug escorts applies only to Puget Sound. Tug escorts are a critical prevention measure for reducing risks from vessel incidents such as loss of propulsion, loss of

steering, or adverse weather. Currently pilots in Grays Harbor and the Columbia River determine if tug escorts are needed and some facilities, such as Imperium, have voluntarily enacted tug escort procedures for laden tankers. This standard practice could be expanded to include Grays Harbor and the Columbia River with the new levels of tanker traffic anticipated in these water bodies.

**Recommendation:** Ecology should lead an analysis with the USCG and Harbor Safety Committees on the potential effectiveness of escort tugs for tank vessels that are on or have the potential to impact Washington navigable waters where they are not already required.

### 17. Evaluate the Effectiveness of Additional Emergency Tow/Rescue Tugs

**Finding:** Emergency Tow/Rescue Tugs can be effective to assist disabled vessels. While effectiveness is site-specific and experience from use in one location does not necessarily transfer to other locations, analysis is needed to examine the potential gains and cost of additional tow/rescue tugs.

In other countries these are called emergency towing vessels (ETVs). Experience in countries where government funded ETVs are stationed<sup>66</sup>, shows that their deployment to stop drifting vessels grounding on leeward shores, or as passive escorts to high-risk ships in transit has been particularly successful. Often ETVs are tasked to stand-by disabled ships while repairs are affected and provide assurance that should conditions change, or repairs prove ineffective, a capable tug is immediately available to take the vessel under tow. An example of such is the Emergency Rescue Towing Vessel (ERTV) stationed at Neah Bay. A characteristic of these applications is relatively wide passages with long drift times.

It is important to note the capabilities of ERTVs and ETVs. The towing vessels can assist a disabled vessel (or tug and barge) and potentially prevent it from drifting ashore. To accomplish this, the tug must:

- Be able to operate in severe weather.
- Reach the vessel before it grounds.
- Be able to attach a tow line in the prevailing weather conditions.
- Have sufficient power to prevent the drift ashore.

ERTVs and ETVs may also be able to provide escort of high-risk vessels if appropriately sized and equipped; and assist in other emergency situations, e.g. fires, persons overboard, medical

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<sup>66</sup> Middleton, R. 2009. Emergency Towing Arrangements in the Mediterranean Sea, SAFEMED Project: MED.2005/109-573

emergencies. But, an ERTV or ETV cannot prevent a collision or prevent a powered grounding.<sup>67</sup>

Turn Point is recognized as a Special Operating Area by the USCG<sup>68</sup> which applies procedures to minimize meetings of large vessels. Use of the rescue tug as a passive escort for vessels, especially high risk vessels, has been proposed. In the 2014 VTRA 2010 study an attempt to model this approach was made. In that study the model applied an escort to all “focus vessels” through Haro Strait and Boundary Pass. Clearly this is beyond the capabilities of a single tug. Further, the effectiveness of an untethered escort in a narrow passage is questionable. Laden tankers traveling this area must have tethered escort in narrow passages such as Rosario Strait. At this time there is insufficient information to assess the effectiveness of such an operation.

The function of an ERTV positioned near the entrance to Grays Harbor and mouth of the Columbia River would be similar to that of the Neah Bay rescue tug or ERTV. Consideration should be given to maintaining it on station outside the harbor or river entrance during periods of heavy weather to avoid bar closures preventing potential rescue actions. Closures are rare; however, requiring a tug to wait outside the bar during closures would increase costs and risks to human life. At this time there is insufficient information to assess the effectiveness of such an operation.

The safety of ERTVs crossing bars during inclement weather must be taken into consideration. The deep draft navigation channel in the Columbia River is 100 miles long and 600 feet wide — geographically very different than Puget Sound. A typical escort tug tethered on a long line will not work in many areas. Either the tugs safety would be jeopardized by having to leave the channel to effectively steer a disabled vessel or in much of the river it would not have the response time to be effective.

**Recommendation:** Ecology should lead an analysis with the USCG and Harbor Safety Committees on the potential effectiveness of a pre-positioned ERTV, stationed in the vicinity of Turn Point at the junction of Haro Strait and Boundary Pass. This analysis should include the potential effectiveness of an ERTV positioned near the entrance to Grays Harbor and mouth of the Columbia River.

## 18. Reconsider the Definition of High-Risk Vessels

**Finding:** High-risk vessels may better be identified with adjusted criteria.

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<sup>67</sup> A powered grounding occurs when a ship proceeds down an unsafe track, even though it is able to follow safe track, due to errors related to human or technical failure. This is opposed to a “drift grounding” in which the vessel is unable to follow a safe track due to mechanical failure, adverse environmental conditions, anchor failure, or assistance failure (DNV Formal Safety Assessment of Cruise Navigation DNV Report 2003-0277. Det Norske Veritas, Høvik, Norway. 2005.

<sup>68</sup> USCG, 2014. Turn Point: Special Operating Area, [www.uscg.mil/d13/cvts/turn.asp](http://www.uscg.mil/d13/cvts/turn.asp) Accessed July 25, 2014.

Some of the criteria currently used are based on incorrect data that may need to be re-examined. For example, the 2014 VTRA 2010 study states that “no Capesize<sup>69</sup> bulker vessels travel through the VTRA study area”. In 2010, 120 bulkers over 100,000 tons DWT berthed at the Canadian Westshore Terminals at the Roberts Bank terminal complex. Of these, over 100 were greater than 150,000 DWT tons and 15 over 200,000 DWT tons. Thus the CVTS and MCTS, pilots and ship masters of ships traveling in Haro Strait and Boundary Pass do, in fact, have experience with Capesize bulk carriers. This suggests a risk mitigation measure to consider these “high-risk” vessels and require the potential Gateway Pacific Terminal Capesize traffic to be escorted. At least initially, this mitigation measure is probably not cost-effective.<sup>70</sup>

**Recommendation:** Ecology should lead an analysis with the USCG and Harbor Safety Committees to define and develop tug escort requirements and standards for “high risk” vessels based on the probability of human error or mechanical failure. Alternative definitions of “high-risk” vessels, i.e. ones for which the probability of human error or mechanical failure are higher, such as “tramp ships,”<sup>71</sup> which may have less experience in the region, would be more cost-effective in reducing incidents. High-risk vessels as defined by large numbers of inspection deficiencies are already subject to increased vigilance.

### 19. Enhance VTS Capability in Grays Harbor, Lower Columbia River, and Outer Coast

**Finding:** A formal vessel traffic system is lacking in Grays Harbor and on the outer coast at present. The current system on the Columbia River may not be adequate in the long term. Current VTS systems are at risk of under-funding, reduction in watchstanders, and reductions in situational awareness due to employed technology systems. There is evidence of many VTS errors and lack of action regarding the tug/tow combinations under the current situation. Reducing funding and personnel will make this situation much worse.

A USCG sponsored VTS covering Grays Harbor, Columbia River, and the outer coast will reduce shipping accidents such as collisions and groundings. If traffic levels increase, more monitoring will be appropriate. Given the level of traffic, this could be a tiered or localized system but the consequence is high enough to warrant this level of effort.

**Recommendation:** The USCG should establish a long term waterways management plan to accommodate increased vessel traffic and an appropriate vessel traffic service for the waterways of Grays Harbor, Columbia River, and the outer coast.

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<sup>69</sup> A Capesize bulker (bulk carrier) is over 150,000 deadweight tonnage (DWT).

<sup>70</sup> Note not all the experience is good, a Capesize bulker allided with the coal terminal in late 2012, however an escort would not have prevented it.

<sup>71</sup> A ship engaged in the tramp trade is one that does not have a fixed schedule or published ports of call. As opposed to freight liners, tramp ships trade on the spot market with no fixed schedule or itinerary/ports-of-call(s).

## 20. Restrictions on Vessel Bunkering Activities to Reduce Potential Oil Spills

**Finding:** Bunkering operations may be increased in Puget Sound with crude by rail vessel traffic coming from Grays Harbor and Columbia River ports since there are limited bunkering facilities in those ports. This increase in bunkering may lead to additional spillage in Puget Sound.

Bunkering restrictions can protect sensitive areas from related spills. These restrictions can introduce migration of risk, but this can be controlled by having enhanced prevention and preparedness in areas where bunkering occurs.

**Recommendation:** Ecology should lead an analysis with the USCG and Harbor Safety Committees to evaluate limiting or moving bunkering activities to locations at which enhanced prevention and preparedness capabilities exist or could be established.

## 21. Reduction of Speed for Container Ships

**Finding:** Speed restrictions on container ships may reduce the likelihood of collisions with other vessels, including crude by rail-related traffic.

The 2014 VTRA 2010 study indicated that speed of container ships in congested areas may be a factor that increases the potential for collisions.

**Recommendation:** Ecology should lead an analysis with the USCG and Harbor Safety Committees on restricting speed for container ships (and other large vessels) to reduce the likelihood of collisions in congested areas of ports or shipping channels in Puget Sound.

## 22. Minimize Multiple Trips from Berth to Anchorage by Tankers

**Finding:** Foreign-flag tankers used to import crude oil make multiple trips from anchorage to berth and back during the off-loading process.

Automatic Identification System (AIS) data shows this is a recurring behavior pattern that introduces additional risk due to added maneuvers and effectively storage of crude oil in vessels in the anchorages.

**Recommendation:** Advocate with the USCG to eliminate the current industry practice of multiple berthing/partial discharging/anchoring of tankers carrying foreign crude oil, either by regulation or through voluntary action adopted as harbor safety standards of care. Exceptions should be allowed on a case-by-case basis for such a standard, such as in the case of facility operations requiring floating storage or partial discharges and sailing offshore would increase risk of drifting.

# Mitigating Risks at Terminals, the Interface between Crude by Rail Transportation and End Users or Marine Transportation – Prevention

The terminals embody the interface between transportation of oil by rail, and either end use of the oil for refining or the next phase of transportation, tank vessels.

## Crude by Rail Terminal Risk Mitigation Recommendations

### 23. Build on 20 years of Spill Prevention at Oil Handling Facilities

**Finding:** The Facility Oil Handling Regulation, Chapter 173-180 WAC, was promulgated prior to the rise of crude by rail transportation. No minimum standards for best practices or technology at crude by rail terminals are included in the regulation.

Washington State spill prevention efforts are some of the most effective in the nation, including:

- State approved plans for spill prevention, operations manuals, training and certification of operations staff, minimum design standards for technology and operations practices, and inspections for compliance.
- Spill investigation with the intent of applying lessons learned to all facilities.
- Consensus standards for minimum performance-based technology and practices for oil handling with a focus on preventing spills over water and land.
- Inspection of oil transfers between onshore facilities and vessels to encourage spill-free operations.

Chapter 173-180 WAC has not been updated for facility spill prevention standards since 1994. Crude by rail was not a common practice at that time, and no design standards exist to cover this area of oil handling. Other areas of the minimum standards are outdated or are missing new technologies and practices that have developed over the intervening years.

**Recommendation:** Ecology should modernize the Design Standards for Class 1 Facilities (WAC 173-180-300 to 340) to address all modes of oil handling in to and out of a Class 1 facility.

### 24. Extending the Best Achievable Protection (BAP) Standard to Facilities

**Finding:** The concept of BAP currently only exists for tank vessels, and has not been extended to facilities handling oil.

BAP sets a standard to continuously reach the highest level of protection in preventing and preparing for oil spills, focusing on best technology, staffing levels, training procedures, and operational methods that provide the greatest degree of protection available. The Legislature established this standard for covered vessels and should now extend it to regulated facilities in order to keep the state's program forward leaning.

**Recommendation:** Modify RCW 90.56 to apply BAP Planning Standards to all facilities handling oil.

## 25. Shared Standards of Spill Prevention on the Columbia River

**Finding:** The Lower Columbia River is a shared waterway with Washington, and both states have an interest in protecting it from pollution. The state of Oregon lacks similar regulations regarding the prevention of oil spills from oil handling facilities and tank ships, in particular a requirement to pre-boom oil transfers when safe and effective to do so.

