DEPARTMENT OF
ECOLOGY
State of Washington

# Final Cost-Benefit and Least Burdensome Alternative Analyses

*Chapter 173-186 WAC*
*Oil Spill Contingency Plan – Railroad*

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# Final Cost-Benefit and Least Burdensome Alternative Analyses

## Chapter 173-186 WAC
## Oil Spill Contingency Plan -- Railroad

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# Executive Summary

This report describes two of the economic analyses performed by the Washington State Department of Ecology (Ecology) to estimate the incremental expected benefits and costs of the adopted Oil Spill Contingency Plan – Railroad rule (chapter 173-186 WAC; the adopted rule). These analyses – the Cost-Benefit Analysis (CBA) and Least Burdensome Alternative Analysis (LBA) – are based on the best available information at the time of publication.

The rule:

- Describes the purpose and use of the contingency plans for rail.
- Describes the applicability and authorities of the rule, and timing for compliance.
- Includes definitions for terms used in the rule.
- Defines authority and process for contingency plan submittal and review.
- Establishes a process for plan updates and notification of significant changes.
- Develops a signature authority for binding plan holders to the use of their plans.
- Establishes contingency plan content requirements.
- Describes the required elements of the contingency plan field document.
- Establishes notification requirements and call out procedures.
- Defines training and personnel resources to fill roles in oil spill management teams.
- Identifies resources at risk from rail spills.
- Establishes equipment-planning standards for responding to railroad oil spills.
- Establishes Best Achievable Protection planning requirements for railroads.
- Establishes a drill program and drill evaluation criteria for railroad plan holders.
- Establishes recordkeeping, noncompliance, and compliance information.
- Addresses other issues to ensure consistency and clarity is maintained throughout the rule.

Increased crude-by-rail transport has changed the risk picture for oil spills in Washington State. During the 2015 legislative session, RCW 88.46.010 and RCW 90.56.010 were amended to include railroads (not owned by the state) that transport bulk oil as cargo in the definition of "facility", and RCW 90.56.210 was amended to expand Ecology's authority to require state contingency plans for rail.

Ecology was directed to develop rules establishing contingency planning requirements for railroads transporting oil in bulk. Contingency plans for railroads ensure that that environmental and economic damages from oil spills are reduced and that public health and safety is protected through immediate notifications of spills and threats of spills, coordination with first responders, pre-staged oil response equipment, and personnel trained to respond to incidents in a rapid,

aggressive, and well-coordinated manner. The regulations also require regularly scheduled oil spill drills to test and strengthen the plans through implementation. Contingency planning requirements for rail are intended to be consistent with existing contingency planning requirements for vessels and other facilities regulated under Chapter 173-182 WAC.

# Costs

The adopted rule, through requirements for contingency planning and supporting access to necessary equipment and personnel resources, is likely to impost the following costs over 20 years.

| Cost | | Low | High |
|---|---|---|---|
| Assuming internal plan development | Plan development | $34,664 | $52,872 |
| | Plan review | $136,974 | $154,712 |
| | PRC contracts | $72,624 | $225,941 |
| | **TOTAL** | **$244,262** | **$433,525** |
| Assuming contracted plan development | Plan development | $202,797 | $405,594 |
| | Plan review | $136,974 | $154,712 |
| | PRC contracts | $72,624 | $225,941 |
| | **TOTAL** | **$412,395** | **$786,247** |

# Benefits

The adopted rule, through requirements that support more immediate, appropriate, and comprehensive response to spills from rail, support the following benefits.

- Reducing the degree or duration of impacts to human wellbeing, especially for over 3 million Washingtonians living near oil-by-rail corridors. Reduced impacts related to:
    - Health:
        - Fire
        - Explosions
        - Air quality
        - Toxic chemical exposure
        - Drinking water contamination
        - Subsistence or traditional food source contamination
    - Quality of life:
        - Evacuation
        - Property damage and contamination
- Reducing the degree of impacts to the environment, related to:

    - Surface water quality
    - Groundwater quality
    - Areas prone to wildfire
    - Fisheries
    - Shellfisheries
    - Bird populations
    - Animals, including sea mammals, consuming contaminated fish, shellfish
    - Endangered species
    - Recreational quality
    - Passive or non-use values for nature
    - Tribal resources and lifeways
    - Impacts to vulnerable multi-value systems, such as the Columbia River:
        - Water for human uses
        - Hydropower
        - Water transportation
        - Recreation valued at $50 million per year (Oregon side of Columbia River Gorge)
        - Commercial and tribal fisheries
        - Salmon and white sturgeon populations in stream
- Reducing the duration or degree of economic disruptions, related to:
    - Vessel delay
    - Business interest losses
    - Building damage from fire
    - Expansion of property contamination
    - Lost use of impacted facilities and roads. Example impacts from the 2016 Mosier derailment include, during cleanup:
        - Evacuation
        - Closure of wastewater treatment, resulting in shipping sewage to Hood River treatment
        - Closure of Interstate 84
    - Lost wages of approximately $28 per hour, on average, in Washington.
    - Property damage, reduced property values, or increased insurance rates for properties near railways. Properties valued at:
        - $150 thousand to over $600 thousand in major cities in Washington
        - Million or multi-million dollar residential, commercial, and industrial properties along rail lines in Seattle, Tacoma, and Vancouver.
    - Marina oiling
    - Shellfish population impacts
    - Shellfish closures
    - Commercial fishing losses
    - Local spending reductions due to smoke or evacuation

    - Park revenue losses
    - Recreational boating revenue losses
    - Wildlife viewing and hunting lost spending
    - Lost tourist spending and income
- Preparedness for response to crude oil (including potentially sinking Group 5 oil) spills
- Possible reductions in costs associated with a worst-case spill. Example modeled worst-case spill costs on the Columbia River:
    - $84.9 million in environmental restoration after a 20 thousand barrel spill of Bakken crude near Bonneville Dam.
    - $5-6 billion in environmental damages, lost human life, and physical injury.

# Cost-Benefit Analysis Conclusion

After evaluating the likely costs and benefits of the adopted rule, Ecology believes that the likely qualitative and quantitative benefits of the rule exceed the likely costs. The compliance costs likely to be accrued by plan holders and PRCs are, over 20 years, likely less than the benefits of improved timeliness and efficiency of spill responses, and planning for spills in population-dense locations.

For comparative purposes:

- The highest total estimated 20-year costs are roughly equivalent to preparedness activities resulting in avoided complete losses of one high-value residential property near rail lines near urban areas of Washington, or seven of the lowest median value properties.
- Costs are also roughly equivalent to preventing partial damage or use loss to a multi-million dollar mixed-use property in south Seattle, or port areas of Tacoma.
- Based on modeled worst-case spills on the Columbia River, the highest 20-year cost is at most one percent of estimated environmental damages resulting from a single large derailment.
- Costs are also equivalent to 25 average full-time employees per year missing a week of work.

Ecology expects that increased preparedness and equipment availability – while not preventing spills – will reduce the degree to which spills of oil transported by rail affect the environment and people, reducing total costs of any given spill.

# Least-Burdensome Alternative Conclusion

After considering alternatives to the adopted rule contents, as well as the goals and objectives of the authorizing law, Ecology determined that the adopted rule represents the least burdensome requirements meeting those goals. Additional flexibility that does not compromise preparedness was added during the comment period, further reducing burden while still meeting the goals and objectives of the authorizing statute.

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# Chapter 1: Background and Introduction

## 1.1 Introduction

This report describes two of the economic analyses performed by the Washington State Department of Ecology (Ecology) to estimate the incremental expected benefits and costs of the adopted Oil Spill Contingency Plan – Railroad rule (chapter 173-186 WAC; the adopted rule). These analyses – the Cost-Benefit Analysis (CBA) and Least Burdensome Alternative Analysis (LBA) – are based on the best available information at the time of publication.

The Washington Administrative Procedure Act (RCW 34.05.328) requires Ecology to evaluate significant legislative rules to "determine that the probable benefits of the rule are greater than its probable costs, taking into account both the qualitative and quantitative benefits and costs and the specific directives of the law being implemented." Chapters 1 – 5 document that determination.

The APA also requires Ecology to "determine, after considering alternative versions of the rule…that the rule being adopted is the least burdensome alternative for those required to comply with it that will achieve the general goals and specific objectives" of the governing and authorizing statutes. Chapter 6 documents that determination.

## 1.2 Description of the adopted rule

The adopted rule:

- Describes the purpose and use of the contingency plans for rail.
- Describes the applicability and authorities of the rule, and timing for compliance.
- Includes definitions for terms used in the rule.
- Defines authority and process for contingency plan submittal and review.
- Establishes a process for plan updates and notification of significant changes.
- Develops a signature authority for binding plan holders to the use of their plans.
- Establishes contingency plan content requirements.
- Describes the required elements of the contingency plan field document.
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- Identifies resources at risk from rail spills.
- Establishes equipment planning standards for responding to railroad oil spills.
- Establishes Best Achievable Protection planning requirements for railroads.
- Establishes a drill program and drill evaluation criteria for railroad plan holders.
- Establishes recordkeeping, noncompliance, and compliance information.
- Addresses other issues to ensure consistency and clarity is maintained throughout the rule.

## 1.3 Reasons for the rule

Increased crude-by-rail transport has changed the risk picture for oil spills in Washington State. During the 2015 legislative session, RCW 88.46.010 and RCW 90.56.010 were amended to include railroads (not owned by the state) that transport bulk oil as cargo in the definition of "facility", and RCW 90.56.210 was amended to expand Ecology's authority to require state contingency plans for rail.

Ecology was directed to develop rules establishing contingency planning requirements for railroads transporting oil in bulk. Contingency plans for railroads ensure that that environmental and economic damages from oil spills are reduced and that public health and safety is protected through immediate notifications of spills and threats of spills, coordination with first responders, pre-staged oil response equipment, and personnel trained to respond to incidents in a rapid, aggressive, and well-coordinated manner. The regulations also require regularly scheduled oil spill drills to test and strengthen the plans through implementation. Adopted contingency planning requirements for rail are intended to be generally consistent with existing contingency planning requirements for vessels and other facilities regulated under Chapter 173-182 WAC.[1]

## 1.4 Oil movement and spill risk in Washington State

In 2015, Ecology assessed trends in oil transportation in Washington.[2] Oil imports by rail were estimated to be zero through 2011, but increased significantly beginning in 2012. There has been a significant shift from vessel to pipeline and rail transport.

Table 1: Gallons of Oil Transported in Washington, by Type

| | Billion Gallons | | | | Percent Total | | |
|---|---|---|---|---|---|---|---|
| Year | Vessel | Pipeline | Rail | Total | Vessel | Pipeline | Rail |
| 2003 | 7.8030 | 0.7753 | 0.0000 | 8.5783 | 91.0% | 9.0% | 0.0% |
| 2004 | 7.3171 | 1.2929 | 0.0000 | 8.6100 | 85.0% | 15.0% | 0.0% |
| 2005 | 7.5884 | 1.0919 | 0.0000 | 8.6803 | 87.4% | 12.6% | 0.0% |
| 2006 | 7.4826 | 1.3079 | 0.0000 | 8.7905 | 85.1% | 14.9% | 0.0% |
| 2007 | 7.1744 | 1.6338 | 0.0000 | 8.8083 | 81.5% | 18.5% | 0.0% |
| 2008 | 6.9090 | 1.7784 | 0.0000 | 8.6875 | 79.5% | 20.5% | 0.0% |
| 2009 | 6.9398 | 1.5992 | 0.0000 | 8.5390 | 81.3% | 18.7% | 0.0% |
| 2010 | 5.5713 | 2.0129 | 0.0000 | 7.5842 | 73.5% | 26.5% | 0.0% |
| 2011 | 6.1756 | 2.1769 | 0.0000 | 8.3525 | 73.9% | 26.1% | 0.0% |
| 2012 | 5.9210 | 2.0756 | 0.5092 | 8.5057 | 69.6% | 24.4% | 6.0% |
| 2013 | 5.7480 | 2.0652 | 0.7128 | 8.5260 | 67.4% | 24.2% | 8.4% |

[1] : Some of the differences are attributed to inland versus marine operating environments. Other differences are attributed to in regulatory authority (for example, regulating the operation of an oil transfer versus merely the transportation of oil).

[2] Ecology (2015a). Washington State 2014 Marine and Rail Oil Transportation Study. March 1, 2015. Ecology publication no. 15-08-010.

Based on surveys conducted in 2014, Ecology found that 19 loaded unit trains with Bakken crude oil pass through Washington weekly. The number of cars per train can reach 120. These trains travel through the following counties:

- Whatcom
- Skagit
- Snohomish
- King
- Pierce
- Thurston
- Lewis
- Cowlitz
- Clark
- Skamania
- Klickitat
- Benton
- Franklin
- Adams
- Lincoln
- Spokane

Some trains transfer oil within the state, while others pass through to Oregon and California.