With the beginning of crude by rail operations at the Columbia Pacific Bio-Refinery (now Global Partners) facility near Clatskanie, Oregon, in 2012, the state of Oregon accepted the increase in risk associated with crude by rail transportation on land, as well as via marine transportation on the Lower Columbia River and outer coast. Oregon does not have regulations regarding the storage of oil in the proximity of waters of the state, nor for transferring the oil from tank farm facilities to forms of freight transportation ('oil transfers')

The state of Washington, among other states, has adopted regulations that address over-water oil transfers from oil handling facilities. A highlight of the Washington regulation (WAC 173-180) is the requirement to place containment boom around receiving marine vessels ('pre-booms') unless it is deemed unsafe and ineffective to do so. When oil spills to water occur at applicable facilities, the oil has an initial level of containment already in place. Successful oil spill prevention programs have been developed in Washington, California and Alaska, among other states.

The Global Partners facility currently pre-booms voluntarily, but there is no authority for Oregon to require it there, or at any of the refined product terminals in the state.

**Recommendation:** Encourage the state of Oregon to adopt facility oil handling regulations that include a pre-boom requirement to mitigate risk of and enhance protection from oil spills.

# Mitigating Risks through Preparedness and Response

While the most effective approaches to mitigating or reducing risk aim at preventing spills and accidents from occurring in the first place through effective prevention measures, the next tier of risk mitigation comes from effective response to incidents to reduce the consequences or impacts of an event. For crude by rail -related train incidents, and potentially for crude by rail -related vessel and facility incidents, the possibility of fire and/or explosion means that emergency preparedness must focus first and foremost on public safety.

Protecting the environment is also a high priority in reducing impacts of incident. Spills from crude by rail trains, tank vessels, or facilities would require appropriate responses to limit the volume of oil released, reduce the spread of the oil, protect the most sensitive resources as prioritized by geographic response plans and other means, and clean up oil that is released to the environment.

After a review of preliminary findings on Washington State's preparedness and response capability for crude by rail incidents, a number of recommendations for options have been developed, as follows.

## Oil Spill Planning and Emergency Response for Crude by Rail

Spill response planning has been repeatedly shown to be instrumental in assuring rapid and effective mitigation of spill incidents regardless of the source of spillage or location. Washington State has developed a comprehensive program to prepare for and respond to spills through the Department of Ecology Spill Prevention, Preparedness, and Response Program. The program needs to be able to prepare and plan for the changing types of incidents that may occur on rail lines, at facilities, and from vessels with crude by rail.

### 26. Support of Multi-Agency Comments on Federal Rulemaking on Oil Spill Response Plans for High-Hazard Flammable Trains

**Finding:** There is currently an Advanced Notice of Proposed Rulemaking (ANPRM) at the federal level by FRA, the PHMSA, and USDOT that proposes revisions to requirements for federal oil spill plans from trains. .

Federal regulations only require comprehensive response plans for spills from carriers of individual rail tank cars with individual capacities of more than 42,000 gallons. This means trains with blocks of cars of 30 or more or unit trains consisting of 100+ rail tank cars have only

basic spill response plans under federal authority. Crude by rail tank cars (both DOT-111 and the newer CPC-1232 cars) typically contain 30,000 to 30,110 gallons, meaning none of the current crude by rail trains are subject to requirements for comprehensive response plans. Washington State provided multi-agency comments to the FRA, PHMSA, and USDOT in response to potential revisions to its regulations that would expand the applicability of comprehensive oil spill response plans (OSRPs) to high-hazard flammable trains. A copy is provided in Appendix C.

**Recommendations:** The joint state agency comments included the following recommendations:

- FRA and PHMSA should require that the threshold for comprehensive OSRPs be set at 3,500 gallons, equivalent to the current requirement for basic OSRPs.
- FRA and PHMSA should require that all federal rail response plans be provided to SERCs, Tribal Emergency Response Commissions, and LEPCs and state agencies designated authority as State on Scene Coordinators.
- FRA and PHMSA should both review and approve OSRPs using clear, specific criteria for plan review and approval, including submittal and review timeframes.
- FRA and PHMSA should require that rail operators participate in a drill and exercise program, including announced and unannounced exercises following national guidelines.
- FRA and PHMSA should require a minimum amount of demonstrated financial resources to pay for response, cleanup, remediation, natural damage assessment, and restoration costs, based on the reasonable worst-case spill volume of a train carrying oil as cargo.
- FRA and PHMSA should require the use of the incident command system to respond together to both risks of spills and actual spill, with the federal, state, tribal and local governments under a Unified Command.

## **27. Modify Washington’s Statutory Definition of “Facility” to Encompass Moving Trains (as well as Stationary Trains Conducting Oil Transfers) in Oil Spill Contingency Plans**

**Finding:** Railroad spills are not currently covered by state approved oil spill contingency plans, a situation which represents a significant gap in response planning.

Washington State has not enforced its laws and regulations requiring oil spill contingency plans for rail cars carrying oil as cargo. State laws do not have similar planning thresholds as federal rules and rail oil spill plans would include unit trains as well as single cars carrying oil as cargo (crude and refined oil products). Current state laws do not define railroads as facilities while moving. This means that there is a gap in planning by the responsible party for a potential major spill, fire and toxic emission release incidents while the train is underway.

**Recommendation:** Modify the definition of “facility” (RCW 90.56) to include moving oil cargo trains and direct Ecology to write rules related to oil spill contingency plans for trains as per

existing facility regulations, to include defining a worst case spill planning volume and requiring participation in drills.

## **28. Certify the Financial Responsibility of Vessel and Facility Operators: Paying for Damages from Oil Spills**

**Finding:** Washington State has not yet established a level of financial responsibility for oil handling facilities, including rail, a situation which represents a significant gap in response planning.

The United States has established a framework based on the premise that the “polluter pays” for oil spills. Both the federal government and Washington State have laws and rules that require certain oil handlers to demonstrate evidence of their financial ability to pay for the removal of oil spills, for natural resource damages and for other expenses related to spill responses. “Financial responsibility” refers to the proof or demonstration that a responsible party is able to pay for the costs and damages of a spill up to a specified amount. Typically, financial responsibility is evidenced by an insurance policy or P&I club documents but also may involve surety bonds, guarantees, letters of credit, or qualification for self-insurance.

The federal government has an established limit to the potential liability for the spiller; Washington’s State has unlimited. In Washington, financial responsibility is based on the type of vessel, and the total capacity for storage of product. Washington State, however, does not currently have a certification program and relies on the USCG, California and Alaska to certify vessels for financial responsibility. Washington has not established financial responsibility levels for facilities which includes both fixed and mobile facilities and rail as a facility.

**Recommendation:** Modify RCW 88.40 and direct Ecology to extend financial responsibility requirements to rail and mobile facilities, and enable Ecology to modify the regulations on financial responsibility requirements (Chapter 317-50 WAC). Issuing Certificates of Financial Responsibility ensure that those transporting oil can pay for cleanup costs and damages resulting from oil spills.

## **29. Define Oil to Include All Forms of Crude Oil**

**Finding:** The current state regulatory definition of oil may not include certain heavy oils, diluted bitumen, synthetic crudes, and other crude oils produced in Canada that are transported in Washington. Additionally, the current definition of oil has a technical drafting error, which may add confusion to the applicability to certain oils.

**Recommendation:** The Washington State Legislature should amend definitions of oil at Chapters 88.40, 88.46, 90.46 and 90.56 RCW to read as follows:

“Oil” or “oils” means oil of any kind that is liquid at 25°C and one atmosphere of pressure, and any fractionation thereof, including, but not limited to, crude oil, bitumen, synthetic crude oil, natural gas well condensate, petroleum, gasoline, fuel oil, diesel oil, biological oils and blends, oil sludge, oil refuse, and oil mixed with wastes other than dredged spoil. Oil does not include any substance listed as of March 1, 2003, in Table 302.4 of 40 CFR Part 302 adopted under section 102(a) of the Federal Comprehensive Environmental Response, Compensation, and Liability Act of 1990, as amended by PL 99-499.

### 30. Volume and Characteristics of Oil Transferred by Rail Facilities

**Finding:** State and local agencies charged with preparation and response to rail spills and incidents that threaten spills do not possess the product type or volume data necessary to properly plan for response strategies. Further, there is no federal or state requirement in existence that would require the railroads to submit oil product type and volume data at the point of transfer to state and local agencies.

Currently, the state does not have means to gather information on the type or volume of oil being shipped through Washington. There are no federal requirements in place to provide the information, with the exception of a recent USDOT Bakken oil emergency order, which does not provide thorough enough information for complete risk-based emergency and spill response planning. For example, the USDOT emergency order was specific to only Bakken crude oil and information on shipment of Bakken crude smaller than one million gallons are not required to be reported.

**Recommendation:** Modify RCW 90.56 to require railroads to submit advance notice to the state on the volume and characteristics of oil being transferred by rail facilities to other facilities or to vessels should this practice exist.

## Local, County and State Emergency Preparedness Response Capabilities

Local, county, and state emergency responders need to be able to respond effectively to incidents that may occur with crude by rail. This means that first responders may need additional training, equipment, and resources to respond to a train derailment with an associated spill, fire/explosion and toxic fume emissions.

### 31. Enhance Emergency Response Capabilities

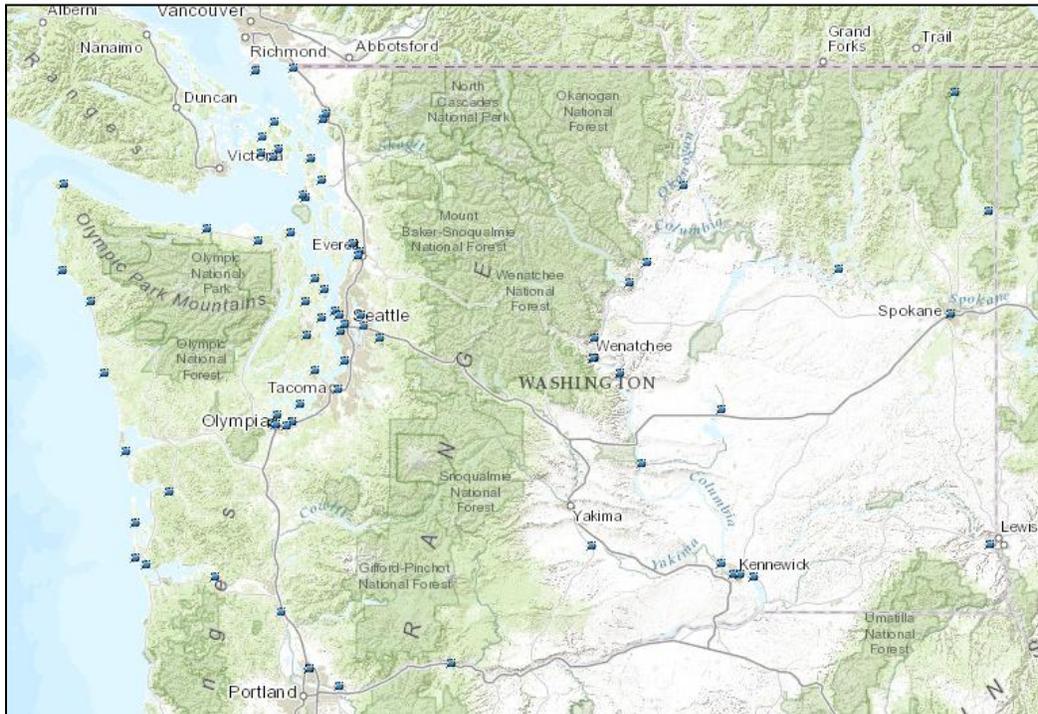
**Finding:** Equipment necessary for oil spill containment, responder health and safety monitoring and fire suppression during a crude oil emergency response are insufficient in much across much of Washington.

Based on preliminary results of a survey conducted by EMD of the 278 local fire districts through which crude by rail transportation occurs or is likely to occur, 62% believe that their departments are not sufficiently trained or do not have the resources to respond to a train derailment accompanied by fire. Local fire departments and fire protection districts across the rail transportation corridor do not have adequate funding necessary to plan, train and equip their communities for a crude oil incident. These incidents need specialized resources such as fire suppressant foam and support equipment, the ability to monitor for potential human health exposures related to Bakken and other crude oil spills, and the ability to contain spilled oil with specialized oil spill response equipment.

In 2006, Ecology administered an oil spill response equipment grant program which provided specialized oil spill response equipment and training to local first responders and tribes across Washington. The \$1.45 million grant project provided 99 oil spill response equipment caches across the state and trained over 1,000 first responders on how to safely and effectively deploy the equipment (see Figure 16). The equipment has been used dozens of times since the equipment was deployed, and has effectively limited the spreading and environmental damage of spills and has reduce the time and costs associated with oils spill cleanup. In just one case where the oil spill response equipment was deployed, the cost of the cleanup was reduced by and estimated \$1.5 million.

This grant program was limited equipment locations, which were based on risks as they were understood in 2006 prior to the development of Bakken crude rail shipment in Washington. This program demonstrates how effective response equipment can be when it is in the hand of local first responders who can deploy the equipment in a much more timely manner than waiting for state or federal response resources to cascade into the area. Additionally, the grant program was one-time funding and requires on-going training, maintenance and periodic equipment replacement in order to be most effective. The existing equipment cache program was also limited in the scope of equipment that was provided to local and tribal first responders and did not fulfill the entire equipment and training needs of first responders who now face the additional risk of highly flammable crudes being shipped by rail.

**Figure 16: Existing Response Equipment Caches**



**Recommendation:** Fund an enhanced and continuous oil spill response equipment and a local first responder firefighting equipment grant program. Ecology should work with local responders to develop rules for the administration of the grant program. Ecology should work with representatives from the local first response community to scope out additional equipment and training needs, such as fire foam and exposure monitoring equipment. On going funding and staffing should be provided to administer the program, maintain existing equipment and provide periodic training to first responders.

### **32. Local Responder Knowledge of Response Equipment and Plans Related to Crude by Rail**

**Finding:** Local responders have identified a lack of knowledge in the available equipment and response resources in the event of a crude by rail incident. Further, there is a gap between railroads and local responders on plans and strategies in place by the railroad should a crude by rail incident occur.

As discovered in the survey developed and disseminated to all fire chiefs and LEPCs within the state, local responders do not feel adequately prepared to contain, defend, and suppress a crude by rail incident. An overwhelming majority of those surveyed are not aware of the response strategies or resources in place by the railroads should an incident take place. There is also a general lack of communication between the railroads and the local response community.

**Recommendation:** EMD should enhance the emergency response capabilities of local, county, and state first responders by assisting adaptation of county-level ESF-10 plans to address crude by rail Oil and Hazardous Materials Response. Ecology, UTC and EMD should work directly with PHMSA and FRA to establish a strategy for railroads to work with local responders in the state to identify railroad response strategies, equipment and available resources, as well as establish a direct line of communication to activate resources.

### 33. Expand Current Centralized Hazardous Material Resources and Training

**Finding:** The majority of local emergency response agencies in the state lack the resources to provide adequate response training for their personnel as well as to conduct emergency planning.

According to the state fire marshal, current funding for federal grants is variable. Homeland Security grants are being reduced while the SAFER and AFG grants are stable at the moment. Some hazardous materials response equipment has been provided by federal grants and private industry; however, this equipment is not supported by ongoing training. Additionally, there is not a comprehensive inventory of the equipment location that would aid in locating and sharing equipment when it is needed. There should be a concerted effort to identify this equipment on a statewide basis. Training for first responders in Washington State is currently insufficient and is not uniformly coordinated, and what training is currently available is at risk of reduction due to reduced federal grants.

**Recommendation:** The Washington Office of Financial Management and the state fire marshal should develop state funding options for the legislature to provide statewide coordinated training. The state fire marshal should also work with the railroads for expansion of the current centralized system for hazardous material training to address the unique hazards presented by crude by rail. The state fire marshal should review first responder rail tank car training needs and develop a specific training program with mandatory requirements and implement a coordinated training program for first responders.

### 34. Update Study on Hazardous Response Teams and Response Structure

**Finding:** There is a need for regional hazardous materials response teams to adequately respond to spills of Bakken crude oil and other hazardous materials.

Previous studies led by Ecology and other stakeholders in 1993, and 2005, were conducted to evaluate gaps in the current hazardous materials response capability in Washington and make recommendations to fill identified gaps. Both of these studies found that substantial gaps in hazardous materials response capability exist in Washington and both made recommendations to develop state-supported regional hazardous material response teams. In January 2006, the Washington State Emergency Management Council unanimously endorsed pursuing the development of regional hazmat teams. Ecology administered an additional study, which was

completed in October 2006, and provided a detailed description and recommendations of program description, candidate funding mechanisms and draft legislation. Details were provided on the location, team types, number of technicians, and training required based on a recent review of the history of hazmat call types and exposure factors using a risk-based model. Legislation to create the program was introduced; however, no action by the legislature was taken.<sup>72</sup>

**Recommendation:** Direct Ecology and state fire marshal’s office to analyze the continued need for hazardous materials response teams, their composition, how they should be equipped and trained, where they should be located, funding mechanisms, and how they will mutually assist statewide. Part of this analysis should include development of a startup and recurring cost estimates for such teams.

## Geographic Response Plans (GRPs)

GRPs are an important part of Washington State’s and the Northwest Area Committee’s oil spill prevention and readiness programs. GRPs are geographic-specific response plans directing immediate actions for oil spills to water. They include response strategies tailored to a specific beach, shore, or waterway and meant to minimize impact on sensitive resources threatened by the spill. Each GRP has two main priorities:

- To identify sensitive natural, cultural or significant economic resources; and
- To describe and prioritize response strategies in an effort to minimize injury to sensitive natural, cultural, and certain economic resources at risk from oil spills.

GRPs are developed as part of the Region 10 Response Team (RRT) and Northwest Area Committee (NWAC).

### 35. Review GRPs for Adequacy of Coverage, Best Technology, Testing and Continuous Development

**Finding:** GRPs have not been developed for most of the rail corridors through which crude by rail trains are transiting or will transit in future. There are also significant gaps in GRPs for marine areas. Capacity does not exist in the state to update and field test GRPs on a regular basis.

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<sup>72</sup> South Seattle Community College District, B. Zetlen, and J. Bernhardt. February 1993. Hazardous Material Response Study Report. Prepared for the Washington State Department of Ecology. DMJM technology. November 2005. Establishing Sustainable Regional crude by rail NE/Hazmat Response Capability in Washington State, Final Report. Prepared for Washington State Department of Ecology.; Patriot Technical Consultants, Inc. October 2006. Statewide Crude by Rail NE Response Program Final Report. Prepared for the Washington State Emergency Response Commission.

A preliminary analysis conducted by the NWAC Oil by Rail Task Force GRP Gap Analysis Work Group (2014) indicated that GRPs have not been developed for most rail corridors although there is some overlap in marine areas where trains travel along the Puget Sound (South Puget Sound, Central Puget Sound, North Central Puget Sound, and Columbia River) and there is some overlap with pipeline companies who have developed company specific response strategies. Their study results are shown in Figure 17, Figure 18, Figure 19, and Figure 20.

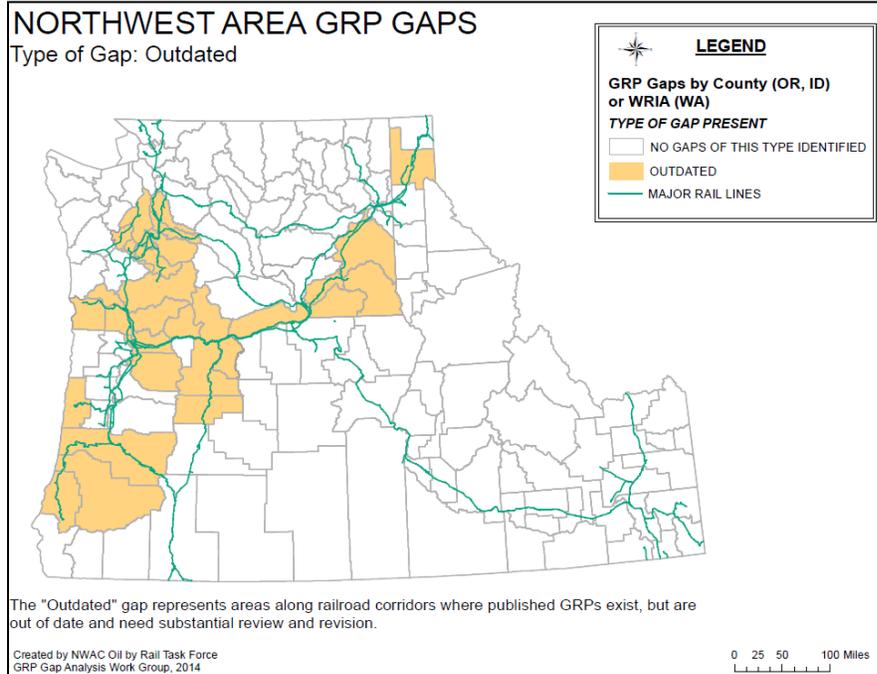
There are also gaps in marine areas. While the goal is to maintain and update GRPs every five years, historically, Ecology has not been able to do this on a regular basis. There have not been sufficient resources to make progress in testing GRP strategies through response equipment deployment.

The GRPs also do not address potential responses for potentially submerged or sinking oils. This is a concern for diluted bitumen spills under some conditions, particularly for spills into waters that have high sediment content and are very turbulent. The increased handling of oils that are known (Group V oils) to sink or may weather and sink requires updates in the way oil spill response is conducted in the northwest. Traditionally response and contingency planning has focused on containing and recovering surface floating oil through the use of booms and surface skimmers. Currently there are limitations on the ability to model, track, locate and recover submerged oil. Regulations do not take into consideration submerged oil response planning for oils that may weather and sink that are not classed as Group V oils.<sup>73</sup>

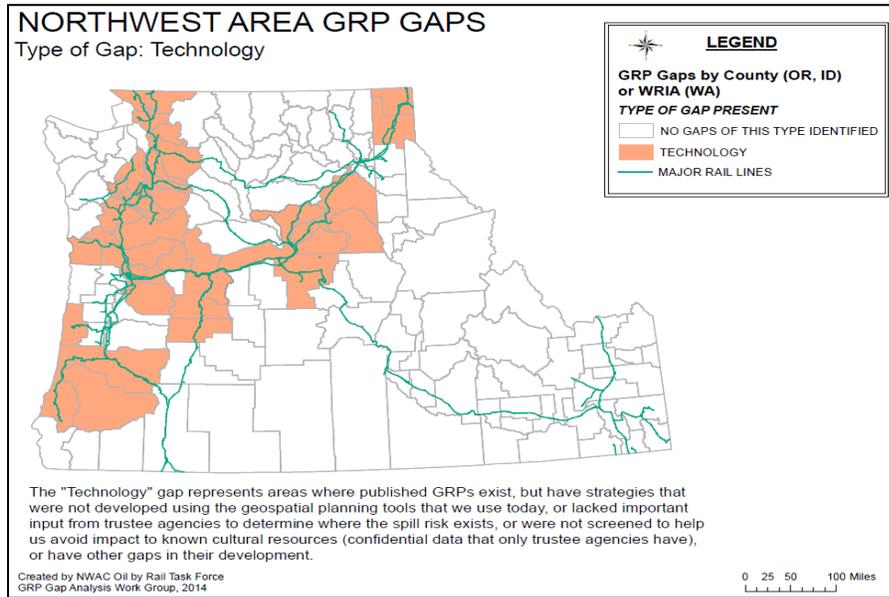
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<sup>73</sup> Group V oils are those that have a density equal to or greater than that of water; these oils may sink when spilled in water.