Ecology also estimated that future crude-by-rail traffic could increase to three times this volume by 2020, and six times the volume (17 billion gallons) by 2035. This would mean approximately 133 weekly (or nearly 17 daily) trains passing through Washington in 2035.[3] The study and the surveys did not assess the volume of other types of oil, such as diesel or biologically based agricultural oil products transported by train. These types of oil when spilled present a risk to the environment and public health and safety.

Washington's waters support some of the most productive and valuable ecosystems in the world, and spills on land or water can threaten public health, safety, the environment, tribal cultural values, and the economy. Equipment failure, human error, poor training, and lack of thorough planning to minimize the impacts of spills can lead to unintended and potentially enormous consequences. Even small oil leaks, drips, and spills lead to cumulative impacts that can significantly degrade our ecosystems.

Transporting oil by rail carries risks typically associated with spills, as well as risks that may be more specific to rail and pipelines transporting oil through population centers. Risks include:

- Public safety risk of fires and explosions
- Public and environmental risk of wildfire
- Public health risk of drinking water contamination
- Health and cultural risks of contamination of subsistence and tribal fishing resources
- Environmental risks of spills to surface waters (marine and freshwater)
- More and larger inland spills than in the past
- Social and economic disruptions
- Property damage from fires or spills
- Property value impacts from increased risk of spills

A total population exceeding 3 million people (2012 Census) lives in cities and towns that have crude-by-rail routes running through or near them.[4]

[3] Ecology (2015a) Washington State 2014 Marine and Rail Oil Transportation Study. March 1, 2015. Ecology publication no. 15-08-010.
[4] Ibid.

## 1.5 Likelihood of spills from rail

During 2003 – 2012, throughout the United States, an average of 96,600 gallons of oil spilled annually from trains. This is equivalent to approximately 0.000086 gallons spilled for every gallon transported, or 0.0086 percent of volume. This is also equivalent to 1 gallon of oil spilled for every 11,628 gallons transported by rail. This number has varied each year, with the lowest ratio of 1 gallon spilled of every 62,500 gallons transported (2012). This is significantly lower than less recent ratio statistics, including 1 gallon spilled of every 333 gallons transported (1990).

Overall, nationally, the rate of gallons spilled per gallons transported by rail has fallen significantly, from 0.000996 in 1980 – 1982, to 0.000086 in 2003 – 2012. The number of spills from rail, however, first falls during 1980 – 2002, but rises again beginning in 2003. This trend is expected to continue as the volume and number of trains carrying oil increase.[5]

## 1.6 Risk from Oils that Sink or Submerge

Increased oil-by-rail traffic is associated with increased bitumen (tar sands) oil and other crude oils being transported through Washington. Because of their properties of potentially sinking or being suspended in the water column, crude oils, even if diluted, are uniquely difficult to remove after a spill. Additionally, some portion may sink or submerge after weathering, which renders conventional techniques ineffective in containing and removing oil from the water's surface. Potentially sinking oil poses a risk of contamination to sediments and their ecosystems, which include economically and culturally valuable shellfish and fisheries.

Costs associated with sinking oils can be significantly higher than other crude oils. In 2012 a large quantity of diluted bitumen spilled from the Enbridge pipeline running through Marshall, Michigan, into the Kalamazoo River. The spill of 20,000 barrels (a barrel contains 42 gallons) ultimately closed an approximately 35-mile stretch of the river for over a year, and required cleanup from floodplains and marshes. Enbridge reported that the total cost of the spill as of December 31, 2015 summed to $1.2 billion.[6] That is approximately $60 thousand per barrel spilled. Prior to this incident, the average crude oil spill in the past decade is reported to be $2 thousand per barrel or more to clean up.

[5] Ecology (2015). Washington State 2014 Marine and Rail Oil Transportation Study. March 1, 2015. Ecology publication no. 15-08-010.
[6] Enbridge, Inc. (2015). 2015 Annual Report. p. 78.

## 1.7 Document organization

The remainder of this document is organized into the following sections:

- Baseline and adopted rule (Chapter 2): Description and comparison of the baseline requirements in state and federal laws and rules, to the adopted rule.
- Likely costs of the adopted rule (Chapter 3): Analysis of the types and size of costs Ecology expects impacted entities to incur as a result of the adopted rule.
- Likely benefits of the adopted rule (Chapter 4): Analysis of the types and size of benefits Ecology expects to result from the adopted rule.
- Cost-benefit comparison and conclusions (Chapter 5): Discussion of the complete implications of the Cost-Benefit Analysis, and any comments on the results.
- Least burdensome alternative analysis (Chapter 6): Analysis of considered alternatives to the contents of the adopted rule.

# Chapter 2: Baseline and the Adopted Rule

## 2.1 Introduction

In this chapter, Ecology describes the baseline to which the adopted rule is compared. The baseline is the regulatory context in the absence of the adopted rule requirements.

Ecology also describes, in this chapter, the adopted rule itself, and identifies which aspects of the rule will likely result in costs or benefits (or both), and require analysis under the APA. Here, Ecology addresses any complexities in the scope of analysis, and indicates how costs and benefits are analyzed and discussed in chapters 3 and 4 of this document.

## 2.2 Baseline

In most cases, the regulatory baseline for CBAs is the existing rule. Where there is no existing rule, federal and local regulations are the baseline.

### 2.2.1 Specific directives of the authorizing statutes

During the 2015 legislative session, RCW 88.46.010 and RCW 90.56.010 were amended to include railroads (not owned by the state) that transport bulk oil as cargo in the definition of "facility", and RCW 90.56.210 was amended to expand Ecology's authority to require state contingency plans for rail.

Directives for contingency plans are set out primarily in RCW 90.56.210. They include:

***Contingency Plan Contents***
*(1) Each onshore and offshore facility shall have a contingency plan for the containment and cleanup of oil spills from the facility into the waters of the state and for the protection of fisheries and wildlife, shellfish beds, natural resources, and public and private property from such spills. The department shall by rule adopt and periodically revise standards for the preparation of contingency plans. The department shall require contingency plans, at a minimum, to meet the following standards:*

> *(a) Include full details of the method of response to spills of various sizes from any facility which is covered by the plan;*
>
> *(b) Be designed to be capable in terms of personnel, materials, and equipment, of promptly and properly, to the maximum extent practicable, as defined by the department removing oil and minimizing any damage to the environment resulting from a worst case spill;*
>
> *(c) Provide a clear, precise, and detailed description of how the plan relates to and is integrated into relevant contingency plans which have been prepared by cooperatives, ports, regional entities, the state, and the federal government;*
>
> *(d) Provide procedures for early detection of oil spills and timely notification of such spills to appropriate federal, state, and local authorities under applicable state and federal law;*
>
> *(e) State the number, training preparedness, and fitness of all dedicated, prepositioned personnel assigned to direct and implement the plan;*

*(f) Incorporate periodic training and drill programs to evaluate whether personnel and equipment provided under the plan are in a state of operational readiness at all times;*

*(g) Describe important features of the surrounding environment, including fish and wildlife habitat, shellfish beds, environmentally and archaeologically sensitive areas, and public facilities. The departments of ecology, fish and wildlife, and natural resources, and the department of archaeology and historic preservation, upon request, shall provide information that they have available to assist in preparing this description. The description of archaeologically sensitive areas shall not be required to be included in a contingency plan until it is reviewed and updated pursuant to subsection (9) of this section;*

*(h) State the means of protecting and mitigating effects on the environment, including fish, shellfish, marine mammals, and other wildlife, and ensure that implementation of the plan does not pose unacceptable risks to the public or the environment;*

*(i) Provide arrangements for the prepositioning of oil spill containment and cleanup equipment and trained personnel at strategic locations from which they can be deployed to the spill site to promptly and properly remove the spilled oil;*

*(j) Provide arrangements for enlisting the use of qualified and trained cleanup personnel to implement the plan;*

*(k) Provide for disposal of recovered spilled oil in accordance with local, state, and federal laws;*

*(l) Until a spill prevention plan has been submitted pursuant to RCW 90.56.200, state the measures that have been taken to reduce the likelihood that a spill will occur, including but not limited to, design and operation of a facility, training of personnel, number of personnel, and backup systems designed to prevent a spill;*

*(m) State the amount and type of equipment available to respond to a spill, where the equipment is located, and the extent to which other contingency plans rely on the same equipment; and*

*(n) If the department has adopted rules permitting the use of dispersants, the circumstances, if any, and the manner for the application of the dispersants in conformance with the department's rules.*

***Plan Submission Timing***

*(2)*

*(a) The following shall submit contingency plans to the department within six months after the department adopts rules establishing standards for contingency plans under subsection (1) of this section:*

*(i) Onshore facilities capable of storing one million gallons or more of oil; and*

*(ii) Offshore facilities.*

*(b) Contingency plans for all other onshore and offshore facilities shall be submitted to the department within eighteen months after the department has adopted rules under subsection (1) of this section. The department may adopt a schedule for submission of plans within the eighteen-month period.*

***Submission of Federal Oil Spill Response Plans***

*(3) The department by rule shall determine the contingency plan requirements for railroads transporting oil in bulk. Federal oil spill response plans created pursuant to 33 U.S.C. Sec. 1321 may be submitted in lieu of contingency plans until state rules are adopted.*

*(4)*

*(a) The owner or operator of a facility shall submit the contingency plan for the facility.*

*(b) A person who has contracted with a facility to provide containment and cleanup services and who meets the standards established pursuant to RCW 90.56.240, may submit the plan for any facility for which the person is contractually obligated to provide services. Subject to conditions imposed by the department, the person may submit a single plan for more than one facility.*

***Acceptability of Federal and State Contingency Plans***

*(5) A contingency plan prepared for an agency of the federal government or another state that satisfies the requirements of this section and rules adopted by the department may be accepted by the department as a contingency plan under this section. The department shall ensure that to the greatest extent possible, requirements for contingency plans under this section are consistent with the requirements for contingency plans under federal law.*

***Plan Approval Criteria***

*(6) In reviewing the contingency plans required by this section, the department shall consider at least the following factors:*

*(a) The adequacy of containment and cleanup equipment, personnel, communications equipment, notification procedures and call down lists, response time, and logistical arrangements for coordination and implementation of response efforts to remove oil spills promptly and properly and to protect the environment;*

*(b) The nature and amount of vessel traffic within the area covered by the plan;*

*(c) The volume and type of oil being transported within the area covered by the plan;*

*(d) The existence of navigational hazards within the area covered by the plan;*

*(e) The history and circumstances surrounding prior spills of oil within the area covered by the plan;*

*(f) The sensitivity of fisheries, shellfish beds, and wildlife and other natural resources within the area covered by the plan;*

*(g) Relevant information on previous spills contained in on-scene coordinator reports prepared by the department; and*

*(h) The extent to which reasonable, cost-effective measures to prevent a likelihood that a spill will occur have been incorporated into the plan.*

*(7) The department shall approve a contingency plan only if it determines that the plan meets the requirements of this section and that, if implemented, the plan is capable, in terms of personnel, materials, and equipment, of removing oil promptly and properly and minimizing any damage to the environment.*

***Plan Validity and Approval***
*(8) The approval of the contingency plan shall be valid for five years. Upon approval of a contingency plan, the department shall provide to the person submitting the plan a statement indicating that the plan has been approved, the facilities or vessels covered by the plan, and other information the department determines should be included.*

***Plan Changes***
*(9) An owner or operator of a facility shall notify the department in writing immediately of any significant change of which it is aware affecting its contingency plan, including changes in any factor set forth in this section or in rules adopted by the department. The department may require the owner or operator to update a contingency plan as a result of these changes.*

***Periodic Review***
*(10) The department by rule shall require contingency plans to be reviewed, updated, if necessary, and resubmitted to the department at least once every five years.*

***Limited Liability***
*(11) Approval of a contingency plan by the department does not constitute an express assurance regarding the adequacy of the plan nor constitute a defense to liability imposed under this chapter or other state law.*

## 2.2.2 Federal requirements

The federal component of the baseline consists of requirements for oil spill response plans in 49 CFR Parts 130 and 174.[7] There are two types of plan required, depending on the capacity of packaging of oil shipments.

- Basic Federal Plan: Required for oil shipments in a packaging having a capacity of 3,500 gallons or more.
- Comprehensive Federal Plan: Required for oil shipments in a package containing more than 42,000 gallons (1,000 barrels).

[7] There is currently a rulemaking pending at the federal level (PHMSA) that could ultimately impose more stringent requirements than the current federal regulations. As this rulemaking is currently pending, it is not part of the baseline for this analysis. Were it part of the analysis, it could affect the difference between the baseline and the adopted rule, potentially reducing both costs and benefits of the adopted rule. While it is not part of the baseline for this analysis, readers should be aware of this pending rulemaking.