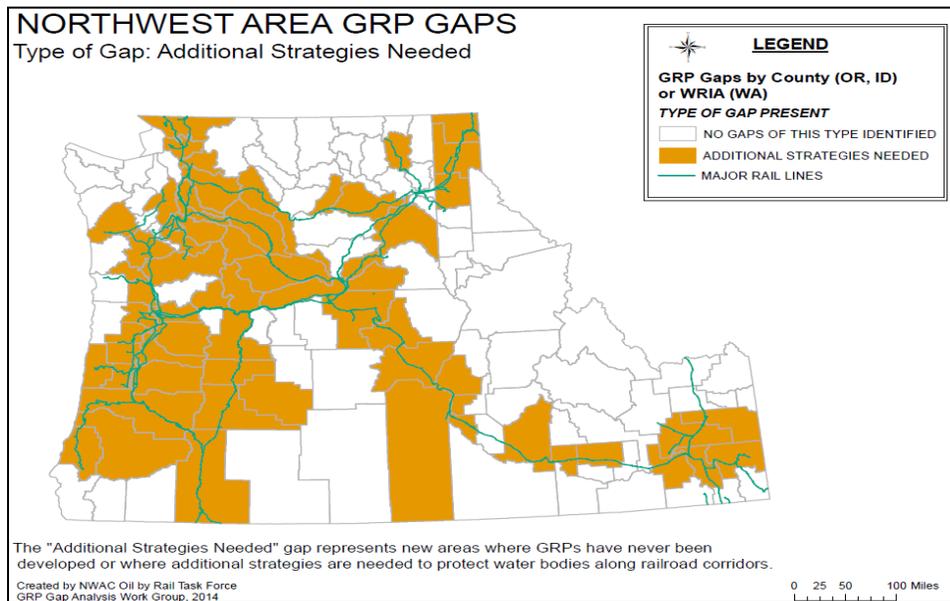
**Figure 17: NW Area GRP Gaps (Outdated Plans)**



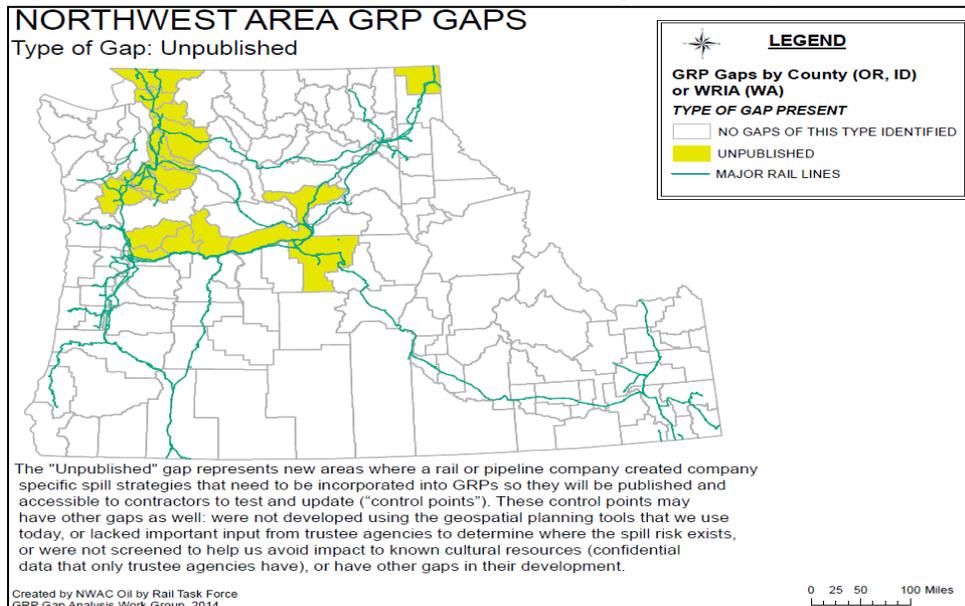
**Figure 18: NW Area GRP Gaps (Technology Gaps)**



**Figure 19: NW Area GRP Gaps (Unpublished)**



**Figure 20: NW Area GRP Gaps (Additional Strategies Needed)**



**Recommendation:** Ecology should continue to develop new and maintain the existing geographic response plans for inland and marine areas at risk from oil spills. This includes full coverage, use of best technology, adequate testing of strategies and updating after lessons are learned. This would allow responders to minimize damages to the environment and economy from spills. Ensure permanent ongoing funding for these important response tools.

## Oil Spill Response Resources: Rail and Vessels

Allocating appropriate spill response resources requires an assessment of the locations and types of incidents likely to occur.

### 36. Sustainable Funding to Maintain Highest Levels of Prevention, Preparedness, and Response Programs in the State of Washington

**Finding:** With the shift of crude oil imports away from tankers to rail and pipeline, a vital funding source supporting the Spill Prevention, Preparedness, and Response Program (Spills Program) at Ecology and other state entities has decreased. The additional state costs needed to manage prevention, preparedness, and response activities as the energy picture and transportation modes change, e.g., rail and pipelines, is not sustainable with current funding mechanisms.

**Recommendation:** Consider funding options to adequately fund Washington’s Spill Prevention, Preparedness, and Response Program.

### 37. Evaluate Risk for Spills Related to Crude by Rail by Location and Incident Nature

**Finding:** Changing oil characteristics, changing transportation modes and routes necessitate the re-evaluation of the sufficiency of oil spill response resources concerning response planning standards, response resource availability and response tactics.

As stated in the NWAC Emerging Risks Task Force Report:<sup>74</sup>

“Where the Northwest Area Contingency Plan (NWACP) has traditionally focused on response to spills of oil to marine waters, recent changes and future trends in modes of crude oil transportation in the Northwest Area reflect a geographic shift to inland areas with a focus on rail transportation. This will result in a change in response strategy and response resource utilization and may warrant a review of the distribution of response resources. Federal and state on-scene coordinators will need to re-focus preparedness and response resources from traditional marine-based scenarios to a broader range of scenarios and work with planholders to ensure that transfer of custody issues – and associated response expectations – are clearly articulated within Contingency Plans.”

A more thorough evaluation of locations that might be considered as probable higher likelihood of spills due to accidents such as vessel collisions/allisions and train derailments, that would be also be associated with potentially high spill consequences (e.g., high population density or environmentally- sensitive areas) should be developed. This could be used for the purposes of

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<sup>74</sup> Northwest Area Committee. 2014. *Emerging Risks Task Force Project Overview* 2013. 61 p.

evaluating the commodity flows through those locations, analyzing the probability of defined incident scenarios in those locations, and for pre-planning of the type and amount of response resources that might be needed. This will help in determining the situations that present the greatest risk (high probability of incident and high consequences).

**Recommendation:** Permitting agencies should require crude by rail facility permit applicants to conduct a thorough evaluation of specific locations of risk for train and/or vessel incidents related to the proposal. This should include inland and coastal areas as determined by the lead agency.

**Finding:** The knowledge of present response capabilities, adequacy and availability of response resources to meet the planning standards throughout the state of Washington for responding to oils which may have a tendency to sink or submerge in inland and marine spill situations is currently not sufficiently understood to make a recommendation other than that the NWAC should specifically conduct a study to review the current response resources attributed to submerged oil response in the state of Washington and develop a definitive status of specific submerged oil response tools and tactics. For inland areas, information on fast-water response tactic is also lacking.

**Recommendation:** The NWAC should support a task force to analyze the type of volume of Group V oils currently moved into the region and target planning efforts at sinking oil.

### **38. Analyze and Enhance Equipment Planning Standards for Grays Harbor, Columbia River, and Puget Sound to Incorporate Crude by Rail Facilities**

**Finding:** The current regulatory response planning for Grays Harbor will require enhancements in the event that all three proposed crude by rail facilities – Imperium, Westway, and Grays Harbor Terminal LLC– be permitted. Current response equipment would likely be insufficient for spills from the facilities and/or the associated tank vessel traffic. Changes on the Columbia River and in Puget Sound also necessitate an analysis to determine whether current standards still remain adequate.

**Recommendation:** Ecology should review statewide regulatory planning standards (Chapter 173-182 WAC) to determine whether the equipment standards are adequate for the potential increase in crude by rail facilities and associated tank vessel traffic, particularly in Grays Harbor and on the Columbia River.

**Recommendation:** Fund an enhanced and on-going oil spill response equipment grant program. In addition to oil spill response equipment, Ecology should work with representatives from the local first response community to scope out additional equipment and training needs, such as fire foam and exposure monitoring equipment. Ecology should work with local responders to develop rules for the administration of the grant program. On going funding and staffing should

be provided to administer the program, maintain existing equipment and provide periodic training to first responders.

## Mitigating Future Risk through Understanding Oil Transportation Changes

The landscape of energy extraction and transportation of extracted crude oil in the US has changed significantly in the last few years, and continues to change nearly weekly. Unpredictable market changes, technological developments, federal regulatory developments, and other factors make it nearly impossible to predict what will occur in Washington with respect to crude by rail transportation over the next few years, let alone decades. During the several months this study has been underway, there have been weekly and sometimes daily changes with regard to federal regulations, new findings on the nature of Bakken crude and diluted bitumen, forecasts of future oil production, speculations on changes to the federal ban on crude oil, technologies to boost crude production in the Bakken oil fields, and many other factors. These developments directly relate to the risk faced by the citizens of Washington with the transportation of crude oil by rail, by vessel, and by pipeline. In addition, many other changes may occur in the future with respect to other vessel and rail transportation patterns related to other economic developments in the state.

### 39. Long-Term Commitment to the Marine and Rail Oil Transportation Study

**Finding:** To provide the public the greatest degree of safety and to properly protect and honor tribal treaty rights, environmental resources, and the economic resources of the state, the changing energy picture and oil transportation needs to be evaluated as an ongoing, long-term process.

In order to provide the citizens of Washington the best means to foster public safety and health, to honor and respect the tribal treaty rights, and to protect the precious natural and economic resources of the state, the Marine and Oil Study is the start of what should become an ongoing effort to ensure Washington has a robust program to address risks and ensure public health and safety. The effort needs to include more comprehensive studies of risk than are possible in the short time frame of these first few months.

The continuing effort needs to be able to be updated as new factors and information come into play, such as, but not limited to:

- Changes in federal regulations related to railroads.

- Changes in the oil volumes transported by different modes, including vessels, rail, pipelines, trucks, and even air, depending on national and international markets, and patterns of transportation.
- Potential exports of crude oil if the federal ban on crude exports is lifted.
- Potential imports of even different types of crude oil from other parts of North America.;
- Further shifts in oil movements with potential permitting of various crude by rail facilities.
- Changes in vessel and rail traffic related to proposed and potential future projects, such as Gateway Pacific Terminal.;
- Greater understanding of the efficacy and cost-effectiveness of risk mitigation measures.
- Greater understanding of the causes and frequencies of crude by rail-related incidents.
- Greater understanding of the nature of impacts and behavior of Bakken crude, diluted bitumen, and, potentially, other crude oils, as well as refined products.
- Greater understanding of the impacts of fires and spills of crude by rail oils – particularly Bakken crude and diluted bitumen – in the highly sensitive areas.
- Updates to the identification and mapping of sensitive and high-consequence areas in the vicinity of rail lines (e.g., densely-populated areas, tribal lands, aquifers, highly-sensitive ecological habitats), as well as marine areas affected by crude by rail vessel traffic and other changes in vessel traffic.

The VTRA model developed by George Washington University (GWU) for the greater Puget Sound/Salish Sea area<sup>75</sup> provides a powerful tool to predict locations and frequencies of collisions, allisions, and groundings of modeled vessels, and subsequent potential releases of oil (fuel or cargo including petroleum products) and other hazardous materials. This can assist in evaluating preventative measures such as the placement of rescue tugs, implementation of vessel traffic restrictions, and others leading to reduced risk of oil spills.