Table 2: Comparison of Federal Oil Spill Response Plan Requirements to the Adopted Rule

| Content | Federal | | Adopted Rule |
|---|---|---|---|
| | Basic | Comprehensive | |
| Plan must set out the manner of response to a discharge. | Yes | Yes | Yes |
| Plan must account for the maximum potential discharge | Yes | Yes | Yes |
| Plan must identify appropriate persons and agencies (including telephone numbers) to be contacted. | Yes | Yes | Yes |
| Plan must be kept on file. | Yes | Yes | No. Plans are submitted for approval. |
| Plan must refer to NCP and Area Plan. | No | Yes | Yes |
| Plan identifies the qualified individual with full authority. | No | Yes | Yes |
| Plan must ensure, by contract or other means, the availability of private personnel and the equipment necessary to remove spilled oil. | No | Yes | Yes |
| Plan must describe training, equipment, testing, and periodic drills. | No | Yes | Yes |
| Plan must contain procedures to be followed during a response. | No | Yes | Yes |

A limited number of rail tank cars in use would be able to transport a volume of 42,000 gallons in a single package.[8] Most, if not all, rail tank cars being used to transport crude oil have a capacity greater than 3,500 gallons. Few railroads are likely to be required to have a Comprehensive Federal Plan. If any affected railroads have Comprehensive Federal Plans, this analysis overestimates the impact of the adopted rule on those railroads in terms of costs and benefits resulting from contingency planning requirements.

[8] Pipeline and Hazardous Materials Safety Administration (2014). Rulemaking for Hazardous Materials: Oil Spill Response Plans for High-Hazard Flammable Trains. States: "As discussed above, we believe that most, if not all, of the rail community transporting oil, including crude oil transported as a hazardous material, is subject to the basic OSRP requirement of 49 CFR 130.31(a), based on the understanding that most, if not all, rail tank cars being used to transport crude oil have a capacity greater than 3,500 gallons. However, a comprehensive OSRP for shipment of oil is only required when the oil is in a quantity greater than 42,000 gallons per package. Accordingly, the number of railroads required to have a comprehensive OSRP is much lower, or possibly non-existent, because a very limited number of rail tank cars in use would be able to transport a volume of 42,000 gallons in a single package.(2)"
Footnote (2): The 2014 AAR's Universal Machine Language Equipment Register (UMLER) numbers showed 5 tank cars listed with a capacity equal to or greater than 42,000 gallons, and none of these cars were being used to transport oil or petroleum products. https://www.regulations.gov/document?D=PHMSA-2014-0105-0001

## 2.3 Analytic scope

This analysis does not consider the costs or benefits of those elements of the adopted rule that are in existing regulation.

It is often the case that Ecology is directed to adopt rules as a result of a legal requirement. In some cases, it is not possible to separate these broad legal requirements from those that are placed in the rule to provide further implementation details, often at Ecology's discretion. For example, the adopted rule outlines specific requirements for plan contents, while the authorizing law more broadly requires full description of contingency plan response and preparedness for responding to a spill.

Where possible, Ecology evaluated the costs and benefits of the adopted rule separate from the requirements set by law. In cases where the adopted rule requirements were not separable from the law's requirements, Ecology conservatively chose to evaluate the overall cost of the requirement (as not to underestimate compliance costs), and attempted to evaluate benefits comparably.

## 2.4 Analyzed changes

Ecology evaluated the following elements of the adopted rule:

- Contingency plan submittal
- Contingency plan contents
- Compilation of field document
- Retention of maintenance records
- General planning standards
- Crude oil planning standard
- In-situ burning planning standard
- Shoreline cleanup planning standard
- Protection of responders and the public planning standard
- Wildlife protection planning standard
- Documentation of planning standards
- Drill requirements

## 2.4.1 Contingency plan submittal

***Baseline:***
Under the authorizing statute, plans must be submitted, then reviewed and updated as necessary at least every five years.

***Adopted Rule:***
The adopted rule specifies contingency plans shall be submitted to Ecology in one of two forms:

- Two physical copies or
- One electronic copy and one physical copy

Plans would be required to be reviewed and updated as necessary every five years.

***Analyzed changes:***

- Submission of plans in one of two allowed forms.
- Review every five years.

## 2.4.2 Contingency plan contents for rail

***Baseline:***
The authorizing statute states the following minimum requirements for contingency plans:

- Be designed to minimize damage to the environment from a worst case spill, including identification of necessary personnel, materials, equipment.
- Provide agreements for equipment, including amount, type, and locations.
- Provide agreements for enlisting use of trained personnel, including number, training, preparedness, and fitness.
- Clear, precise, and detailed description of how the rail contingency plan relates to existing contingency plans.
- Full response method details.
- Periodic training and drill programs.
- Provide for disposal of recovered oil.
- Means of protecting and mitigating effects on environment.
- Describe surrounding environment.
- Provide procedures for early detection and timely notification of spills.

In addition, some railroads are currently required to have federal oil spill response plans. These plans, at the basic level, are required to:

- Set forth the manner of response to a discharge.
- Account for maximum potential discharge.
- Identify appropriate persons and agencies.
- Identify phone numbers to be contacted.

Ecology sent a survey to railroads operating in the state in December 2015 to determine which railroads would be covered by the adopted rule. The survey also asked railroads if they maintain a federal oil spill contingency plan, though it did not identify whether those plans were the basic plan, or the more in-depth comprehensive plan. We assumed all federal plan holders had at least the basic plan.

***Adopted Rule:***
The adopted rule requires the following additional details be included in contingency plans:

- Binding agreement
- Name, location, type, address
- Size of worst case spill volume(s) (WCSV)
- Log sheet for changes
- Table of contents and cross-reference table reflection locations of plan components
- List and map of routes and operations, plus above-ground tank capacity if combined tank capacity exceeds 1,320 gallons
- List oil cargo, origin, type, safety information
- Primary response contractor (PRC) contract
- Mutual aid agreements
- Spill team organization chart
- Organization list of staff
- Description of the planning process and job description for staff positions
- Description of training
- Description of notification procedures
- List of notification names and numbers
- Identification of central reporting office
- Form to document notifications
- Procedures to track recovery volume and disposal volume
- Assessment methods of spill (product, volume, environment, safety)
- Section for documentation of spills
- Checklist of response steps
- Methods to assess groundwater impact
- Procedures for managing liability
- How environmental protection will be achieved
- Describe surrounding area
- Identify potential command posts
- Description of how plan holder meets planning standard

***Analyzed changes:***
Requirements for rail contingency plan contents under the adopted rule are generally more specific than the minimum requirements under the baseline statute or federal law. For this reason, this analysis addresses the impacts of all of the adopted rule requirements for contingency plan contents, except, as already required under the baseline:

- Description of the planning process.
- Description of training.
- Description of how environmental protection will be achieved.
- Description of surrounding areas.

Under the adopted rule, railroads that are required to have federal oil spill response plans may submit those plans to Ecology in lieu of a new contingency plan, as long as the existing plans meet the requirements of the adopted rule.

## 2.4.3 Compilation of field document

***Baseline:***
None

***Adopted Rule:***
The adopted rule requires rail plan holders to create a field document, consisting of a subset of the elements of their contingency plans. The field document contains time-sensitive information, is kept in key locations, and is available to personnel participating in oil-handling operations. It must contain:

- Procedures to detect, assess and document the presence and size of a spill.
- Spill notification procedures.
- Checklist that identifies significant steps used to respond to a spill, listed in a logical progression of response activities.

***Analyzed changes:***
The adopted rule requirements for the field document are all elements of the overall contingency plan. We therefore estimate the impacts of this requirement based on estimates of time needed to compile this document from otherwise required information in the contingency plan.

## 2.4.4 Retention of maintenance records

***Baseline:***
None.

***Adopted Rule:***
The adopted rule requires rail plan holders to keep response equipment maintenance records for five years.

***Analyzed changes:***
Keeping maintenance records for five years.

## 2.4.5 General planning standards

***Baseline:***
While the authorizing statute and federal response plans require broad preparedness for dealing with oil spills, they state no specific requirements for planning standards.

Railroads with federal plans may or may not have existing equipment or contracts with PRCs.

***Adopted Rule:***
For all rail plan holders, the adopted rule requires preparedness, including equipment and personnel in appropriate locations, that meets the planning standards below. Railroads may meet these standards directly, or contract with PRCs.

Table 3: Adopted General Planning Standards

| Time (hours) | Boom/Assessment | Minimum Oil Recovery Rate % of Worst Case Spill Volume per 24 hours[9] | Minimum Storage in Barrels |
|---|---|---|---|
| 6 | A safety assessment of the spill by trained crew and appropriate air monitoring could have arrived.<br><br>5,000 feet of boom available for containment, recovery or protection could have arrived.<br><br>Alternatively, resources identified to deploy a site specific strategy to keep oil from entering surface waters or penetrating into the ground could have arrived. | Capacity to recover the lesser of 10% of worst case spill volume or 4,100 barrels within 24-hour period could have arrived | 1 times the Effective Daily Recovery Capacity (EDRC) appropriate to operating environment |
| 12 | Additional 20,000 feet of boom to be used for containment, protection or recovery could have arrived. | Capacity to recover the lesser of 15% of worst case spill volume or 12,000 barrels within 24-hour period could have arrived | 1.5 times the EDRC appropriate to operating environment |
| 24 | More boom as necessary for containment, recovery or protection. | Capacity to recover the lesser of 20% of worst case spill volume or 16,000 barrels within 24-hour period could have arrived | 2 times the EDRC appropriate to operating environment |
| 48 | More boom as necessary for containment, recovery or protection. | Capacity to recover the lesser of 25% of worst case spill volume or 20,000 barrels within 24-hour period could have arrived | More as necessary to not slow the response |

***Analyzed changes:***
All requirements in the above table.

[9] The equipment planning standards in WAC 173-186-310 were adjusted in the final draft of the rule to be aligned and in proportion with the planning standards for other facilities, pipelines and vessels. This change scales the requirements evenly across all industry sectors while providing an adequate level of protection.

## 2.4.6 Crude oil planning standards

***Baseline:***
None, unless a federal response plan already addresses cleanup of crude (including Group 5) oils and has necessary preparedness via contract with a PRC.

***Adopted Rule:***
The adopted rule requires rail plan holders carrying, handling, storing, or transporting crude (including Group 5) oils to have a contract with a PRC that maintains the resources and/or capabilities necessary to respond to a spill of crude oils. Equipment is required to include at least:

- Sonar, sampling equipment or other methods to locate the oil on the bottom or suspended in the water column.
- Containment boom, sorbent boom, silt curtains, or other methods for containing the oil that may remain floating on the surface or to reduce spreading on the bottom.
- Dredges, pumps, or other equipment necessary to recover oil from the bottom and shoreline.
- Equipment necessary to assess the impact of such spills.
- Other appropriate equipment necessary to respond to a spill involving the type of oil handled, stored, or transported.

The equipment above is required to be able to respond to a spill of crude oils within 12 hours.

***Analyzed changes:***
PRC contract requirement above, allowing for federal plan holders that may already contract with a PRC that meets these requirements.

## 2.4.7 In-situ burning planning standard

***Baseline:***
None, unless a federal response plan already addresses in-situ burning and has necessary equipment supporting it, by ownership or contract with a PRC.

***Adopted Rule:***
The adopted rule requires rail plan holders operating in areas where in-situ burning could be approved to identify equipment for the use of in-situ burning, including:

- Locations of fire booms.
- Air monitoring equipment.
- Firefighting foam.
- Igniters and aircraft or vessels to be used to deploy the igniters.

The above is required to be able to respond to a spill within 12 hours.

***Analyzed changes:***
Identification and access to the equipment above, allowing for federal plan holders that may already own this equipment or contract with a PRC that meets these requirements.

## 2.4.8 Shoreline cleanup planning standard

***Baseline:***
None, unless a federal response plan already addresses shoreline cleanup and has necessary equipment supporting it, by ownership or contract with a PRC.

***Adopted Rule:***
The adopted rule requires each rail plan holder to identify and ensure the availability of response resources necessary to perform shoreline cleanup operations.

These resources are required to be located in a way that they are available within 24 hours.

***Analyzed changes:***
Identification and access to the resources above, allowing for federal plan holders that may already own equipment or contract with a PRC that meets these requirements.

## 2.4.9 Protection of responders and the public planning standard

***Baseline:***
None, unless a federal response plan already addresses the protection or responders and the public.

***Adopted Rule:***
The adopted rule requires rail plan holders to include in their contingency plans a narrative description of applicable federal, state, and local requirements.