However its value is dependent upon the use of current and accurate vessel population types and numbers. For example, the 2014 VTRA 2010 study provides a vessel traffic risk assessment (VTRA) based upon vessel population models that predate the recent increase in crude by rail and uses incomplete information on Canadian sourced vessel traffic. The baseline year for the study is 2010. There were no crude by rail imports into Washington State in 2010.<sup>76</sup> As such the 2014 VTRA 2010 study does not include the current or future impacts of crude by rail on marine traffic in Northern Puget Sound. The VTRA included an analysis of the impact of three significant potential projects; the Gateway bulk carrier terminal, the Trans-Mountain pipeline expansion, and the combination of proposed changes at Deltaport. The last project as modeled represents incomplete or inaccurate information. The number for the bulk carriers utilized

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<sup>75</sup> vanDorp, J.R., and J. Merrick. 2014. 2014 VTRA 2010 Final Report: Preventing Oil Spills from Large Ships and Barges in Northern Puget Sound & Strait of Juan de Fuca. Prepared for Washington State Puget Sound Partnership. 163 p.

<sup>76</sup> Department of Ecology data. 2014.

represents a projected total at final capacity<sup>77</sup>, not an increase over the existing number. The number of new container vessels appears to be based upon increases in container throughput and does not include changes in vessel capacities that have occurred<sup>78</sup> that reduce the increase in number of vessels. As such both the baseline case and potential cases including this project are skewed. Further, in limiting potential what-if scenarios to planned expansion and construction projects that were in advanced stages of a permitting process in 2010, the study does not include projects that would currently meet those criteria.

The 2014 VTRA 2010 also does not address vessel traffic in Grays Harbor or the Columbia River, both waterways that are and will be significantly affected by the changes brought about by crude by rail transportation and handling. Additional VTRA studies should evaluate such factors as one-way traffic, more call-in points, large vessel no-meeting requirements, speed restrictions, high-risk tug escort requirements, and tug escort requirements for ATBs. Assessments should include the effects of traffic congestion on risk.

There are few, if any, studies that analyze the risk of accidents and spills from crude by rail trains. Since crude by rail transportation, in particular, is very new to Washington State, and to North America (US and Canada) as a whole, there are few previous studies to which to refer for analyses of risk to Washington State. The limitations in quantifying crude by rail risk have to do with the uncertain future picture of federal regulations for railroads and the changing energy picture for Washington, as well as North America as a whole.

A Rail Transportation Risk Analysis (RTRA) study (re-useable risk model) that can be updated and adapted to the changing energy picture could be incorporated as part of the long-term Marine and Rail Oil Transportation Study. The RTRA model should incorporate:

- Crude by rail traffic patterns as part of the larger rail traffic system in Washington (train types, routes, frequency of transits – loaded and unloaded, cargo types, tank car types).
- Analysis of the increasing infrastructure of rail components (track, ballast, ties, bearings, etc.) and the relationship to prevention of derailments and collisions.
- Frequency analysis of incidents that might potentially lead to spillage and/or fires (e.g., derailments, collisions).
- Geographic analysis of track systems and locations where incidents may be more likely due to track condition, inspection frequency, operating conditions, train congestion, etc.
- Analysis of the types of incidents that occur with respect to numbers of cars involved (e.g., in a derailment).
- Incident rates for spillage and spill volume involved.

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<sup>77</sup> Westshore Terminals. 2013. personal communication, August 2013.

<sup>78</sup> Port Metro Vancouver. 2014. DTRRIP project description, [www.portmetrovancouver.com/en/projects/OngoingProjects/DTRRIP.aspx](http://www.portmetrovancouver.com/en/projects/OngoingProjects/DTRRIP.aspx), Accessed 23 July 2014.

- Analyses of the degree to which prevention measures may reduce the likelihood of major incidents.

**Recommendation:** Ensure permanent ongoing funding for Ecology transportation risk experts. This would allow Ecology to keep informed on public health and safety, and environmental protection matters and impacts due to the changing energy picture over time. Additional funding should be directed to Ecology to support the expansion of vessel traffic risk assessment studies to Grays Harbor, the Columbia River, the outer coast, and changes in Puget Sound. Further funding should direct the development of a rail traffic risk assessment model to analyze changes to the rail transportation system.

Fund and direct Ecology and other agencies to continue developing the Marine and Rail Oil Transportation Study to incorporate the changes that will occur with the energy movement in the nation, the region, and in Washington State.

#### **40. Outreach on Crude by Rail Transportation System Impacts to Cultural and Economic Resources**

**Finding:** There is great concern among the public and various stakeholder groups about the wide-reaching effects of the crude by rail marine and rail transportation and associated facilities on the economy of Washington State, and on tribal treaty rights, in addition to potential environmental impacts, including climate change issues.

Public concerns are not limited to the effects of potential accidents (spills and/or fires), but also the potential ways in which the crude by rail system and the increase in port activities with new facilities affects the tribal treaty rights, the environment, and the regional economy. While these issues are extremely important, they fall outside the direct topic of the current phase of the Marine and Rail Oil Transportation Study.

These issues are being raised in community meetings and will be captured to some extent in the stakeholder workshop and outreach programs associated with the current study. But, since these topics are ancillary to the immediate concerns of the study, additional information would be needed before any further studies might be recommended.

**Recommendation:** Continue outreach efforts on the changing energy picture to potentially affected tribes, communities, and stakeholders to further refine the issues of concern for future studies and action. Throughout, respect for tribal treaty rights must be a high priority.

## Conclusion

This initial report presents the preliminary findings and recommendations of Ecology, UTC, and EMD, with assistance from the Marine and Rail Oil Transportation Study team's consultants over the last several weeks. The findings and recommendations were supplemented by the invaluable input from others participating in this process. The comments received were considered in developing recommendations. A more detailed technical will be presented to the Legislature on December 1, 2014, as directed by the 2014 budget proviso.

# Terms and Acronyms

**AAR:** Association of American Railroads

**AIS:** Automatic Identification System (ship transponder system currently used by most commercial shippers).

**ANPRM:** Advanced Notice of Proposed Rulemaking

**ANS:** Alaska North Slope Crude Oil

**ANT:** Advanced Notice of transfer

**ATB:** Articulated Tug Barge (tug-barge combination system capable of operation on the high seas, coastwise and further inland. It combines a normal barge, with a bow resembling that of a ship, but having a deep indent at the stern to accommodate the bow of a tug. The fit is such that the resulting combination behaves almost like a single vessel at sea as well as while maneuvering)

**bbbl:** barrels (equivalent of 42 gallons)

**BC:** British Columbia

**BNSF:** The name for the entity formerly referred to as “Burlington Northern Santa Fe Railroad”

**Bunkering:** The taking on of fuel by ships

**CRBP:** Columbia River Bar Pilots

**COLRIP:** Columbia River Pilots

**CVTS:** Cooperative Vessel Traffic Services

**DOT:** Department of Transportation

**DWT:** Deadweight Tonnage

**ECP:** Electronically Controlled Pneumatic (brake)

**EIS:** Environmental Impact Statement

**EMD:** Emergency Management Division

**EPA:** Environmental Protection Agency

**ERTS:** Environmental Report Tracking System

**ERTV:** Emergency Response Towing Vessel

**ETV:** Emergency Towing Vessel

**First-Class Cities:** Cities that have 10,000 or more population.

**First Responder:** A general term for all trained emergency service personnel (as a firefighter, police officer, paramedic, etc.) who are expected to respond to emergencies or large-scale disasters.

**FRA:** Federal Railroad Administration

**GRP:** Geographic Response Plan

**GT:** Gross Tons

**HHFT:** High-hazard Flammable Trains (also called Key Trains)

**ICCTA:** The Interstate Commerce Commission Termination Act of 1995

**IMO:** International Maritime Organization (UN)

**Key Trains:** another term referring to high-hazard flammable trains (HHFT)

**LEPC:** Local Area Planning Committee

**MCTS:** Canadian Marine Communications and Traffic Services

**NPRM:** Notice of Proposed Rulemaking

**NTSB:** National Transportation Safety Board

**NWAC:** Northwest Area Committee

**NWACP:** Northwest Area Contingency Plan

**OPA90:** Oil Pollution Act of 1990

**OR-DEQ:** Oregon Department of Environmental Quality

**OPSA:** Oil Spill Prevention Account

**OSRA:** Oil Spill Response Account

**OSRP:** Oil Spill Response Plan

**PHMSA:** Pipeline and Hazardous Material Safety Administration

**PTC:** Positive Train Control

**RCW:** Revised Code of Washington

**RRT:** Regional Response Team

**SMART:** International Association of Sheet Metal, Air, Rail, and Transportation Workers

**STB:** Surface Transportation Board

**U&A:** Usual and Accustomed (This is a treaty term from the Stevens' Treaties used extensively in *US v. Washington*, referring to an area where a particular tribe traditionally fished and over which the tribe has a territorial use claim under the provisions of the treaty. treaty tribes retained their right to take fish in their "usual and accustomed" areas.)

**UN:** United Nations

**UP:** Union Pacific Railroad

**USCG:** US Coast Guard

**UTC:** Utilities and Transportation Commission

**VTRA:** Vessel Traffic Risk Assessment

**VTS:** Vessel Traffic Services

**WAC:** Washington Administrative Code

**WSDOT:** Washington State Department of Transportation

# Appendix A: Proviso and Governor's Directive

## Budget Proviso

The Washington State 2014 Supplement Budget provided one-time funding (ESSB 6002) for Ecology to conduct a Marine and Rail Oil Transportation Study. The objective of the study is to analyze the risks to public health and safety, and the environmental impacts associated with the transportation of oil in Washington State:

\$300,000 of the state toxics control account — state appropriation is provided solely for the department to conduct a study of oil shipment through the state. The purpose of the study is to assess public health and safety as well as environmental impacts associated with oil transportation. The study must provide data and analysis of statewide risks, gaps, and options for increasing public safety and improving spill prevention and response readiness. The department shall conduct the study in consultation with the department of transportation, the emergency management division of the military department, the utilities and transportation commission, tribes, appropriate local, state, and federal agencies, impacted industry groups, and stakeholders. The department must provide an update to the governor and the legislature by December 1, 2014, and a final report by March 1, 2015.

## Governor's Directive

On June 11, 2014, Washington Governor Jay Inslee issued Directive 14-06 as follows:

The Pacific Northwest is experiencing rapid changes in how crude oil is moving through rail corridors and over Washington waters, creating new safety and environmental risks. As petroleum shipments from Alaska decline, transportation of crude oil from the Bakken region via rail is increasing. At the same time, shipments of Canadian crude oil into British Columbia ports are increasing. These shipments also travel through Washington waters. The changing sources and transportation of crude oil bring new risks to our communities along rail lines and to the Columbia River, Grays Harbor, and Puget Sound waters. Since 2008, rail traffic hauling crude oil has increased more than 40-fold nationwide and major accidents have occurred over the past year in both the United States and Canada.

Public interest in this issue is growing, and an increasing number of Washington State communities are calling for improved safety measures. Public safety is of paramount concern to our residents, citizens, and local governments. While the State will do all it can within its authority to ensure that safety, the Federal government must also exercise its authority to improve the safety of oil transported by rail. In addition, both governments must work to

enhance our collective ability to prevent and respond to spills that can harm our natural resources.