Rail plan holders must also describe their resources for conducting air monitoring to protect oil spill responders and the public. Descriptions must include:

- How initial site characterization for responders will occur.
- Air monitoring instruments and detection limits that will be used when monitoring for public safety.
- Action levels for various oil constituents of concern based on products handled by the railroad (benzene, H2S, etc.).
- How data management protocols and reporting timeframes will be managed under unified command.
- How communication methods to at-risk populations will be managed under unified command.
- How evacuation zones and shelter-in-place criteria are established under unified command.

***Analyzed changes:***
Description of the above elements.

## 2.4.10 Wildlife protection planning standard

***Baseline:***
None, unless a federal response plan already addresses wildlife protection and has necessary equipment supporting it, by ownership or contract with a PRC.

***Adopted Rule:***
The adopted rule requires rail plan holders to identify applicable federal, state and Northwest Area Contingency Plan (NWACP) requirements for wildlife rescue and rehabilitation. They must describe the equipment, personnel, resource and strategies for compliance with those requirements. These resources must be able to respond within 12 hours.

***Analyzed changes:***
Identification and access to the equipment above, allowing for federal plan holders that may already own this equipment or contract with a PRC that meets these requirements.

## 2.4.11 Documentation of planning standards

***Baseline:***
None, though documentation is implicit in general requirements stated in the authorizing statute and federal response plans.

***Adopted Rule:***
The adopted rule requires rail plan holders to describe how planning standards are met. Plans must include a spreadsheet (provided by Ecology) specifying resources that meet planning standards. The spreadsheet must include the type, quantity, home base, and provider for each of the following:

- Boom
- Recovery systems
- Storage
- Personnel

***Analyzed changes:***
Completion of Ecology-provided spreadsheet.

## 2.4.12 Drill requirements

***Baseline:***
None, unless a federal response plan already requires drills, directly or by contract with a PRC.

***Adopted rule:***
In each triennial cycle, the adopted rule requires rail plan holders or their contracted PRCs to perform the spill response drills below.

Table 4: Adopted Drill Requirements

| Type of Drill | Frequency Within the Triennial Cycle | Special Instructions | Scheduling Instructions |
|---|---|---|---|
| Tabletop drills | 3 - One in each year of the cycle | One of the three shall involve a worst case discharge scenario. The worst case discharge scenario drill shall be conducted once every three years. | Scheduled at least 60 days in advance, except the worst case discharge scenario at least 90 days in advance. |
| Deployment drills | 6 - Two per year | These drills include notification, safety assessments, GRP and equipment deployments. | Scheduled at least 30 days in advance. |
| Ecology initiated unannounced drills | As necessary | This drill may involve testing any component of the plan, including notification procedures, deployment of personnel, boom, recovery, and storage equipment. | No notice. |
| Wildlife Deployment Drill | 1 - One in each three year cycle. This is an additional drill unless it is incorporated into a large multi-objective deployment drill. | This drill will be a deployment of wildlife equipment and wildlife handlers. | Scheduled at least 30 days in advance. |

***Analyzed changes:***
The required drills above, allowing for federal plan holders that may already meet these requirements.

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# Chapter 3: Likely Costs of the Adopted Rule

## 3.1 Introduction

Ecology estimated the expected costs associated with the adopted rule, as compared to the baseline as described in section 2.2 of this document, and as specified in section 2.4 of this document. The baseline is the regulatory circumstances in the absence of the adopted rule. For the purposes of analyzing costs, requirements were grouped together where activities and documentation are interrelated. The list below shows that grouping.

The costs analyzed here include:

- Contingency plan and field document costs:
    - Contingency plan submittal
    - Plan contents
    - Compilation of field document
    - Maintenance and retention of maintenance records
    - Documentation of planning standards
- PRC contract costs, for meeting:
    - General planning standards
    - Crude oil planning standards
    - In-situ burning planning standard
    - Shoreline cleanup planning standard
    - Protection of responders and the public planning standard
    - Wildlife protection planning standard
    - Drill requirements
- Possible additional or relocated response asset costs

## 3.2 Affected entities

Based on the results of a survey sent to railroads operating in the state in December 2015, Ecology identified nine railroads operating in Washington that are likely to be covered by the adopted rule.[10] The likely covered railroads include:

1. BNSF Railway Company
2. Central Washington Railroad (c/o Columbia Basin Railroad)
3. Columbia Basin Railroad Company Inc.
4. Great Northwest Railroad, Inc. (parent company WATCO)
5. Portland Vancouver Junction Railroad
6. Puget Sound & Pacific Railroad (Genesee & Wyoming)
7. Tacoma Rail
8. Union Pacific Railroad
9. Western Washington Railroad, LLC

Five of these railroads informed Ecology through the survey that they have a federal oil spill response plan. Ecology assumed, conservatively, that these plans met at least the basic federal plan requirements and had access to the necessary supporting assets. In quantitative cost estimates, however, Ecology made the additional conservative overestimation assumption that none of these plans would be sufficient to be submitted as a complete state plan. If any of these plans is sufficient to be submitted as a state plan, costs will be lower than estimated in this document.

We also identified 15 approved primary response contractors (PRCs) that may need to acquire or relocate additional spill response assets in locations currently not equipped to meet the adopted rule's planning standards.

1. Able Clean-up Technologies, Inc.
2. Ballard Marine Construction
3. Big Sky Industrial
4. Clean Harbors Environmental
5. Clean Rivers Cooperative, Inc.
6. Cowlitz Clean Sweep, Inc.
7. Focus Wildlife
8. Global Diving and Salvage
9. Green Sweep Asphalt Services
10. Guardian Industrial Services
11. Islands' Oil Spill Association
12. Marine Spill Response Corp.
13. NRC Environmental Services
14. NWFF Environmental Inc.
15. Tidewater Barge Lines / Tidewater Terminal Company

[10] Information available on one additional railroad made it uncertain whether it would be covered.

## 3.3 Expected costs

Ecology assumed that entities would reduce compliance costs by:

- Sharing assets to the maximum extent practicable, via contracts with approved PRCs.
- Using existing equipment that is available in locations that meet the adopted rule's planning standards.

This would include the costs of:

- Up to 9 railroads incurring costs of developing, writing, and submitting a contingency plan and creating a field document, internally or via consultant contract.
- Up to 9 railroads incurring costs of contracting with a PRC for spill response coverage and required drills.
- Possible additional costs (to a PRC, if any) of acquiring additional assets to meet the adopted rule's planning standards, in locations that are currently unsupported. These costs would likely be passed on to rail plan holders through increased fees.

### 3.3.1 Contingency plan and field document costs

The adopted rule would require rail plan holders to either develop a contingency plan themselves, or hire a consultant to develop it. We estimated both types of cost.

Contingency plan and field document costs include:

- Contingency plan submittal
- Plan contents
- Compilation of field document
- Maintenance and retention of maintenance records
- Documentation of planning standards

Based on past surveys of large facilities developing contingency plans, we estimated that external consultant costs (plus small amounts of internal support or administrative work) would cost between approximately $203 thousand and $406 thousand (2016-dollars).[11] This would be a one-time cost associated with the first plan submittal. Larger, more complex oil-by-rail operations are likely to choose this option.

If, however, development of contingency plans was able to be done internally at covered railroads, we estimated that this cost would be between $35 thousand and $55 thousand. This range is based on an hourly wage of $77.81 for environmental engineers, including benefits equaling 35.5 percent of salary, and overhead equaling 26.1 percent of salary and benefits. This

[11] WA Department of Ecology (2003). Ecology survey of contingency plan holders, asking about costs of developing federal and state contingency plans. Federal plans were used as the proxy for this analysis, because they were more representative of a situation in which a covered entity does not create any plan under the baseline.

also includes various assumptions about the time and effort it would take to develop a plan that includes the various required elements of a contingency plan under the adopted rule.[12,13] (These assumptions are summarized in Appendix A.) Smaller, less complex oil-by-rail operations are likely to choose this option.

Ecology is assuming conservative assumptions here. There are two options in the rules that could reduce the costs of developing a plan: plan holders joining together to submit a single plan that covers all their operations, or plan holders using the boilerplate, fill in plan that Ecology intends to provide on their website.

Based on a 2003 survey of facility contingency plan holders, and assumed hours required for review and updating, we estimated that annually reviewing plans, and doing additional review and updating on the 5-year plan cycle, would cost between $137 thousand and $155 thousand (in 2016 present-value dollars, using a 1.18-percent discount rate).[14]

### 3.3.2 PRC contract costs

This analysis assumes that, rather than acquiring their own assets, covered railroads will minimize costs by contracting with PRCs for access to response equipment and personnel that meet the adopted rule's:

- General planning standards
- Crude oil planning standards
- In-situ burning planning standard
- Shoreline cleanup planning standard
- Protection of responders and the public planning standard
- Wildlife protection planning standard
- Drill requirements

We estimated these costs to be between $450 and $1,400 per year for the first transit (without additional costs for additional transits within the same year), as based on oil volumes up to the maximum assumed worst case spill volume (WCSV) of nearly 79 thousand barrels, and prices available from the Washington State Maritime Cooperative (WSMC) for coverage. This estimate includes access to assets owned or accessible to the Marine Spill Response Corporation (MSRC).[15] The large PRC, National Response Corporation (NRC), indicated in a 2013 client advisory letter that its rates for its standard contingency plan were lower than those of WSMC.[16] For the nine likely covered railroads, this cost is equivalent to a 20-year cost between $73 thousand and $256 thousand in 2016 present value, using a 1.18-percent discount rate.[17]

[12] US Bureau of Labor Statistics (2014). May 2014 State Occupational and Wage Estimates for Washington.
[13] WA Department of Ecology (2015b). Washington State assumptions for overhead for legislative estimates of compensation costs for fiscal notes, 2015-16.
[14] Historic average real rate of return on US Treasury Department I-Bonds. Associated historic average inflation rate is approximately 2 percent. US Treasury (2016).
[15] Washington State Maritime Cooperative (2014). Annual Vessel Assessment Fee Schedule (Effective January 1, 2014).
[16] National Response Corporation (2013). Client Advisory Letter 2013-04. September 5, 2013.
[17] US Treasury Department (2016). Historic average real rate of return on US Treasury Department I-Bonds. Associated historic average inflation rate is approximately 2 percent.

### 3.3.3 Possible additional or relocated response asset costs

At the time of this publication, Ecology has not yet completed modeling of whether existing equipment could meet the full degree of coverage as required in the adopted rule. For this analysis, however, we completed a review of data describing equipment locations, and identified the most likely gaps in asset availability. Recall that the adopted rule requires certain assets and capabilities be within six-hour, 12-hour, 24-hour, and 48-hour distances from covered rail transit locations. If existing equipment covers these requirements, this additional asset cost is zero. If assets need to be relocated, or additional response assets need to be purchased, it is likely that at least one PRC would incur these costs, and would likely pass those costs on in distributed form to plan holders. At this time, Ecology was not able to estimate these costs quantitatively, but includes them qualitatively.

As part of this analysis, we examined the locations and types of equipment currently available at various planning points, as well as the travel distances (in hours) from a subset of significant points to other areas of the state. This equipment is currently contracted to facilities, vessels and pipelines as part of their contingency planning for spills. Some individual firms also own their own equipment (e.g., BNSF), and may make it available through contract. Other equipment, such as liquid storage, is covered by letters of intent indicating the asset may be made available (for which Ecology accounts a 3-hour delay for planning purposes).

Of the significant locations, equipment was at most 12 hours from the farthest distances in its service area (e.g. equipment from Spokane getting to the tip of the Olympic Peninsula; Aberdeen to the northeast corner of Pend Oreille County). Ecology finds that equipment may reach all areas of the state by land in at most 24 hours. These service areas overlap, especially along Puget Sound and the Columbia River (areas with significant oil-by-rail traffic), but also throughout central and eastern Washington. Many of these resources (including storage) are able to be relocated, rather than replaced or added to, to minimize costs of comprehensive response asset coverage compliant with the adopted rule.

## 3.4 Summary of costs

Ecology estimated the following quantifiable costs, over 20 years, likely associated with the adopted rule. These costs would be incurred across nine likely covered existing railroads carrying bulk oil through the state. In addition, it is possible that PRCs (or plan holders, through passed-on rate increases) would incur additional costs of some response asset relocation or acquisition.

Table 5: Total 20-Year Present Value Costs

| Cost | | Low | High |
|---|---|---|---|
| Assuming internal plan development | Plan development | $34,664 | $52,872 |
| | Plan review | $136,974 | $154,712 |
| | PRC contracts | $72,624 | $225,941 |
| | **TOTAL** | **$244,262** | **$433,525** |
| Assuming contracted plan development | Plan development | $202,797 | $405,594 |
| | Plan review | $136,974 | $154,712 |
| | PRC contracts | $72,624 | $225,941 |
| | **TOTAL** | **$412,395** | **$786,247** |

These costs may increase proportionally if additional railroads are covered, or if new covered railroads begin operations in the state. Depending on future pricing schedules and possible response to very high demand for PRC services, these costs might also increase in the future if increases in oil-by-rail traffic significantly increase demand for PRC contracts, or increase the likelihood or frequency of railroads needing to use PRC services.

# Chapter 4: Likely Benefits of the Adopted Rule

## 4.1 Introduction

The benefits of preparedness and thorough, measurable contingency planning are many fold. Careful planning leads to the ability to respond to a spill more rapidly, effectively, and with appropriate resources that are well maintained. Damages from spills are minimized when responsible parties are trained and organized to respond. Preparedness also drives better awareness of spill risks and leads to more investments in prevention.

Rapid response and cleanup has four effects:

1. Immediate cost of cleanup falls because of the broader pre-staging of equipment and people.
2. More oil is removed from the original spill location, which reduces the costs of expanded cleanup, socio-economic damages, penalties, and long term natural resource damages.
3. Oil is removed more quickly and safely from population-dense locations, reducing fire, air-quality, and oil-exposure risks to people and property.
4. More oil may be recovered using rapid, aggressive response.

Ecology estimated a range of possible benefits, as well as discussed all benefits qualitatively, that would result from the adopted rule. The elements of the adopted rule resulting in costs (as discussed in Chapter 3) all support faster response to spills, better training and cleanup capability, and additional protection for responders and the public. These elements all support an overall benefit of avoiding some of the damages of an oil spill.

In this chapter, we qualitatively discuss, and describe the quantification (where possible) of costs associated with different types and locations of spills in Washington, as well as different types of spill associated with transporting oil by rail. We discuss the reductions in those costs that could be supported by the adopted rule. Reduced costs are benefits of the rule.

The elements supporting better, faster oil-by-rail spill response preparedness in Washington include:

- Comprehensive contingency plan content tailored for rail transport of oil, including but not limited to:
    - List and map routes and operations, plus above-ground tank capacity if combined tank capacity exceeds 1,320 gallons
    - List oil cargo, origin, type, safety info
    - PRC contract(s)
    - Mutual aid agreements
    - Spill team organization chart
    - Organization list of staff

    - Description of training
    - Description of notification procedures
    - Notification names and numbers
    - Identification of a central reporting office
    - Procedures to track recovery volume and disposal volume
    - Assessment methods of spill (product, volume, environment, safety)
    - Documentation of spills
    - Checklist of response steps
    - Methods to assess groundwater impact
    - Procedures for managing liability
    - Description of how environmental protection will be achieved
    - Description of the surrounding area(s)
    - Identification of potential command posts
- Field document for immediate, accessible information supporting on-site response coordination.
- Access to necessary equipment and trained personnel in locations appropriate for bulk oil spills from rail. This includes general response, as well as in-situ burning, shoreline, and wildlife response where appropriate and necessary.
- Planning for protection of the public and responders, with regard to air quality.
- Drills practicing use of equipment and personnel in response to rail-based oil spills.

## 4.2 Impacts of spills

Spills from oil trains can have a variety of impacts, ranging from relatively mild to severe. While the adopted rule does not intend to prevent such spills, the degree of preparedness it requires would serve to reduce response times, reduce overall remediation times, and protect the public and environment to a greater degree, as well as reduce the duration of disruptions to economic activity.

The table below lists a sample of oil train spills and their impacts.[18]

[18] Ecology (2015a). Washington State 2014 Marine and Rail Oil Transportation Study. March 1, 2015. Ecology publication no. 15-08-010.

Table 6: Example Oil Train Spills and Impacts

| Location/Date<br>Incident Type | Fire | Spill (Gallons) | Details of Incident |
|---|---|---|---|
| LaSalle, CO<br>9-May-14<br>Derailment | No | 6,500 | 6 cars of a 100-car crude oil train derailed, causing leakage from one car. Leakage was at rate of 20-50 gallons/minute. Spill contained in ditch. No injuries. |
| Lynchburg, VA<br>30-Apr-14<br>Derailment | Yes | <50,000 | 15 cars in crude oil train derailed in downtown area of city. 3 cars caught fire, and some cars derailed into river along tracks. Immediate area surrounding derailment evacuated. No injuries were reported. |
| Vandergrift, PA<br>13-Feb-14<br>Derailment | No | 4,550 | 21 tank cars of 120-car train derailed outside Pittsburgh. 19 derailed cars carrying crude oil from western Canada; 4 released product. No fire or injuries. |
| Philadelphia, PA<br>20-Jan-14<br>Derailment | No | None | 7 cars of 101-car CSX train, including 6 carrying crude oil, derailed on bridge over Schuylkill River. No injuries and no leakage were reported, but 2 cars, one tanker, leaning over river. |
| Wisconsin/ Minnesota<br>3-Feb-14<br>Leak | No | 12,000 | Valve or cap mishap caused spill of 12,000 gallons from one tank car while en route between Winona and Red Wing. Train traveling at low speed. |
| Plaster Rock, New Brunswick, Canada<br>7-Jan-14<br>Derailment | Yes | Unknown | Train delivering crude from Manitoba and Alberta to Irving Oil refinery in St. John, New Brunswick. 45 homes evacuated; no injuries reported. 17 cars of mixed train hauling crude oil, propane, and other goods derailed likely due to sudden wheel/axle failure. 5 tank cars carrying crude oil caught fire and exploded. |
| Casselton, ND<br>30-Dec-13<br>Derailment | Yes | >400,000 | Eastbound train hauling 106 tank cars of crude oil struck westbound train carrying grain that shortly before had derailed onto eastbound track. Some 34 cars from both trains derailed, including 20 cars carrying crude oil that exploded and burned for over 24 hours. About 1,400 residents of Casselton were evacuated, but no injuries were reported. Cause of derailments and subsequent fire under investigation. |

| Location/Date<br>Incident Type | Fire | Spill (Gallons) | Details of Incident |
|---|---|---|---|
| Aliceville, AL<br>8-Nov-13<br>Derailment | Yes | <748,400 | Train hauling 90 cars of crude oil from North Dakota to refinery near Mobile, AL, derailed on section of track through wetland near Aliceville, AL. 30 tank cars derailed and some dozen burned. No one was injured or killed. The derailment occurred on a short line railroad's track that had been inspected a few days earlier. Cause of derailment under investigation. 30 cars derailed, 12 breached. |
| Gainford, Alberta, Canada<br>19-Oct-13<br>Derailment | Yes | Unknown | 9 tank cars of propane and four tank cars of crude oil from Canada derailed. About 100 residents evacuated. 3 propane cars burned, but tank cars carrying oil were pushed away and did not burn. No one injured or killed. Derailment cause under investigation. 9 propane, 4 crude; 3 propane cars burned. |
| Lac-Mégantic, Quebec, Canada<br>5-Jul-13<br>Derailment | Yes | >26,500 | Train with 72 loaded tank cars of crude oil from North Dakota moving from Montreal, Quebec, to St. John, New Brunswick, stopped at Nantes, Quebec, at 11:00 pm. Operator and sole railroad employee aboard train secured it and departed, leaving train on short line track with descending grade of 1.2%. At about 1:00 am, train began rolling down descending grade toward own of Lac-Mégantic, about 30 miles from U.S. border. Near center of town, 63 tank cars derailed, resulting in multiple explosions and subsequent fires. 47 fatalities and extensive damage to town. 2,000 people evacuated. . |
| White River, Calgary, Alberta<br>Derailment | Yes | 26,866 | A broken wheel and emergency brake application caused a derailment. Two of seven cars carrying crude oil spilled. There was a fire that was put out by local firefighters. |
| Parkers Prairie, MN<br>27-Mar-13<br>Derailment | No | 30,000 | 14 cars on 94-car crude oil train derailed; up to 3 cars ruptured. |
| Lynchburg, VA | Yes | Unknown | 17 car derailment and fire |

| Location/Date<br>Incident Type | Fire | Spill (Gallons) | Details of Incident |
|---|---|---|---|
| May-14<br>Derailment | | | |
| Ontario, Canada<br>Feb-15<br>Derailment | Yes | Unknown | 35 cars derailed and 7 caught fire |
| Southwestern Alberta<br>Feb-15 | No | None | 12 crude oil cars derailed. |
| West Virginia<br>Feb-15 | Yes | Under investigation | Train derailment involving 27 cars spilled oil into the Kanawha River, a source of drinking water in Kanawha and Fayette counties. 19 cars were involved in the fire. |
| Mosier, Oregon<br>Jun-16<br>Derailment | Yes | 42,000 | 96-car oil train derailed 20 feet from the city's sewage treatment facility and next to the Columbia River. 16 cars derailed and 4 were involved in the fire. Drinking water use was restricted and the town's treatment plant was closed (with wastewater shipped to nearby Hood River). Groundwater contamination and an oil sheen on the river were later observed. |

### 4.2.1 Human Wellbeing Costs

The derailment in Lac-Mégantic, Canada was particularly devastating, and is an example of the type of incident the adopted rule intends to make railroads more prepared to deal with. It is notable that Lac-Mégantic had a population of around 6 thousand[19] when the derailment killed 47 people in the center of town. The table below summarizes the populations of cities and towns in Washington with oil trains passing through or near them.[20] Many of these cities have populations in the tens or hundreds of thousands, and/or high population density near rail corridors.

Table 7: Washington populations on or Near Oil-by-Rail Lines

| Route | City/Town | Population (2012) |
|---|---|---|
| Main Route<br>North Dakota–Spokane | Milwood | 1,770 |
| | Spokane | 209,525 |
| | Spokane Valley | 91,113 |
| West Route<br>Spokane–Everett | Harrington | 413 |
| | Odessa | 887 |
| | Ephrata | 7,916 |
| | Quincy | 7,013 |
| | Wenatchee | 32,562 |
| | Cashmere | 3,145 |
| | Leavenworth | 1,989 |
| | Index | 184 |
| | Gold Bar | 2,089 |
| | Sultan | 4,715 |
| | Monroe | 17,503 |
| | Snohomish | 9,275 |
| | Everett | 104,655 |
| Southwest Route<br>Spokane–Tri-Cities | Cheney | 11,018 |
| | Sprague | 435 |
| | Ritzville | 1,678 |
| | Lind | 572 |
| | Hatton | 102 |

[19] Statistics Canada (2011). Canada 2011 Census.
[20] Ecology (2015a). Washington State 2014 Marine and Rail Oil Transportation Study. March 1, 2015. Ecology publication no. 15-08-010.

| Route | City/Town | Population (2012) |
|---|---|---|
| | Connell | 5,421 |
| | Mesa | 501 |
| | Pasco | 65,600 |
| | Kennewick | 75,971 |
| Northwest Route<br>Tri-Cities–Auburn | Benton City | 3,142 |
| | Prosser | 5,799 |
| | Mabton | 2,323 |
| | Toppenish | 9,017 |
| | Wapato | 5,065 |
| | Union Gap | 6,060 |
| | Yakima | 93,101 |
| | Selah | 7,333 |
| | Ellensburg | 18,348 |
| | Cle Elum | 1,890 |
| | Maple Valley | 24,171 |
| | Covington | 18,298 |
| | Auburn | 73,505 |
| Western Route<br>Tri-Cities–Vancouver, WA | Lyle | 530 |
| | White Salmon | 2,259 |
| | Stevenson | 1,482 |
| | North Bonneville | 961 |
| | Washougal | 14,584 |
| | Camas | 20,490 |
| | Vancouver | 165,489 |
| North Route<br>Vancouver–Centralia | Ridgefield | 5,260 |
| | Woodland | 5,540 |
| | Kalama | 2,323 |
| | Kelso | 11,832 |
| | Longview | 36,548 |
| | Castle Rock | 1,984 |
| | Vader | 619 |

| Route | City/Town | Population (2012) |
|---|---|---|
| | Winlock | 1,329 |
| | Napavine | 1,766 |
| | Chehalis | 7,298 |
| | Centralia | 16,505 |
| West Sub-Route Centralia–Hoquiam | Rochester | 1,829 |
| | Oakville | 676 |
| | Elma | 3,052 |
| | Montesano | 3,905 |
| | Aberdeen | 16,529 |
| | Hoquiam | 8,535 |
| North Route Centralia–Seattle | Bucoda | 562 |
| | Tenino | 1,699 |
| | Lacey | 43,860 |
| | DuPont | 8,808 |
| | Steilacoom | 6,070 |
| | Lakewood | 31,562 |
| | Tacoma | 202,010 |
| | Fife | 9,333 |
| | Puyallup | 38,147 |
| | Edgewood | 9,501 |
| | Sumner | 9,541 |
| | Pacific | 6,838 |
| | Algona | 3,101 |
| | Auburn | 73,505 |
| | Kent | 122,999 |
| | Tukwila | 19,611 |
| | Renton | 95,448 |
| | Seattle | 634,535 |
| North Route Seattle–Vancouver, BC | Shoreline | 54,352 |
| | Woodway | 1,322 |
| | Edmonds | 40,400 |

| Route | City/Town | Population (2012) |
|---|---|---|
| | Lynnwood | 36,275 |
| | Mukilteo | 20,605 |
| | Everett | 104,655 |
| | Marysville | 62,402 |
| | Stanwood | 6,422 |
| | Mt. Vernon | 32,287 |
| | Burlington | 8,470 |
| | Anacortes | 15,928 |
| | Bellingham | 82,234 |
| | Ferndale | 11,998 |
| | Blaine | 4,831 |
| **Total** | | **3,054,740** |

Along the Columbia River where it forms the border with Oregon, additional populations are at risk in cities such as Portland, Hood River, and The Dalles.