This directive outlines key components to be addressed by State agencies in their charge to assess the safety of oil transportation in Washington. With respect to the transportation of oil by rail within Washington State, the Department of Ecology, in consultation with the Department of Transportation, Utilities and Transportation Commission, Washington Military Department's Emergency Management Division, the Federal Railroad Administration, and Tribal governments, will:

- Characterize risk of accidents along rail lines.
- Review State and Federal laws and rules with respect to rail safety and identify regulatory gaps.
- Assess the relative risk of Bakken crude with respect to other forms of crude oil.
- Identify data and information gaps that hinder improvements in public safety and spill prevention and response.
- Begin development of spill response plans for impacted counties.
- Identify potential actions that can be coordinated with neighboring States and British Columbia.
- Identify, prioritize, and estimate costs for State actions that will improve public safety and spill prevention and response

In advance of its update to the Legislature, the Department of Ecology will prepare a draft report with initial findings and recommendations by October 1, 2014, that addresses these and any other issues necessary to ensure public safety and environmental protection with respect to the transportation of oil in Washington State. The Department of Ecology will also propose a strategy for consideration in the Governor's 2015-17 Budget to meet funding needs that would increase the safety and spill response and prevention capacity related to transportation of oil by rail.

The concerns of Washington citizens with respect to the safe transportation of oil through our State must be re-examined in light of the rapid changes taking place. This directive will help ensure that we respond to these changes to protect our communities and environment.

## **Appendix B: Multi-Agency Comments on Federal Notice of Proposed Rulemaking (NPRM)**

September 26, 2014

Secretary Anthony Foxx  
Department of Transportation  
1200 New Jersey Avenue SE  
Washington, D.C. 20590

Administrator Cynthia L. Quarterman  
Pipeline and Hazardous Materials Safety Administration  
Department of Transportation  
1200 New Jersey Avenue SE  
Washington, D.C. 20590

Re: Docket No. PHMSA-2012-0082 (HM-251), Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains - Notice of Proposed Rulemaking

Dear Secretary Foxx and Administrator Quarterman:

In response to train accidents and incidents involving trains transporting large volumes of flammable liquids, on July 23, 2014, the Pipeline and Hazardous Materials Safety Administration (PHMSA), in coordination with the Federal Railroad Administration (FRA), two agencies within the United States Department of Transportation (USDOT), issued a Notice of Proposed Rulemaking (Notice or NPRM). In that Notice, those agencies proposed new requirements for trains transporting Class 3 flammable liquids, including tank car standards, and changes to existing rules for those offering the flammable liquids for transportation.

The Washington Utilities and Transportation Commission (UTC), the Washington State Department of Ecology (Ecology), the Washington State Department of Transportation (WSDOT) and the Emergency Management Division of the Washington Military Department (EMD) jointly file these comments for Washington state in response to the NPRM.

The UTC has authority over railroad safety in the state, and conducts safety inspections under the FRA's State Participation Program. Ecology is responsible for the oil spill prevention, preparedness, and response plans for the state. WSDOT oversees the management of the Amtrak Cascades, intercity passenger rail service along the Pacific

Northwest Rail Corridor, one of 11 federally-designated passenger rail corridors in the United States. In addition, WSDOT owns a short-line rail system and is responsible for the State Rail Plan and freight rail and marine transportation policy. EMD is the state agency responsible for assisting with and managing the state response to natural and human-made disasters and leads the State Emergency Response Commission (SERC).

Given the various roles of these state agencies and their shared interest in ensuring the public safety of the citizens and protecting the unique natural resources of Washington state, the agencies jointly file these comments.

Washington state, the 20<sup>th</sup> largest state in the nation has a total land area of 66,544 square miles.<sup>1</sup> There are 3,157 miles of railroad track in the state, ranking it 22<sup>nd</sup> in the nation for track mileage. Traditionally, crude oil has been shipped to the state by waterborne transportation. However, in recent years, there has been an exponential increase in the amount of crude oil shipped to and through Washington state by rail. In 2013, approximately 280 million barrels of oil were shipped by rail through the United States<sup>2</sup> with approximately 17 million barrels of oil being shipped through Washington.<sup>3</sup> This movement of oil by rail in Washington is projected to more than triple in 2014, increasing to 55 million barrels.<sup>4</sup>

Washington state is home to one of the richest and most diverse landscapes in the world, with significant natural and economic resources and communities, including the inland marine waters and estuaries of the Puget Sound, the mighty Columbia River, the volcanic Cascade mountain range, fertile agricultural lands, and populous cities. Currently the majority of the transportation of oil by rail in Washington enters the state at the border with Idaho near Spokane, crosses the Spokane River, travels to Pasco and then westward along the Columbia River Gorge to Vancouver, Washington. Leaving Vancouver by rail, the oil travels north to Tacoma, then along the Puget Sound through Seattle, the most populous city in the state, on its way to Anacortes and Ferndale, near the Canadian border. Empty cars will often, though not always, travel east across the Cascades through Wenatchee on their way out of the state through Spokane.

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<sup>1</sup> [http://www.statemaster.com/graph/geo\\_lan\\_are-geography-land-area](http://www.statemaster.com/graph/geo_lan_are-geography-land-area).

<sup>2</sup> U.S. Rail Transportation of Crude Oil: Background and Issues for Congress, Congressional Research Services, May 2014.

<sup>3</sup> <http://www.statesmanjournal.com/story/news/2014/05/26/west-coast-oil-trains/9605759/>.

<sup>4</sup> Senator Murray Press Release on DOT NPRM on Tank Standards, July 2014.

When crude oil is carried by rail it is typically transported in unit trains, i.e., trains made up entirely of one type of cargo. These unit trains can contain more than 100 tank cars with the potential for significant impact on the state's natural resources in the event of a spill or fire. The increased risks identified in the NPRM associated with the transportation of crude oil by rail necessitate immediate and comprehensive action by the USDOT on enhancing tank car standards and operational controls for high-hazard flammable trains with the goal of reducing derailments, incidents, accidents and spills, and increased transparency about the transportation of these flammable liquids.

#### **I. High-Hazard Flammable Train**

The NPRM defines high-hazard flammable trains (HHFT) as any train comprised of 20 or more cars transporting Class 3 flammable liquids. The Association of American Railroads (AAR) similarly defines a "key train" as any train with 20 carloads or intermodal portable tank loads of any combination of hazardous materials. The AAR goes further to define a "key train" as any train with one tank carload of Poison or Toxic Inhalation Hazard (PIH or TIH). The NPRM asks for comments on (a) how the HHFT designation affects operating practices and trains carrying other Class 3 flammable liquids; (b) the costs and benefits to including flammable gas and combustible liquids in the definition of HHFT and (c) the risks posed by hazardous materials when in high-hazard flammable trains.

Washington state supports the USDOT's proposal to address specifically trains carrying Class 3 flammable liquids. Washington state requests that the definition of high-hazard flammable trains also include any train carrying one or more tank carloads of a Packing Group I, Class 3 flammable liquid. The risks associated with Packing Group I, Class 3 flammable liquids, which include Bakken crude, should receive the same precautions and mitigation factors associated with PIH and TIH. Further, because of the exponential increase in the transportation of Bakken crude, the volatility associated with the commodity, as well as the amount of such hazardous materials moving into and through Washington, it is necessary to take this precaution in the interest of public safety and protection of the state's natural resources. For these reasons, Washington state recommends amending the definition of a high-hazard flammable train as follows, with changes marked in bold:

§ 171.8 Definitions

\*\*\*\*\*

High-hazard flammable train means a single train carrying 20 or more carloads of a Class 3 flammable liquid or a single train carrying one carload of a Packing Group I, Class 3 flammable liquid.<sup>5</sup>

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**II. Classification and Characterization of Mined Liquids and Gases**

The development of a sampling and testing program, outlined in the NPRM, regarding the classification and characterization of mined gases and liquids is an important step to ensuring public safety with the movement of HHFTs. The NPRM asks for comments on: (a) clarity in the guidelines; (b) specificity needed regarding a sampling and testing program; (c) incentives for offerors already using the safest packing and equipment standard; (d) differences in the processes and costs of mined gases versus mined liquids; and (e) the variability that exists in product.

Focusing on items (b) and (e) of this issue, Washington state requests that the programs and results from this sampling and testing be made immediately available to the states. One of the most important steps that USDOT must take during this rulemaking, which is beyond those options in the NPRM, but something that communities and first responders in Washington state have requested numerous times, is the need for better communication and access to more complete information about the materials being shipped through the state. It is not enough to say that there is a sampling and testing program in place when those results and the criteria are not made available for review. Another missing component to the sampling and testing program is an independent analysis, whether through random auditing or a third party annual audit.

Further, Washington state supports the classification of Bakken crude as a Packing Group I, Class 3 material. Given the variability of Bakken crude Washington state strongly recommends further analysis of Bakken crude and the current extraction techniques with the goal of reducing the volatility of the product prior to transport. Depending on the region, time of year and mining techniques, Bakken crude is significantly more volatile than other crude oils. The state agencies propose the following changes to the proposed rule on sampling and testing to mitigate concerns with variability, with changes marked in bold:

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<sup>5</sup> Packing group means a grouping according to the degree of danger presented by hazardous materials. Packing group I poses the greatest danger.

§ 173.41 Sampling and testing program for mined gas and liquid.

(a) *General.* Mined gases and liquids, such as petroleum crude oil, extracted from the earth and offered for transportation must be properly classed and characterized as prescribed in § 173.22 of this subpart, in accordance with a sampling and testing program which specifies at a minimum:

- (1) A frequency of sampling and testing that accounts for appreciable variability of the material, including the time, temperature, method of extraction (including chemical use), and location of extraction;
- (2) Sampling at various points along the supply chain to understand the variability of the material during transportation;
- (3) Sampling methods that ensure a representative sample of the entire mixture, as packaged, is collected;
- (4) Testing methods that enable complete analysis, classification, and characterization of the material under the HMR.
- (5) Statistical justification for sample frequencies;
- (6) Duplicate samples for quality assurance purposes; and
- (7) Criteria for modifying the sampling and testing program.

(8) Independent third-party auditing on a set schedule

(b) *Certification.* Each person who offers a hazardous material for transportation shall certify, as prescribed by § 172.204 of this subchapter, that the material is offered for transportation in accordance with this subchapter, including the requirements prescribed by paragraph (a) of this section.

(c) *Documentation, retention, review, dissemination of program.* The sampling and testing program must be documented in writing and must be retained for as long as it remains in effect. The sampling and testing program must be reviewed at least annually and revised and/or updated as necessary to reflect changing circumstances. The most recent version of the sampling and testing program, or relevant portions thereof, must be available to the employees who are responsible for implementing it. When the sampling and testing program is updated or revised, all employees responsible for implementing it must be notified, and all copies of the sampling and testing program must be maintained as of the date of the most recent revision.

(d) Access by DOT and the state to a copy of program documentation. Each person required to develop and implement a sampling and testing program must maintain a copy of the sampling and testing program documentation (or an electronic file thereof) that is accessible at, or through, its principal place of business, and must make the documentation immediately available upon request to an authorized official of the Department of Transportation or a designated representative of a state.

### **III. Rail Routing**

The NPRM lists 27 safety and security factors considered in the routing of HHFTs. Washington State finds that this rail routing risk assessment is critically necessary given the significant scenic areas, natural and economic resources and communities through which oil is transported by rail in the state. Washington state strongly encourages making routing risk assessments and factors used in route selection available to state agencies and local responders. The NPRM appears to assume that the railroads simply need to consider the 27 factors but does not explain how they are used or why certain routes are chosen. The USDOT should consider weighting of these factors, giving priority to factors related to public safety and environmental concerns.

In addition, we believe USDOT should mandate sharing this information as well as operational data about the number and timing of trains carrying crude oil with the state and local governments. This is of great concern to Washington and the USDOT must address this gap in this rulemaking.