The degree to which railroads are aware of and plan for spills in population-dense areas, and have access to equipment that addresses spills rapidly and efficiently, reduces the scope of these spill impacts on:

- Health:
    - Fire
    - Explosions
    - Air quality
    - Toxic chemical exposure
    - Drinking water contamination
    - Subsistence or traditional food source contamination

- Quality of life:
    - Evacuation
    - Property damage and contamination

## 4.2.2 Environmental costs

The adopted rule is designed to help railroads be adequately prepared for spill response that minimizes environmental damage, through rapid and comprehensive action. While larger public knowledge exists about spills to waterways, there are possible environmental impacts of spills to all media, both near and away from surface waters. These include damages to:

- Surface water quality
- Groundwater quality
- Fisheries
- Areas prone to wildfire
- Shellfisheries
- Bird populations
- Animals, including sea mammals, consuming contaminated fish, shellfish
- Endangered species
- Recreational quality

***Passive or non-use values for nature***

A 1995 case study of willingness to pay to prevent spills on the California coast indicates the value placed on prevention at $76.45 per household.[21] The spills described in the study oiled 10 miles of coast and killed 12,000 birds. By comparison, the scenarios studied for these rules involve only the central coastline of California whereas the adopted rule affects Puget Sound and the Columbia River, as well as numerous freshwater bodies near coasts as well as inland. The California scenario involved prevention and immediate response through the use of a tug escort. Thus the case study assumed 100% of spills would be immediately addressed for a 10 year period. Therefore, the losses for the California study may be more appropriate for the smaller, more frequent spills than for the worst case spills which Ecology is required to prepare for in Washington law. [22]

***Tribal resources and traditional lifeways***

Many of Washington's tribes are located near oil-by-rail transportation corridors and have exposure to the risks of oil spills. The environmental values shared by many Washingtonians are of deep historical and cultural significance. This holds fundamentally true for Washington's tribal nations as well. Tribal culture is closely tied to and has co-evolved with productive and functional ecosystems. Tribes and tribal members possess property and self-government rights that predate the formation of the United States and the creation of the State of Washington, and are guaranteed under treaties and federal law.

Due to federal laws and inherent tribal sovereignty, each reservation in the state constitutes a bordering jurisdiction for environmental purposes, but environmental actions outside the reservation affect the tribe and the residents of the reservation just as the actions within the reservation affect the state and its citizens. The adopted rule's requirements for rapid and comprehensive response to spills from rail are likely to reduce the degree or severity of impacts to tribal resources and traditional lifeways.

[21] Carson, RT, et al. (2004). Valuing Oil Spill Prevention: A case study of California's Central Coast. Richard T Carson, Michael B. Conaway, W. Michael Hanemann, Jon A. Krosnick, Robert C. Michael, Stanley Presser, Kluwer Academic Publishers, 2004. Notes: This value must be indexed for inflation. There were a variety of exclusions. E.g. if the 15% of the respondents who objected that the oil companies should pay for the tug and not the citizens were excluded the results would have be $8.74 higher.

[22] RCW 90.56.010 Definitions. RCW 90.56.210 Contingency plans. RCW 88.46.010 Definitions. RCW 88.46.060 Contingency plans. RCW 90.56.060 Statewide master oil and hazardous substance spill prevention and contingency plan--Evaluation and revision or elimination of advisory committees.

***Multiple simultaneous losses***

Spills along or into waterways simultaneously affect multiple values. The Columbia River can serve as an example of multiple values vulnerable to oil spills, in areas frequented by oil trains. The Columbia is the largest river in the Pacific Northwest, and is over a thousand miles long. It is a large regional source of water, hydropower, transportation, recreation, and habitat. In particular, it is home to or a place of transit for multiple fish species, and specifically salmon species (some of which are listed as protected under the Endangered Species Act on sections of the Columbia or its tributaries) and the white sturgeon (the population of which is divided into landlocked populations between the river's dams, except below Bonneville Dam). Recreational areas thrive on and near the river throughout its course, including near freight rail crossings such as the Rock Island Railroad Bridge near Wenatchee, WA. Downriver, the Columbia River Gorge is a National Scenic Area that attracts $50 million dollars in annual spending in local communities on the Oregon side of the river.[23] The river (including its fisheries) is also of significant historical and cultural value to multiple regional tribes. The adopted rule's requirements for rapid and comprehensive response to spills from rail are likely to reduce impacts to these multiple values.

## 4.2.3 Economic disruption costs

Where oil-by-rail spills impact areas also used for economic activity, such as waterways, ports, recreational locations, and fisheries, that economic activity could also be disrupted. This is also the case in more population-dense locations that might require evacuation or be damaged, condemned, or destroyed. The adopted rule's requirements for rapid and comprehensive response to these spills is likely to reduce the duration of these disruptions, resulting in reduced:

- Vessel delay
- Business interest losses
- Building damage from fire
- Expansion of property contamination
- Lost use of affected facilities and roads
  The June 2016 oil train derailment and fire near Mosier, OR occurred within 20 feet of the area's wastewater treatment plant. The event caused the evacuation of approximately 100 people, the closure of Interstate 84 (a significant east-west transit and transport corridor), drinking water restrictions, early ending of the school year, and the closure of the wastewater treatment plant during remediation.[24] Sewage was shipped to Hood River for treatment until the treatment plant could be reopened without discharging oil contaminants to the Columbia River.
- Lost wages
  The average wage in Washington in 2014 was $55,427,[25] or roughly $28 per hour (assuming full time work for 50 weeks per year).
- Property damage, reduced property values, or increased insurance rates for properties near railways transporting oil

[23] White, EM and D Goodding (2013). Spending and Economic Activity from Recreation at Oregon State Park Properties – Columbia River Gorge Management Unit. Oregon State University. June 2013. https://www.oregon.gov/oprd/PLANS/docs/scorp/2013-2018_SCORP/Gorge_Economic_Impact%20Report.pdf
[24] http://www.kgw.com/news/report-fire-smoke-spotted-from-multi-car-train-derailment-in-gorge/230412557
[25] WA Office of Financial Management (2016a). Washington and US Average Wages. http://www.ofm.wa.gov/trends/economy/fig102.asp

The Washington State Office of Financial Management reports the median home price in Washington as over $286 thousand in 2015.[26] Zillow estimates recent median home prices as between $200 thousand and $600 thousand in major cities in northwest Washington, prices near $250 thousand in Vancouver, over $200 thousand in Kennewick, and over $150 thousand in Spokane.

These are all areas through which oil trains pass, though they are likely to pass near industrial, commercial, or residential areas with property values already lowered by proximity to railways (up to a 10-percent reduction in property values nearest to tracks[27], and among those an over 20-percent difference in prices 20 meters versus 100 meters from tracks[28]; these reductions will likely be further exacerbated by increased risks posed by oil trains). In dense urban centers, however, trains may pass through high-value commercial or industrial, and multi-unit residential areas, such as the:

- Multi-million-dollar properties of the SoDo neighborhood of Seattle29
- Near million-dollar high-volume port areas of Tacoma (those not owned by the city)30
- Multi-million-dollar redeveloped former industrial areas of Tacoma31
- Million-dollar waterfront properties on the Columbia River in Vancouver.32,33
- Marina oiling
- Shellfish population impacts
- Shellfish closures
- Commercial fishing losses
- Local spending reductions due to smoke or evacuation
- Park revenue losses
- Recreational boating revenue losses
- Wildlife viewing and hunting lost spending
- Lost tourist spending and income

In addition to external impacts after a spill, there are likely stock losses both for companies responsible for spills, and other companies in the industry. This can be accompanied by reduced demand for the product of an identifiable company. If a large spill took place along a rail line in Washington, there is a potential for a similar reaction. This reaction is possible in small spills, as well as larger spills approaching worst case volume. Given the larger neighboring population, the economic damages would be higher and the press visibility would be greater. Stock and demand impacts are important to larger companies and to individuals and companies that are holding their stock. The total losses also include political shifts as part of the fallout from a large spill. Reduced negative impacts resulting from a spill, due to increased preparedness under the adopted rule, would serve to mitigate these types of impact.

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[26] WA Office of Financial Management (2016b). Median Home Price in Washington. Updated July 13, 2016. http://www.ofm.wa.gov/trends/economy/fig107.asp

[27] Simons, RA and AE Jaouhari (2004). The effect of freight railroad tracks and train activity on residential property values. Survey. Appraisal Journal.

[28] Strand, J and M Vågnes (2001). The relationship between property values and railroad proximity: a study based on hedonic prices and real estate brokers' appraisals. *Transportation* 28: 137 – 156, 2001.

[29] http://www.kingcounty.gov/services/gis/Maps/parcel-viewer.aspx accessed August 2016.

[30] http://matterhorn3.co.pierce.wa.us/publicgis/ accessed August 2016.

[31] Ibid.

[32] http://gis.clark.wa.gov/mapsonline/ accessed August 2016.

[33] Note that trains passing through these areas may be traveling at lower rates of speed. For context, the June 2016 derailment in Mosier, OR occurred with a train traveling 25 miles per hour. US Department of Transportation (2016). Preliminary Findings Report: Mosier, Oregon; Union Pacific Derailment. http://www.fra.dot.gov/eLib/details/L17964

### 4.2.4 Example costs of worst-case rail oil spills

In May 2016, the Washington Attorney General's Office commissioned a report on the potential impacts of a worst-case spill on the lower Columbia River.[34] As one of its modeled spills, the report used a derailment of a train carrying 840 thousand gallons (20 thousand barrels) of Bakken crude oil near and upstream of the Bonneville Dam. Estimated restoration-based damages were $84.9 million, including $54.5 million for injured habitats in the river channel, and $30.4 million for damages to floodplain wetlands.

In 2016, the Energy Facility Site Evaluation Council (EFSEC) received testimony from Robert Blackburn, Managing Principal of a company providing risk management and claim settlement solutions.[35] The testimony described the maximum foreseeable loss (MFL) of a catastrophic incident near Vancouver as a "rough estimate" of $5-6 billion. This was based on a facility handling 15 million gallons of Bakken crude or diluted bitumen oils per day, or four "High-Hazard Flammable Trains" (HFFT; freight trains carrying 20 or more tank cars of crude oil in one block). This estimate accounted for environmental damages to sensitive natural areas, as well as loss of human life, physical injury, and damages to high-value infrastructure.

### 4.2.5 Planning for crude oils (including Group 5)

Up-to-date preparedness for new types of oils is crucial to avoiding unexpected value losses due to an inability to locate and track the oil, longer duration spills, and reduced ability to recover and remediate. By including a crude oil planning standard (that includes Group 5, potentially sinking oils), explicitly in the adopted rule, Ecology is attempting to also increase preparedness for what are potentially high-cost oil spills from potentially sinking oils. This reduces the likelihood of a lack of sufficient and dedicated resources, as well as ensuring access to trained personnel for this special case class of oils.

[34] Abt Associates, Inc. (2016). Potential Fishing Impacts and Natural Resource Damages from Worst-Case Discharges of Oil on the Columbia River. Report in the Matter of Application No. 2013-01, Vancouver Energy Distribution Terminal, EFSEC Case Number 15-001. May 26, 2016.

[35] State of Washington Energy Facility Site Evaluation Council (2016). Case number 15-001. In the matter of: Application No. 2013-01. Tesoro Savage, LLC. Vancouver Energy Distribution Terminal. Prefiled testimony of Robert J. Blackburn, filed by the City of Vancouver.

## 4.3 Summary of Benefits

The adopted rule, through requirements that support more immediate, appropriate, and comprehensive response to spills from rail, support the following benefits:

- Reducing the degree or duration of impacts to human wellbeing, especially for over 3 million Washingtonians living near oil-by-rail corridors. Reduced impacts related to:
    - Health:
        - Fire
        - Explosions
        - Air quality
        - Toxic chemical exposure
        - Drinking water contamination
        - Subsistence or traditional food source contamination
    - Quality of life:
        - Evacuation
        - Property damage and contamination
- Reducing the degree of impacts to the environment, related to:
    - Surface water quality
    - Groundwater quality
    - Areas prone to wildfire
    - Fisheries
    - Shellfisheries
    - Bird populations
    - Animals, including sea mammals, consuming contaminated fish, shellfish
    - Endangered species
    - Recreational quality
    - Passive or non-use values for nature
    - Tribal resources and lifeways
    - Impacts to vulnerable multi-value systems, such as the Columbia River:
        - Water for human uses
        - Hydropower
        - Water transportation
        - Recreation valued at $50 million per year (Oregon side of Columbia River Gorge)
        - Commercial and tribal fisheries
        - Salmon and white sturgeon populations in stream

- Reducing the duration or degree of economic disruptions, related to:
    - Vessel delay
    - Business interest losses
    - Building damage from fire
    - Expansion of property contamination
    - Lost use of impacted facilities and roads. Example impacts from the 2016 Mosier derailment include, during cleanup:
        - Evacuation
        - Closure of wastewater treatment, resulting in shipping sewage to Hood River treatment
        - Closure of Interstate 84
    - Lost wages
    - Property damage, reduced property values, or increased insurance rates for properties near railways. Properties valued at:
        - $150 thousand to over $600 thousand in major cities in Washington
        - Million or multi-million dollar residential, commercial, and industrial properties along rail lines in Seattle, Tacoma, and Vancouver.
    - Marina oiling
    - Shellfish population impacts
    - Shellfish closures
    - Commercial fishing losses
    - Local spending reductions due to smoke or evacuation
    - Park revenue losses
    - Recreational boating revenue losses
    - Wildlife viewing and hunting lost spending
    - Lost tourist spending and income
    - Preparedness for response to crude oil (including potentially sinking Group 5 oil) spills
- Possible reduced costs associated with a worst-case spill. Example modeled worst-case spill costs on the Columbia River
    - $84.9 million in environmental restoration after a 20 thousand barrel spill of Bakken crude near Bonneville Dam.
    - $5-6 billion in environmental damages, lost human life, and physical injury.

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# Chapter 5: Cost-Benefit Comparison and Conclusions

## 5.1 Likely costs of the rule

The adopted rule, through requirements for contingency planning and supporting access to necessary equipment and personnel resources, is likely to impost the following costs over 20 years.

Table 8: Summary of 20-Year Present Value Costs

| Cost | | Low | High |
|---|---|---|---|
| Assuming internal plan development | Plan development | $34,664 | $52,872 |
| | Plan review | $136,974 | $154,712 |
| | PRC contracts | $72,624 | $225,941 |
| | **TOTAL** | **$244,262** | **$433,525** |
| Assuming contracted plan development | Plan development | $202,797 | $405,594 |
| | Plan review | $136,974 | $154,712 |
| | PRC contracts | $72,624 | $225,941 |
| | **TOTAL** | **$412,395** | **$786,247** |

## 5.2 Likely benefits of the rule

The adopted rule, through requirements that support more immediate, appropriate, and comprehensive response to spills from rail, support the following benefits:

- Reducing the degree or duration of impacts to human wellbeing, especially for over 3 million Washingtonians living near oil-by-rail corridors. Reduced impacts related to:
    - Health:
        - Fire
        - Explosions
        - Air quality
        - Toxic chemical exposure
        - Drinking water contamination
        - Subsistence or traditional food source contamination

    - Quality of life:
        - Evacuation
        - Property damage and contamination
- Reducing the degree of impacts to the environment, related to:
    - Surface water quality
    - Groundwater quality
    - Areas prone to wildfire
    - Fisheries
    - Shellfisheries
    - Bird populations
    - Animals, including sea mammals, consuming contaminated fish, shellfish
    - Endangered species
    - Recreational quality
    - Passive or non-use values for nature
    - Tribal resources and lifeways
    - Impacts to vulnerable multi-value systems, such as the Columbia River:
        - Water for human uses
        - Hydropower
        - Water transportation
        - Recreation valued at $50 million per year (Oregon side of Columbia River Gorge)
        - Commercial and tribal fisheries
        - Salmon and white sturgeon populations in stream
- Reducing the duration or degree of economic disruptions, related to:
    - Vessel delay
    - Business interest losses
    - Building damage from fire
    - Expansion of property contamination
    - Lost use of impacted facilities and roads. Example impacts from the 2016 Mosier derailment include, during cleanup:
        - Evacuation
        - Closure of wastewater treatment, resulting in shipping sewage to Hood River treatment
        - Closure of Interstate 84

    - Lost wages of approximately $28 per hour, on average, in Washington.
    - Property damage, reduced property values, or increased insurance rates for properties near railways. Properties valued at:
        - $150 thousand to over $600 thousand in major cities in Washington
        - Million or multi-million dollar residential, commercial, and industrial properties along rail lines in Seattle, Tacoma, and Vancouver.
    - Marina oiling
    - Shellfish population impacts
    - Shellfish closures
    - Commercial fishing losses
    - Local spending reductions due to smoke or evacuation
    - Park revenue losses
    - Recreational boating revenue losses
    - Wildlife viewing and hunting lost spending
    - Lost tourist spending and income
- Preparedness for response to crude oil (including potentially sinking Group 5 oil) spills
- Possible reductions to costs resulting from a worst-case spill. Example modeled worst-case spill costs on the Columbia River
    - $84.9 million in environmental restoration after a 20 thousand barrel spill of Bakken crude near Bonneville Dam.
    - $5-6 billion in environmental damages, lost human life, and physical injury.

## 5.3 Conclusion

After evaluating the likely costs and benefits of the rule, Ecology believes that the likely qualitative and quantitative benefits of the adopted rule exceed the likely costs. The compliance costs likely to be accrued by plan holders and PRCs are, over 20 years, likely less than the benefits of improved timeliness and efficiency of spill responses, and planning for spills in population-dense locations.

For comparative purposes:

- The highest total estimated 20-year costs are roughly equivalent to preparedness resulting in avoided complete losses of one high-value residential property near rail lines near urban areas of Washington, or seven of the lowest median value properties.
- Costs are also roughly equivalent to preventing partial damage or use loss to a multi-million dollar mixed-use property in south Seattle, or port areas of Tacoma.
- Based on modeled worst-case spills on the Columbia River, the highest 20-year cost is at most one percent of estimated environmental damages resulting from a single large derailment.
- Costs are also equivalent to 25 average full-time employees per year missing a week of work.

Ecology expects that increased preparedness and equipment availability – while not preventing spills – will reduce the degree to which spills of oil transported by rail affect the environment and people, reducing total costs of any given spill.

# Chapter 6: Least Burdensome Alternative Analysis

## 6.1 Introduction

Chapter 34.05.328(1)(d) requires Ecology to "…[d]etermine, after considering alternative versions of the rule and the analysis required [the APA] that the rule being adopted is the least burdensome alternative for those required to comply with it that will achieve the general goals and specific objectives [of the authorizing statute]." In other words, Ecology is required to determine that the contents of the adopted rule are the least burdensome set of requirements that still achieve the goals and objectives of the authorizing statute.

Ecology assessed alternatives to elements of the adopted rule, and determined whether they met the goals and objectives of the authorizing statute. Of those that would meet these objectives, Ecology determined whether the adopted rule requirements were the least burdensome.

## 6.2 Goals and objectives

The authorizing statute, Chapter 90.56 RCW states:

> In order to establish a comprehensive prevention and response program to protect Washington's waters and natural resources from spills of oil, it is the purpose of this chapter:
> a) To establish state agency expertise in marine safety and to centralize state activities in spill prevention and response activities;
> b) To prevent spills of oil and to promote programs that reduce the risk of both catastrophic and small chronic spills;
> c) To ensure that responsible parties are liable, and have the resources and ability, to respond to spills and provide compensation for all costs and damages;
> d) To provide for state spill response and wildlife rescue planning and implementation;
> e) To support and complement the federal oil pollution act of 1990 and other federal law, especially those provisions relating to the national contingency plan for cleanup of oil spills and discharges, including provisions relating to the responsibilities of state agencies designated as natural resource trustees. The legislature intends this chapter to be interpreted and implemented in a manner consistent with federal law;
> f) To provide broad powers of regulation to the department of ecology relating to spill prevention and response;
> g) To provide for independent review on an ongoing basis the adequacy of oil spill prevention, preparedness, and response activities in this state;
> h) To provide an adequate funding source for state response and prevention programs; and

i) To maintain the best achievable protection that can be obtained through the use of the best achievable technology and those staffing levels, training procedures, and operational methods that provide the greatest degree of protection achievable.

And the particular section concerning contingency plans, RCW 90.56.210, lists specific objectives as discussed in section 2.2.1 of this document.

# 6.3 Alternatives considered

## 6.3.1 No rulemaking status quo

Not having a rule would be less burdensome, but would not be allowed under the authorizing statute. Nor would it provide Washington's communities and the environment with protection from the damages of oil spills along rail corridors.

## 6.3.2 Excluding federal plans

Ecology considered excluding compliant federal plans from consideration as state plans, but determined that if federal plans met the requirements of the adopted rule (and therefore the statute), they could be submitted in lieu of a separate plan. This reduces burden on covered entities, while maintaining the required level of preparedness.

## 6.3.3 Individual plans for each rail carrier

Ecology considered requiring each rail carrier to provide its own contingency plan, but determined that the goals of the statute could be met while allowing for integrated plans covering multiple rail carriers, and reduced burden.

## 6.3.4 No phase in

Ecology considered requiring all elements of the adopted rule to be met on its effective date, but determined this would be unnecessarily more burdensome while providing limited additional protection as covered parties would likely take time to acquire access to resources meeting the adopted planning standards.

## 6.3.5 Limited acceptability of drills

Ecology considered excluding out-of-state drills and disallowing combined drills, but determined that this would impose more burden while not necessarily providing additional preparedness for appropriately responding to spills.

## 6.3.6 Expand the number of equipment planning points along rail corridors and increase the caps in the equipment planning standard

Ecology considered including more railroad equipment planning points along rail corridors and higher caps in the equipment planning standard which could have increased the amount of equipment needed to comply with these regulations. Ecology determined that this would be unnecessarily burdensome while providing limited additional preparedness for appropriately responding to spills.

### 6.3.7 No or limited boilerplate option

Ecology considered requiring all rail plan holders to develop their own format for contingency planning, but determined that this may be more burdensome, particularly for smaller railroads exclusively carrying biological oils. Ecology plans to develop a boilerplate plan as an option for all rail plan holders. The version of the rule proposed in April 2016 allowed for this option only for railroads exclusively transporting biological oils, but during the comment period, Ecology identified that a boilerplate option would reduce burden to all railroads without affecting preparedness.

### 6.3.8 Single Method to Calculate Worst Case Spill Volume

In the rule proposed in April 2016, Ecology allowed only one calculation for Worst Case Spill Volume (WCSV). During the public comment period, it became apparent that stakeholders supported alternative calculations of WCSV. Because it is allowed under the authorizing statute, the adopted rule allows railroads to submit alternative calculations for Ecology's consideration. This allows prospective flexibility, allowing railroads to submit alternative calculations that retain the required degree of preparedness (therefore acceptable to Ecology) and thus reduce burden for railroads.

## 6.4 Conclusion

After considering alternatives to the adopted rule contents, as well as the goals and objectives of the authorizing law, Ecology determined that the adopted rule represents the least burdensome requirements meeting those goals.

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# References


Abt Associates, Inc. (2016). Potential Fishing Impacts and Natural Resource Damages from Worst-Case Discharges of Oil on the Columbia River. Report in the Matter of Application No. 2013-01, Vancouver Energy Distribution Terminal, EFSEC Case Number 15-001. May 26, 2016.

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# Appendix A – Requirement Comparisons and Cost Assumptions

The table below summarizes requirements in the rule and associated implementation cost estimates used to complete analyses in this document.