Finally, Washington state supports the work of United States Senators Patty Murray and Susan Collins in developing the Short Line Rail Safety Institute. Washington state believes the Institute is a positive step in mitigating the risks associated with shipping hazardous materials and strongly encourage the continued support from USDOT on this initiative.<sup>6</sup>

### **IV. Notification to State Emergency Response Commissions of Petroleum Crude Oil Train Transportation**

The USDOT's emergency order, DOT-OST-2014-0067, requiring that railroads notify the State Emergency Response Commission (SERC) when transporting more than a million gallons, approximately 35 tank cars, of Bakken crude oil was a necessary first step. We strongly encourage USDOT to expand the scope of the emergency order to include any movement of any crude oil types in excess of 42,000 gallons, approximately 1.5 tank cars. Broadening the scope of the emergency order would allow for better preparation by the local response community and a more complete understanding of the type of oil moving through our cities and towns. This information is necessary for first responders, but also for those

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<sup>6</sup> <http://www.murray.senate.gov/public/index.cfm/2014/5/oil-trains-murray-collins-lead-bipartisan-push-for-increased-safety-resources-on-short-line-railroads>.

that are tasked with the cleanup of any spill. The different types of crude oils present very different logistical problems in terms of cleanup which may require special equipment in some locations. The need for our state and local first responders to be prepared for a spill or catastrophic accident should outweigh any claimed security sensitivity. The information contained within those reports should be available and posted online for ease of access by local responders and other organizations in the event of an accident or spill.

#### **V. Speed Restrictions**

On February 21, 2014, Secretary Foxx sent a letter to the President and Chief Executive Officer of the AAR requesting that AAR and its members subscribe to voluntary actions to improve the safe transportation of crude oil by rail, which included speed restrictions. The industry complied with the voluntary speed restrictions. Washington state supports the USDOT setting in rule speed reduction standards.

The NPRM sets a speed restriction of 50 mph on HHFTs that meet enhanced standards and requests comments on operating speeds on HHFTs not meeting enhanced standards of (a) 40 mph in all areas; (b) 40 mph in high threat urban areas (which include only Seattle, Bellevue and Vancouver in Washington); and (c) 40 mph in areas with a population of 100,000 or more. The NPRM also requests comment on costs associated with delays from speed restrictions, effects on traffic network, safety benefits of speed restrictions, diversion of traffic to other forms of transportation and other geographic delineations to consider.

Because there are populated areas in Washington at risk other than the three cities of Seattle, Bellevue and Vancouver, Washington state encourages the adoption of a reduced speed of no more than 40 mph for HHFTs moving through populated areas in excess of 100,000 people, if the HHFT meets new tank car standards and has enhanced braking system in place. However, the basis for determining an "area" of population in excess of 100,000, such as square acres, county lines, or other factors, should provide for the maximum protection possible, and should be made clear in the rule. Special consideration should also be given to areas deemed by the state to be environmentally sensitive (e.g., the Columbia River Gorge National Scenic Area) or of significant cultural importance, such as usual and accustomed tribal fishing areas.

Currently, BNSF Railway Company (BNSF), which transports crude oil into Washington, voluntarily restricts the maximum speed of loaded unit bulk trains to 45 mph and allows empty unit bulk trains to operate at maximum track speed. Washington state supports a maximum speed of 45 mph, outside of populated areas, for all HHFT's that meet new tank

car standards and enhanced braking system requirements that are the subject of the NPRM, unless otherwise restricted by other maximum speed requirements.

While Washington state supports phasing out the DOT 111 model tank car as quickly as possible, it supports the NPRM recommendation for an immediate speed restriction of 30 mph for any HHFT that does not meet revised tank car standards or have an enhanced braking system in place.

However, Washington state recognizes that speed reductions of HHFT freight movements below 40 mph on shared freight and passenger rail corridors could effect on-time performance of intercity and commuter passenger trains. Passenger train on-time performance is governed by agreements with BNSF and changes in law may require renegotiation of these agreements, impacting federally required on-time performance standards. Freight movements, particularly expedited or time-sensitive shipments, including agricultural commodities, could also be impacted. Further analysis of the causes of derailments and the role that train speed plays should be considered.

**VI. DOT Specification 117 – Prescribed Car**

The proposed options for new tank car standards are a significant component of the NPRM. These options include:

Tank Car	Head Shield	Shell	Jacket	Top Fittings Protection**	Thermal Protection	Braking
Option 1: PHMSA and FRA Designed Tank Car	Full-height, 1/2 inch thick head shield	9/16 inch Minimum	Minimum 11-gauge jacket constructed from A1011 steel or equivalent. The jacket must be weather-tight	TIH Top fittings protection system and nozzle capable of sustaining, without failure, a rollover accident at a speed of 9 mph	Thermal protection system in accordance with § 179.18	Electronic Controlled Pneumatic (ECP) brakes
Option 2: AAR 2014 Tank Car	Full-height, 1/2 inch thick head shield	9/16 inch Minimum	Minimum 11-gauge jacket constructed from A1011 steel or equivalent. The jacket must be weather-tight	Equipped per AAR Specifications Tank Cars, appendix E paragraph 10.2.1	Thermal protection system in accordance with § 179.18	In trains with Distributed Power (DP) or End of Train (EOT) devices
Option 3: Enhanced CPC 1232 Tank Car	Full Height 1/2 inch thick head shield	7/16 inch- Minimum	Minimum 11-gauge jacket constructed from A1011 steel or equivalent. The jacket must be weather-tight	Equipped per AAR Specifications Tank Cars, appendix E paragraph 10.2.1	Thermal protection system in accordance with § 179.18	In trains with DP or EOT devices

The DOT specification 111 tank car is not appropriate for the transportation of highly flammable liquids such as Bakken crude oil. Washington state supports the adoption of the PHMSA and FRA-designed DOT specification 117 tank car (i.e., Option 1). The additional wall thickness, enhanced braking system and roll-over protection afforded by this option is necessary to better safeguard the public as more crude oil is being transported by rail. In addition, Washington state requests that those companies that invested in the AAR 2014-designed car before the adoption of this rule, which is similar in most ways to the PHMSA and FRA model, should not be penalized for improving the safety of the tank cars, and should be allowed to utilize the cars for their full economic lifespan.

Washington state has additional concerns regarding the impact on railroad track of the increased weight of the DOT specification 117 tank car, the increased traffic and the number of cars in unit trains. This additional risk to public safety and the environment by HHFTs warrants an increased inspection frequency on rail corridors that will be used for HHFTs. Washington state suggests the inspection frequency should be “twice weekly with at least one calendar day interval between inspections.”

#### **VII. DOT Specification 111 Tank Car Phase Out**

The NPRM proposes to require the use of the new DOT specification 117 tank car and calls for the phase out of the DOT specification 111, accordingly. The DOT 111 will be allowed to be repurposed, retrofitted or retired according to a proposed timeline set forth in the NPRM. The phase out of DOT specification 111 tank cars for HHFTs is necessary and Washington state supports the decision to move to a more robust tank car design.

However, not all tank cars that fall under DOT specification 111 are the same. Washington state requests that DOT specification 111 tank cars that meet the AAR CPC 1232 standards and were built after October 1, 2011, be allowed to continue in service for their economic life, except for the transportation of Packing Group I materials past October 1, 2016. Further, Washington state recommends that the proposed timeline for phasing out DOT 111 tank cars should be expedited for Packing Group I and II materials by a year, with the result that DOT 111 tank cars, including those complying with CPC 1232 standards, should not be used to transport Packing Group I materials after October 1, 2016. Similarly, Packing Group II materials should not be transported in DOT 111 tank cars, excluding those complying with CPC 1232 standards, after October 1, 2017. Washington state’s proposal maintains the focus on public safety, which should be paramount in the decision on this rule.

<b>Washington state recommended timeline for discontinued use of DOT Specification 111 tank cars in HHFT service</b>	
<i>Packing Group</i>	<i>DOT 111 Not Authorized After</i>
I (including Bakken)	October 1, 2016
II	October 1, 2017 (excluding CPC 1232)
III	October 1, 2020 (excluding CPC 1232)

Due to uncertainties regarding adequate characterization of crude oil properties such as corrosivity, Washington state recommends that all existing tank cars more than 10 years old have a thorough tank shell thickness survey to ensure the tank is suitable for Packing Group II and III Class 3 liquids. Any tank that shows significant signs of corrosion should be taken out of crude, ethanol, and any other Packing Group I or II service immediately.

#### **VIII. Conclusion**

Washington state encourages the USDOT to adopt swiftly rules in this proceeding that will protect the safety of the citizens of Washington and other states and the significant natural and economic resources and communities in Washington. The number of trains carrying large amounts of crude oil into and through the state are increasing dramatically and the USDOT must continue its recent efforts to increase the safety and transparency of crude oil transportation by rail. Washington state strongly support the direction of the NPRM on enhanced tank car standards and operational controls for high-hazard flammable trains and encourage the USDOT not to reduce the stringency of regulations for such trains.

Sincerely,



Steven V. King, UTC Executive Director  
and Secretary



Lynn Peterson, WSDOT Secretary



Maia D. Bellon, Ecology Director



Robert Ezelle, EMD Director

**Appendix C: Multi-Agency Comments on Federal  
Advanced Notice of Proposed Rulemaking  
Hazardous Materials: Oil Spill Response Plans  
for High-Hazard Flammable Trains**



September 17, 2014

Secretary Anthony Foxx  
Department of Transportation  
1200 New Jersey Avenue SE  
Washington, D.C. 20590

Administrator Cynthia L. Quarterman  
Pipeline and Hazardous Materials Safety Administration  
Department of Transportation  
1200 New Jersey Avenue SE  
Washington, D.C. 20590

Re: Docket No. PHMSA–2014–0105 (HM–251B), Hazardous Materials: Oil Spill Response Plans for High-Hazard Flammable Trains - Advanced Notice of Proposed Rulemaking

Dear Secretary Foxx and Administrator Quarterman:

In response to train accidents and incidents involving trains transporting large volumes of flammable liquids, on August 1, 2014, the Pipeline and Hazardous Materials Safety Administration (PHMSA) and the Federal Railroad Administration (FRA), referred to jointly here as the USDOT, issued an Advanced Notice of Proposed Rulemaking (Notice or ANPRM). In that Notice, the USDOT seeks comment on potential revisions to its regulations that would expand the applicability of comprehensive oil spill response plans (OSRPs) to high-hazard flammable trains (HHFTs).

The Washington State Department of Ecology (Ecology), the Washington State Department of Fish and Wildlife (WDFW), and the Washington State Department of Natural Resources (DNR) jointly file these comments in response to the ANPRM.

Ecology is responsible for the oil spill prevention, preparedness, and response plans in the state. WDFW and DNR act as the state trustees of resources at risk of damage from oil spills, including fish, wildlife, aquatic lands, and shellfish. Given the various roles of each state agency and our

shared interest in ensuring the public safety of the citizens of Washington State and protecting the unique natural resources of the state, the agencies are filing joint comments.

Washington State has a total land area of 66,544 square miles and is the 20<sup>th</sup> largest state in the nation.<sup>79</sup> There are 3,157 miles of railroad track in the state, ranking it 22<sup>nd</sup> in the nation for track mileage. Traditionally, crude oil has been shipped to the state by waterborne transportation. However, in recent years, there has been an exponential increase in the amount of crude oil shipped to and through Washington State by rail. In 2013, approximately 280 million barrels of oil were shipped by rail through the United States<sup>80</sup> with approximately 17 million barrels of oil being shipped through Washington.<sup>81</sup> This movement of oil by rail in Washington is projected to more than triple in 2014, increasing to 55 million barrels.<sup>82</sup>

Washington State is home to one of the richest and most diverse landscapes in the world, with significant natural and economic resources and communities, including the inland marine waters and estuaries of the Puget Sound, the mighty Columbia River, the volcanic Cascade mountain range, fertile agricultural lands, and populous cities. Currently the majority of the transportation of oil by rail in Washington enters the state at the border with Idaho near Spokane, crosses the Spokane River, travels to Pasco and then westward along the Columbia River gorge to Vancouver. Leaving Vancouver by rail, the oil travels north to Tacoma, then along the Puget Sound through Seattle, the most populous city in the state, on its way to Anacortes and Ferndale, near the Canadian border. Empty cars will often travel east, though not always, across the Cascades through Wenatchee on their way out of the state through Spokane.

Crude oil is usually transported in unit trains; i.e., trains made up entirely of one type of cargo. These unit trains can contain more than 100 tank cars, with the potential for significant impact on the state's natural resources in the event of a spill or fire. The increased risks identified in the ANPRM associated with the transportation of crude oil by rail necessitate immediate and comprehensive action by the USDOT on oil spill response plans to ensure that railroads and local communities are prepared to respond to the increased risk of oil spill from rail incidents.

## I. Oil Spill Response Plan Thresholds

The threshold for applying basic (>3500 gallons per package) or comprehensive (>42,000 gallons per package) OSRPs is not adequate for transport of oil by rail. As noted below, the transport of oil by rail presents a variety of risks that are not solely attributable to flammability of oil in transport, and therefore OSRPs should apply to all railroads carrying oil in bulk. As the ANPRM seeks comment on specific thresholds, we recommend that the threshold for

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<sup>79</sup> [http://www.statemaster.com/graph/geo\\_lan\\_are-geography-land-area](http://www.statemaster.com/graph/geo_lan_are-geography-land-area).

<sup>80</sup> U.S. Rail Transportation of Crude Oil: Background and Issues for Congress, Congressional Research Services, May 2014.

<sup>81</sup> <http://www.statesmanjournal.com/story/news/2014/05/26/west-coast-oil-trains/9605759/>.

<sup>82</sup> Senator Murray Press Release on DOT NPRM on Tank Standards, July 2014.

comprehensive OSRPs be set at 3,500 gallons, equivalent to the current requirement for basic OSRPs.

Oil spills can threaten some of Washington's most productive and valuable ecosystems. All spills can threaten public health, safety, the environment, and ultimately damage the state's economy and quality of life. Almost 2,500 miles of major rivers in Washington run within 1,000 feet of a rail line. An incident involving oil transported by rail in bulk could adversely and significantly impact the natural resources and economic health of the state.

Oil spills of any size, depending on product type and location, threaten productive and valuable ecosystems, killing birds and marine life, contaminating beaches, shellfish, and groundwater. Spilled oil poses serious threats to fresh water and marine environments. It affects surface resources and a wide range of subsurface organisms that are linked in a complex food chain that includes human food resources. Significant oil spills can cause millions of dollars in damage to important industries, including shellfish production, fishing, tourism, and recreation.

Because of the impact that spills can have on Washington's environmental and economic health, there should be one set of comprehensive requirements for all rail cars transporting more than 3,500 gallons of oil.

## II. Planning Standards

Washington strongly urges that 49 CFR Part 130 be revised to establish standards that at least require the following:

- *Plan Review and Approval:* 33 USC 1321(j) expressly requires the President to review and approve the oil spill response plans. However, the current 49 CFR 130 does not provide for any type of review. Review and approval are a mandate delegated to USDOT and cannot be ignored by PHMSA and the FRA. There should be clear, specific criteria for plan review and approval, including submittal and review timeframes. See WAC 173-182-120; 140; 142.
- *Drills & Exercises:* A robust drills and exercise program, including announced and unannounced exercises following NPREP. We recommend the Washington model; see also WAC 173-182-700 – 740.
- *Spill Management Team:* Trained Spill Management Team requirements, capable of staffing a Unified Command for response to at least the reasonable worst-case spill. See WAC 173-182-280
- *Oil Spill Response Contractor:* Required use of an oil spill cleanup contractor whose personnel and equipment has at least been inspected and tested. We recommend the Washington model; see WAC 173-182-800

- *Performance Cleanup Standards:* Address response resource arrival times cascaded in over time. Specifically, on-water recovery equipment, containment (boom), temporary storage of recovered materials, and staffing. U.S. Coast Guard - see 33 CFR 154 (facilities) and 155 (vessels).
- *Financial Responsibility:* Require a minimum amount of demonstrated financial resources to pay for response, cleanup, remediation, natural damage assessment, and restoration costs, based on the reasonable worst-case spill volume.
- *Shoreline Cleanup Standards:* Contracts for adequate equipment and personnel to address different shoreline types and local environmental conditions should be identified in all plans.
- *Sensitive Site Strategies:* OSRP plan holders should work with area planning committees to develop Geographic Response Plans along rail routes adjacent to or crossing navigable waters. The plans should require use of strategies to protect identified environmentally, economically, and culturally sensitive areas, protected within certain time frames, with adequate response resources. These are provided for in the Area Contingency Plans (ACP) developed by the U.S. Coast Guard and the Geographic Response Plans (GRP) developed by U.S. Environmental Protection Agency. For existing ACPs and GRPs, the railroads merely have to agree in their response plan to use the ACPs and GRPs.
- *Dedicated & Non-dedicated Response Resources:* In order to ensure that response equipment and personnel can arrive within the first six hours (or other set time), these resources, including personnel, temporary storage and vessels, must be dedicated solely oil spill response. Boom and skimmers by function and design are always considered dedicated.
- *Waste Storage & Management:* Plans requirements should include identification of temporary storage for all recovered oil and oily waste, up to two times the RWCS volume.
- *Incident Command System:* Require the use of NIMS, and the incident command system developed and used by the U.S. Coast Guard and U.S. Environmental Protection Agency in their *Incident Management Handbook – 2014*.
- *Group 5 Oils:* Require planning for oils that are heavier than water and will sink. Examples of this type of oil could be Canadian Tar Sands and asphalts.
- *Oiled Wildlife Care:* Identify applicable federal requirements for assessing oiled-wildlife impacts and wildlife rescue and rehabilitation. Describe the equipment, personnel, resource and strategies for compliance with these requirements. Require the use of oiled-wildlife contractors whose personnel and equipment has at least been inspected and tested. We recommend the Washington model; see WAC 173-182-800.
- *Oiled Wildlife Performance Standard:* The plan should address oiled wildlife resource arrival over time. Specifically, appropriate rehabilitation equipment and shelters, search and collection equipment; transportation equipment; wildlife hazing equipment; and necessary staffing (including ICS positions). In Washington, handlers of oil must

indicate how they will provide the necessary resources within twenty-four hours of spill notification (WAC 173-182-540).

- *Fire Fighting:* Identify how fires will be addressed. Compare on-water firefighting and salvage requirements of the U.S. Coast Guard.
- *Training:* More details in the plan regarding specific incident command position staffing training.
- *Agent for Service of Process:* Require someone who will be available to receive legal process.

### III. Public Disclosure of Oil Spill Response Plans

PHMSA should require that all response plans be provided to State Emergency Response Commissions (SERCs), Tribal Emergency Response Commissions (TERCs), and Local Emergency Planning Committees (LEPCs) and state agencies designated authority as State on Scene Coordinators. As noted by the National Transportation Safety Board, “carriers have effectively placed the burden of remediating the environmental consequences of an accident on local communities along their routes.”<sup>83</sup> Giving SERCs, TERCs, and LEPCs access to OSRPs would at least partially ameliorate this situation, giving local communities access to information on railroad response resources and spill management teams.

### IV. Applicability

OSRPs should apply to oil in transport, not only to high hazard flammable trains of a certain threshold. The environmental, economic, and public health risks associated with the transport of oil by rail are not solely attributable to flammability of oil in transport. Comprehensive oil spill plans are required for vessel transport and near shore terminals, not because of the inherent risk of fire or explosion, but because of the threat of environmental damage from toxicological, mechanical, and persistence characteristics of oil introduced into the aquatic environment of navigable waters. The same logic should apply to spills of oil from oil trains and OSRPs should apply to all railroads carrying oil in bulk.

### V. Savings Clause:

PHMSA is implementing 33 USC sec. 1321, which is sec. 311 of the Federal Water Pollution Control Act. Subsection (o)(2) of that law states:

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<sup>83</sup> Safety Recommendation (SR) R-14-5, National Transportation Safety Board, <http://www.nts.gov/doclib/reclatters/2014/R-14-004-006.pdf>.

(2) Nothing in this section shall be construed as preempting any State or political subdivision thereof from imposing any requirement or liability with respect to the discharge of oil or hazardous substance into any waters within such State, or with respect to any removal activities related to such discharge.

This clearly preserves state authority to adopt requirements for response plans from railroads. PHMSA's rulemaking should confirm this understanding in its Federalism analysis.

On behalf of the citizens of the state of Washington, the DOE, WDFW, and DNR encourage the USDOT to swiftly adopt rules in this proceeding that will protect the safety of the citizens of Washington and other states and the significant natural and economic resources and communities in Washington. The number of trains carrying significant amounts of crude oil into and through the state is increasing and the USDOT must continue its recent efforts to increase the safety and transparency of crude oil transportation by rail. The Washington State agencies strongly support the direction of the ANPRM on oil spill response plans and encourage the USDOT to increase the response capacity of railroads and local communities.

Sincerely,



Maia D. Bellon  
Director, Washington State Department of Ecology



Peter Goldmark  
Commissioner of Public Lands, Department of Natural Resources



Phil Anderson  
Director, Washington State Department of Fish and Wildlife

**Appendix D: Transmittal Letter from Governor  
Jay Inslee on the Two Federal Proposed  
Rulemakings**

JAY INSLEE  
Governor



**STATE OF WASHINGTON**  
Office of the Governor

September 30, 2014

The Honorable Anthony Foxx  
Secretary of Transportation  
U.S. Department of Transportation  
1200 New Jersey Avenue SE  
Washington, DC 20590

Dear Secretary Foxx:

On behalf of Washington State, I would like to thank you for expediting new rules to address safety and spill response regarding the transportation of crude oil by rail. The transportation of hazardous materials, like Bakken crude, poses a significant risk to public safety, the environment and areas of significant cultural heritage. These risks are especially prevalent in Washington where we have seen an exponential increase in the transportation of crude oil by rail.

As you know, federal preemption hampers the ability of states to respond to these new challenges making your rule update all the more important to Washingtonians. As you review the enclosed comments from my agencies, I urge you to act swiftly to resolve the current concerns about the transportation of Bakken crude oil.

Specifically, we support a quicker phase out of the T-111 tanks cars that are inadequate for transporting high-hazard materials. We appreciate the move towards safer cars but urge that the T-111 cars not be used for high-hazard material like Bakken crude after October 2016. In addition, trains carrying high-hazard material should move no faster than 40 miles per hour through populated areas. Special consideration should also be given to environmentally sensitive areas like the Columbia River Gorge or those of significant cultural importance, such as usual and accustomed tribal fishing areas.

With respect to oil spill response planning for high-hazard trains, we recommend that the threshold to trigger comprehensive spill response plans be set at 3,500 gallons and that planning standards be similar for those already established for marine transport. Washington has a comprehensive spill prevention response program for Puget Sound that should serve as a model for rail transport. In addition, spill response plans need to be made available to local emergency response planners and should apply to all oil transport, not just high-hazard trains. Finally, federal rulemaking should confirm that the Clean Water Act savings clause preserves state authority to require that railroads submit contingency plans.

The help of your department will be critical in ensuring the safety of our citizens and protection of our environment as unprecedented amounts of crude oil move along rail lines across the country.



The Honorable Anthony Foxx  
September 30, 2014  
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In concert with your actions, I have directed my state agencies to provide me with recommendations for state action on this issue in advance of our next legislative session. Let us share a commitment to the people of Washington that public safety and protection of our natural resources come first as we both move to address this new challenge.

Very truly yours,



Jay Inslee  
Governor

Enclosures (2)

1. Washington State Agency Comments. Docket No. PHMSA-2012-0082 (HM-251) Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains - Notice of Proposed Rulemaking.
2. Washington State Agency Comments. Docket No. PHMSA-2014-0105 (HM-251B), Hazardous Materials: Oil Spill Response Plans for High-Hazard Flammable Trains - Advanced Notice of Proposed Rulemaking.

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**Accommodation Requests:**

To request ADA accommodation including materials in a format for the visually impaired, call Ecology at 360-407-7455. Persons with impaired hearing may call Washington Relay Service at 711. Persons with speech disability may call TTY at 877-833-6341.

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