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| **External Costs (as applicable)** | | | | | | | | | |
| **Contracted contingency plan plus associated in-house inputs** | n/a | Overall plan includes all individual plan require-ments | Federal plan as described below may be submitted as state plan if they meet the re-quirement | $22,533 (see survey re-sponses from 2003) | $45,066 (see survey responses from 2003) | 1 consultant contract | Up to 9 (5 have federal plan they may submit) | **$202,797** | **$405,594** |
| **PRC contract** | n/a | Overall contract including access to planning standard and trained resources | n/a | $450 (low annual rate for WSMC with access to MSRC re-sources) | $1,400 (high annual rate for WSMC with access to MSRC resources) | 1 plan per railroad (from one of 14 approved PRCs) | 9 | **$72,624** | **$225,941** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| **PRC additional equipment purchase for locations lacking nearby access** | | | | | | qualitative | n/a | **qualitative** | **qualitative** |
| **Contingency Plan** | | | | | | | | | |
| Plan submittal | n/a | 2 physical or 1 electronic; may submit existing plan for federal or another state; Rail carrying crude have 90 days; Non-crude has 180 days. | n/a | minimal | minimal | minimal | Up to 9 (5 have federal plan they may submit) | **minimal** | **minimal** |
| Plan review, update | At least 5-year review and updating | 5-year review and updating | n/a | $5,698 (based on average sur-veyed | $77.81 (based on $41.51 2014 for WA environ-mental | 40 hours for the 5 year. up to 8 hours at the annual | Up to 9 | **$136,974** | **$154,712** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | | | | cost updated to 2016 using CPI) | engineer updated to 2016 using a 1.000760341 BLS CPI multiplier, and with added 35.5% benefits and overhead that is 26.1% of wage and benefits) | | | | |
| Plan contents | n/a | binding agreement | Set forth the manner of response to a discharge; Account for maximum potential discharge; Identify appropriat | Part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environmental engineer updated to 2016 using a 1.000760341 BLS CPI multiplier, and with | minimal | Up to 9 | **minimal** | **minimal** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | | | e persons and agencies, phone numbers to be contacted | | added 35.5% benefits and overhead that is 26.1% of wage and benefits) | | | | |
| | Implied identifica-tion of plan holder | Name, location, type, address | | Part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environmental engineer updated to 2016 using a 1.000760341 BLS CPI multiplier, and with added 35.5% benefits and overhead that is 26.1% of wage and benefits) | minimal | Up to 9 | **minimal** | **minimal** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | Be designed with personnel, materials, equip-ment to remove oil and minimize damage to the environ-ment from worst case spill | Size of worst case spill volume | | n/a -- no change from baseline (statute) | | | | | |
| | n/a | Log sheet for changes | | Part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environmental engineer updated to 2016 using a 1.00076034 1 BLS CPI multiplier, and with | 0.5 hours | Up to 9 | **$350** | **$350** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | added 35.5% benefits and overhead that is 26.1% of wage and benefits) | | | | |
| | n/a | List and map routes and operations, plus above ground tank capacity if exceeds 1,320 gallons | | Part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environ-mental engineer updated to 2016 using a 1.00076034 1 BLS CPI multiplier, and with added 35.5% benefits and overhead that is 26.1% of | 6 hours | Up to 9 | **$4,202** | **$4,202** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | wage and benefits) | | | | |
| | n/a | List oil cargo, origin, type, safety information | | Part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environ-mental engineer updated to 2016 using a 1.00076034 1 BLS CPI multiplier, and with added 35.5% benefits and overhead that is 26.1% of wage and benefits) | 4 hours | Up to 9 | **$2,801** | **$2,801** |
| | State number, training, prepared-ness, and | PRC contract | | Part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environment | 18 - 32 hours | Up to 9 | **$12,605** | **$22,409** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | fitness of personnel. Provide agree-ments for equip-ment and personnel. Provide agree-ments for enlisting use of trained personnel. Amount, type, and locations of equip-ment. | | | | al engineer updated to 2016 using a 1.00076034 1 BLS CPI multiplier, and with added 35.5% benefits and overhead that is 26.1% of wage and benefits) | | | | |
| | Clear, precise, and detailed descriptio n of how plan relates to existing c- | Mutual aid agreements | | minimal | minimal | minimal | Up to 9 | **minimal** | **minimal** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | plans. Amount, type, and locations of equip-ment. | | | | | | | | |
| | State number, training, preparedn ess, and fitness of personnel. | Spill team org chart | | minimal | minimal | minimal | Up to 9 | **minimal** | **minimal** |
| | State number, training, prepared-ness, and fitness of personnel. | Org. list of staff | | minimal | minimal | minimal | Up to 9 | **minimal** | **minimal** |
| | Full response method details | Description of planning process | | n/a - no change from baseline (statute and federal) | | | | | |
| | State number, training, prepared-ness, and | Description of training | | n/a -- no change from baseline (statute) | | | | | |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | fitness of personnel. Periodic training and drill programs. | | | | | | | | |
| | Full response method details | List notification names and numbers | | minimal | minimal | minimal | Up to 9 | **minimal** | **minimal** |
| | Full response method details | Identify central reporting office | | minimal | minimal | minimal | Up to 9 | **minimal** | **minimal** |
| | Full response method details | Form to document notifications | | Part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environmental engineer updated to 2016 using a 1.00076034 1 BLS CPI multiplier, and with added 35.5% | 1 to 4 hours | Up to 9 | **$700** | **$2,801** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | benefits and overhead that is 26.1% of wage and benefits) | | | | |
| | Full response method details. Provide for disposal of recovered oil. | Procedures to track recovery volume and disposal volume | | Part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environ-mental engineer updated to 2016 using a 1.00076034 1 BLS CPI multiplier, and with added 35.5% benefits and overhead that is 26.1% of wage and benefits) | 4 hours | Up to 9 | **$2,801** | **$2,801** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | Full response method details | Assessment methods of spill (product, volume, environment, safety) | | Part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environmental engineer updated to 2016 using a 1.000760341 BLS CPI multiplier, and with added 35.5% benefits and overhead that is 26.1% of wage and benefits) | 4 hours | Up to 9 | **$2,801** | **$2,801** |
| | Full response method details | Documenta-tion of spills | | Part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environmental engineer updated to 2016 using | 1 to 4 hours | Up to 9 | **$700** | **$2,801** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | a 1.000760341 BLS CPI multiplier, and with added 35.5% benefits and overhead that is 26.1% of wage and benefits) | | | | |
| | n/a | Checklist of response steps | | Part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environmental engineer updated to 2016 using a 1.000760341 BLS CPI multiplier, and with added 35.5% benefits and | 1 hour | Up to 9 | **$700** | **$700** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | overhead that is 26.1% of wage and benefits) | | | | |
| | Full response method details | Methods to assess groundwater impact | | Part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environ-mental engineer updated to 2016 using a 1.00076034 1 BLS CPI multiplier, and with added 35.5% benefits and overhead that is 26.1% of wage and benefits) | 4 hours to identify known locations of shallow ground-water; hire contractor at high end | Up to 9 | **$2,801** | **see consultant costs** |
| | Pro-cedures | Procedures for | | n/a -- no change from baseline (statute) | | | | | |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | for managing public and private claims | managing liability | | | | | | | |
| | Means of protecting and mitigating effects on environ-ment. | How environmental protection will be achieved | | n/a -- no change from baseline (statute) | | | | | |
| | Describe surround-ing en-vironment | Describe surrounding area | | n/a -- no change from baseline (statute) | | | | | |
| | n/a | Identify potential command posts | | Part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environ-mental engineer updated to 2016 using a 1.00076034 1 BLS CPI multiplier, | 1 - 8 hours | Up to 9 | **$700** | **$5,602** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | and with added 35.5% benefits and overhead that is 26.1% of wage and benefits) | | | | |
| | n/a | Description of how holder meets planning standard | | part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environ-mental engineer updated to 2016 using a 1.00076034 1 BLS CPI multiplier, and with added 35.5% benefits and overhead that is 26.1% of | 1-4 hours | Up to 9 | **$700** | **$2,801** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | wage and benefits) | | | | |
| Field document | n/a | Field document containing subset of overall c-plan | n/a | Part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environ-mental engineer updated to 2016 using a 1.00076034 1 BLS CPI multiplier, and with added 35.5% benefits and overhead that is 26.1% of wage and benefits) | 4 hours | 9 | **$2,801** | **$2,801** |
| Equipment maintenance records | n/a | Keep 5 years | n/a | Part of con-sultant contract | $77.81 (based on $41.51 2014 for WA environ- | minimal | 9 | **minimal** | **minimal** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | mental engineer updated to 2016 using a 1.000760341 BLS CPI multiplier, and with added 35.5% benefits and overhead that is 26.1% of wage and benefits) | | | | |
| **Planning Standards** | | | | | | | | | |
| 6-hour (210 road mile) | n/a | 5,000' boom | n/a | part of PRC contract | n/a | n/a | 9 | **see PRC contract** | **see PRC contract** |
| | n/a | safety assessment | n/a | part of PRC contract | n/a | n/a | 9 | **see PRC contract** | **see PRC contract** |
| | n/a | Min recovery: 0.1*WCSV or 4,100 barrels | n/a | part of PRC contract | n/a | for top WCSV, lesser is 4,100 | 9 | **see PRC contract** | **see PRC contract** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | n/a | ERDC storage | n/a | part of PRC contract | n/a | 4,100 | 9 | **see PRC contract** | **see PRC contract** |
| 12-hour (420 road mile) | n/a | 20,000' boom | n/a | part of PRC contract | n/a | n/a | 9 | **see PRC contract** | **see PRC contract** |
| | n/a | Min recovery: 0.15*WCSV or 12,000 barrels | n/a | part of PRC contract | n/a | for top WCSV, lesser is 11,820 | 9 | **see PRC contract** | **see PRC contract** |
| | n/a | 1.5*ERDC storage | n/a | part of PRC contract | n/a | 17,730 | 9 | **see PRC contract** | **see PRC contract** |
| | n/a | Crude oil must also have sonar, sampling equipment, boom, sorbent, silt curtains, dredges, pumps, impact assessment equipment, etc. to locate and recover | n/a | part of PRC contract | qualitative | qualitative | unknown | **see PRC contract** | **see PRC contract** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | | sinking or suspended oils | | | | | | | |
| 24-hour (840 road mile) | n/a | boom as necessary | n/a | part of PRC contract | qualitative | qualitative | 9 | **see PRC contract** | **see PRC contract** |
| | n/a | Min recovery: 0.2*WCSV or 16,000 barrels | n/a | part of PRC contract | n/a | For top WCSV, lesser is 15,760 | 9 | **see PRC contract** | **see PRC contract** |
| | n/a | 2*ERDC storage | n/a | part of PRC contract | n/a | 31,520 | 9 | **see PRC contract** | **see PRC contract** |
| 48-hour (1680 road mile) | n/a | boom as necessary | n/a | part of PRC contract | qualitative | qualitative | 9 | **see PRC contract** | **see PRC contract** |
| | n/a | Min recovery: 0.25*WCSV or 20,000 barrels | n/a | part of PRC contract | n/a | for top WCSV, lesser is 19,700 | 9 | **see PRC contract** | **see PRC contract** |
| | n/a | Storage as necessary | n/a | part of PRC contract | n/a | qualitative | 9 | **see PRC contract** | **see PRC contract** |
| Timing of meeting equipment | n/a | 18 months; | n/a | n/a | | | 2 to 9, | **n/a** | **n/a** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| planning standards | | | | | | | | | |
| In-situ burning: 12-hour (420 road mile) | n/a | Fire booms, air monitoring, foam , igniters, aircraft, vessels | n/a | Part of PRC contract | n/a | < 31,520 | 9 | **see PRC contract** | **see PRC contract** |
| Shoreline cleanup: 24-hour (840 road mile) | n/a | Equipment and personnel | n/a | Part of PRC contract | n/a | n/a | 9 | **see PRC contract** | **see PRC contract** |
| Protection of responders, public | n/a | Narrative, listing plans and resources, air monitoring, federal/state/ local resources | n/a | Part of con-sultant contract | n/a | n/a | 9 | **see PRC contract** | **see PRC contract** |
| Wildlife protection: 24-hour (840 road mile) | n/a | Equipment, personnel, resource strategies | n/a | Part of PRC contract | n/a | n/a | 9 | **see PRC contract** | **see PRC contract** |
| Documentation of planning standards | n/a | Spread-sheet of boom, recovery, | n/a | Part of PRC contract | n/a | n/a | 9 | **see PRC contract** | **see PRC contract** |

| Requirement Type | Auth. statute: RCW 90.56.210 | Adopted Rule | Federal Plan (basic) | Unit Cost Bound | Unit Cost Bound | Number of Units | No. of Rail-roads | 20-year Present Value Cost – High | 20-year Present Value Cost – High |
|---|---|---|---|---|---|---|---|---|---|
| | | storage, personnel by type, quality, home base, provider | | | | | | | |
| **Drills** | | | | | | | | | |
| Tabletop | n/a | 1 per year | n/a | Part of PRC contract | n/a | n/a | 9 | **see PRC contract** | **see PRC contract** |
| Deployment | n/a | 2 per year (may be multi-objective) | n/a | part of PRC contract | n/a | n/a | 9 | **see PRC contract** | **see PRC contract** |
| Un-announced | n/a | as necessary | n/a | part of PRC contract | qualitative | qualitative | 9 | **see PRC contract** | **see PRC contract** |
| Wildlife deployment | n/a | 1 per 3 years (may be part of large multi-objective drill) | n/a | part of PRC contract | qualitative | qualitative | 9 | **see PRC contract** | **see PRC contract** |